DIGITAL GLASGOW

GLASGOW

DIGITAL
GLASGOW
STRATEGY

FOREWORD

In recent decades, digital technology has changed the way we live, the way we work and the way our cities are run. And we know that as the pace of technological change accelerates exponentially, the implications for Glasgow's economy and public services will only increase.

The Digital Glasgow Strategy sets out Glasgow's plans to embrace the opportunities of the digital age, and acknowledges too the challenges we face as a city as a result of the disruption technology can bring to our economy.

Like previous industrial revolutions, the Digital Revolution will help drive economic growth and opportunity, and Glasgow must be ready to embrace the transformative potential of digital. But we must also ensure all Glaswegians can benefit from this opportunity, and take action to support workers, businesses and citizens across the city to fully participate and succeed in a digital world.

We must build, too, on Glasgow's existing strengths in digital and innovation, and strive to be recognised as a leader in our efforts to use technology to improve our public services and the way the city works for its people.

This is a broad and comprehensive strategy, developed in partnership with key stakeholders from across the public, private, third and academic sectors in the city. It is a strategy for Glasgow, not just the City Council, and the collective efforts of the partners involved in Digital Glasgow will be central to realising the city's potential.
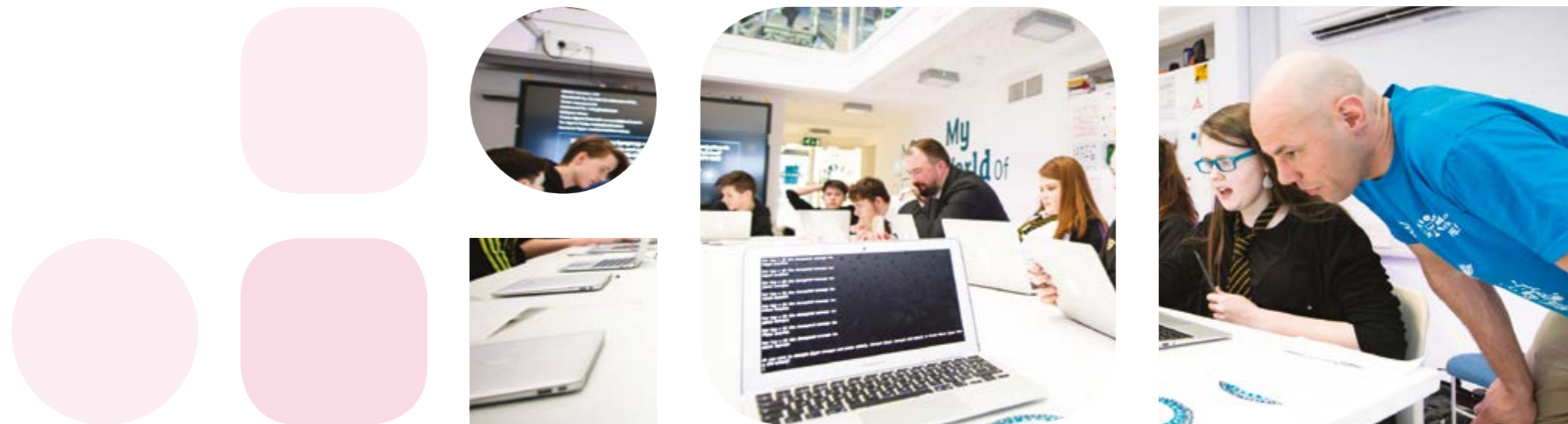
I would like to thank all of our partner organisations for their important contributions and continued collaboration, as well as the members of the council's Digital Glasgow Board for their oversight and support in guiding this strategy's development.

This document represents Glasgow's statement of intent – an ambitious vision for a city where digital drives inclusive economic growth, transforms our public services and improves our citizens' quality of life. I look forward to working with partners across Glasgow as we act to make this vision a reality.
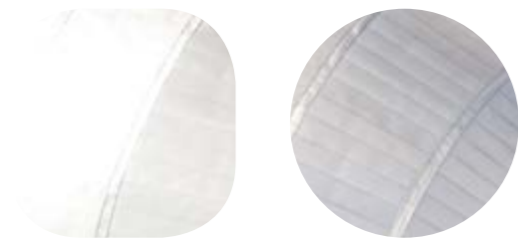
CLLR ANGUS MILLAR
Depute City Convenor for Economic Growth
Chair, Digital Glasgow Board

CONTENTS

SUMMARY

This strategy sets out our priorities and commitments to developing Glasgow's digital economy and transforming our public services through the use of digital technology. The strategy represents a step change in our approach to digital technology, and it has been developed in collaboration with a broad range of partners from across the public, private, third, and academic sectors. It is a bold, ambitious, and comprehensive plan that recognises the extraordinary opportunity that digital technology provides to our city, but also the challenges that we all face as a consequence of the rapidly evolving digital world we live in.

Recent global trends associated with digital technology have led to a new era. It is being heralded as a new revolution (the "fourth industrial revolution") and that is how we plan to treat it. This new era is less about online shopping, online services, and social media, and more about everyday objects being connected to the internet (the so-called "Internet of Things"), artificial intelligence, automation, and robotics, and is fuelled by data, and a new wave of innovation across many sectors.

Like the industrial revolutions of the past, it will provide us with an unprecedented opportunity to develop our economy, to improve quality of life, and to truly transform our services. At the same time however, we need to ensure that these opportunities are available to everybody within the city, and we need to ensure that the city's businesses and the city's workforce are prepared for the changes ahead.

OUR STRENGTHS

We are excited by this prospect. Glasgow is no stranger to economic change and our diverse economy thrives on scientific and engineering endeavour and excellence. Our city's strengths mean we are well-placed to embrace the opportunity:

- Our digital sector is our fastest growing economic sector, and is the largest digital economy in Scotland (in terms of Gross Value-Added, GVA) according to TechNation.

- Our digital sector is not a standalone tech cluster of digital businesses, but a diverse and overlapping sector with digital jobs underpinning many of Glasgow's other sectors.

- Our city is home to three of Scotland's largest and most prestigious universities, the world-renowned Glasgow School of Art, and home to the three largest colleges in Scotland.

- With 43% of Scotland's population within the Glasgow metropolitan area and a student population of 130,000, Glasgow provides access to some of the best talent in the country.

- 50% of Scotland's students in electronics, mechanics and software are in Glasgow.

- We are ranked No. 1 within the UK's core cities for producing the highest number of digital technology students and graduates.

- We have become recognised globally for our smart city achievements through our Innovate UK Future Cities Demonstrator and subsequent smart city programmes such as our Horizon 2020 smart street project and our smart canal project.

- We have a critical mass of expertise, passion and innovation in the city and are creating two innovation districts within the city centre and in the west end.

OUR CHALLENGES

With so much capability, talent and experience within the city we are delighted to set out a bold and ambitious digital strategy for our economy and for transforming our public services. But this strategy also recognises that we need to remain vigilant. Access to digital technology can improve quality of life, financial inclusion, health and wellbeing, employability and civic participation. But not everybody in the city currently has access to it, nor do they have the skills to truly embrace its potential. Being digitally excluded can exacerbate social and economic exclusion and tackling the digital divide must be a key priority for Glasgow.

We also recognise and acknowledge that digital is having a disruptive influence across global economic markets. We have seen markets such as retail, tourism, transport, and media experience upheaval as new "tech" companies have entered their markets with novel business models and innovative new digital products and services that have displaced established businesses. In some cases, major household brands have been consigned to the history books. This is a trend that is likely to continue and affect other sectors in similar ways, bringing with it new levels of task automation, and therefore impacting upon the future of work.

Despite the growth in our digital economy, we have also seen a decline in the number of people working in digital businesses and a levelling out of digital business turnover. Despite the talent available within the city, we also rank 5th for digital jobs in the UK, behind Leeds, Edinburgh, Birmingham & Manchester.

OUR VISION

We therefore set out our vision for Glasgow to be:

> "A world class city with a thriving digital economy and community, where everyone can flourish and benefit from the best digital connectivity and skills, where technology is used to improve everyone's quality of life, drive businesses' innovation and service design and improve our city, its neighbourhoods and its success."

Underpinning this vision we set out two principal aims, supported by a set of goals that each defines the outcomes that we all want to achieve, and some of the key actions that we all commit to undertaking.

OUR PLAN

OUR FIRST AIM

"We want businesses across all of our sectors to realise the potential that digital provides, to stimulate innovation, and to establish Glasgow's tech sector as a **top 20 global digital economy**"

The actions we will take to realise this aim include:

DIGITAL BUSINESS

We will seek to attract new digital tech conferences and events to the city to act as a catalyst for inspiration, and to showcase Glasgow on a global scale.

We will undertake a review of the potential impact of digital on Glasgow's key sectors and develop case studies to promote digital innovation across the key sectors.

We will commission a review of the tech cluster to identify opportunities to better support and

grow the community, and we will work with the sector and partners to implement the findings of the review.

We will position digital as a key theme for our new Innovation Districts and work collaboratively with organisations such as innovation centres.

We will establish a new campaign to promote Glasgow's digital sectors, including an inward investment proposition to better promote Glasgow's achievements and ambition.

DIGITAL SKILLS AND EMPLOYMENT

We will establish a new industry partnership to provide a single and coordinated approach for employers to engage with the development and delivery of digital skills education.

We will establish a new campaign to promote the quality and diversity of digital careers in Glasgow.

We will establish a city-wide digital skills research programme which will include commissioning a review of current digital technology skills gaps, and research into the future skills needs of Glasgow's economy.

DIGITAL INCLUSION AND PARTICIPATION

We will work in partnership across all sectors in the city to deliver the pledges of Scotland's Digital Participation Charter, developing a more joined-up approach to helping our residents to use technology to participate in social, economic, and civic life.

We will deliver a targeted Digital Inclusion

programme that ensures that everybody who needs access to Universal Credit has the necessary digital skills to apply.

We will encourage and support companies to actively support digital inclusion and participation initiatives through training programmes.

DIGITAL CONNECTIVITY

We will establish a new partnership which will invest, build and manage a shared digital communications infrastructure in order to accelerate investment in 5G and fibre connectivity and address so-called "not spots" in the city.

We will undertake a programme of "Barrier Busting" to make it easier for telecommunications providers to engage with us to accelerate the deployment of digital connectivity.

OUR SECOND AIM

"We want Glasgow to be recognised as **one of the most pioneering and innovative smart cities in the world**, and we want to apply this innovation to transforming our public services."

The actions we will take to realise this aim include:

DIGITAL AND SMART SERVICES

DIGITAL CUSTOMER EXPERIENCE
We will increase the number of transactions that can be completed online, and work to improve the online transaction experience.

We will look to make better use of data to remove the need to apply for grants and services where citizens may be automatically entitled.

DIGITAL HEALTH AND CARE
We will work with NHS Greater Glasgow and Clyde to provide seamless access to digital services across health and social care services and provide better integration between health and care services.

We will explore opportunities to expand the use of digital engagement tools which allow people to have video calls with health and care professionals.

We will migrate our telecare service to digital technology and will provide opportunities for innovation in advanced digital telecare services and data analytics that can help people to live independent lives.

DIGITAL LEARNING AND TEACHING
We will provide access to over 50,000 Apple iPads to every child from P6 and above (the largest deployment of its kind in the world), expand the availability of Wi-Fi across classrooms, and upgrade the digital connectivity provided to schools to (up to) 100 x faster than it is currently.

We will place digital leadership at the heart of School Improvement Plans and will undertake an extensive digital leadership development and professional development programme for school staff.

We will work with partners to launch a new "Parent Portal" which will provide access to digital services and information for parents.

DIGITAL PLANNING
We will develop a 3D strategy including plans to enable 3D planning application submissions and the development of an intelligent 3D City Model for use across a range of public services in the city.

We will publish the 3D City model as ope data and seek opportunities to stimulate open innovation.

SMART CITY MANAGEMENT
We will expand the use of the Glasgow Operations Centre for coordinating other city services.

We will scale up our smart city infrastructure such as Intelligent Street Lighting (to 22,000 street lights), Smart Bins, and sensors across the city. We will continue to attract and deliver smart city innovation projects such as our current Horizon 2020 "RUGGEDISED Smart Street" project and our pioneering Smart Canal project.

We will provide greater opportunities for SMEs to innovate with smart city infrastructure by creating a "living lab" environment.

DIGITAL TOURISM AND HERITAGE
We will use digital technology to enrich the visitor experience in our venues and attractions to improve interpretation and enhance access to programmes and collections.

We will use digital technology to enrich the visitor experience within the built environment of the city, for example using digital wayfinding to ensure visitors have the confidence to explore when they are here.

We will use digital technology to develop digital channels to share inspiring content to encourage visitors to come to the city and make the most of their time when here.

OUR PLAN – CONTINUED

OUR SECOND AIM – CONTINUED

DIGITAL COMMUNITY ENGAGEMENT AND EMPOWERMENT

We will work with communities to design a new digital service that will provide communities with better access to information about their area.

We will expand upon our use of digital consultation tools to consult the people of

Glasgow in our decisions (for example budget consultations, and other consultations) and introduce a new digital service that allows people to vote on local community matters, helping maximise participation in Participatory Budgeting as it is deployed within the city.

DIGITAL LEADERSHIP

We will deliver a digital awareness programme for our elected members, senior officers, and partners in collaboration with the Digital Office for Scottish Local Government.

We will establish a new "ways of working" programme to implement new transformation methodologies such as agile development,

service design, and open innovation. This will be delivered in partnership with the Digital Office for Scottish Local Government.

We will establish a digital skills programme which we will deliver in partnership with the Digital Office for Scottish Local Government.

DIGITAL FOUNDATIONS

TECHNOLOGY FOUNDATIONS
We will upgrade the capacity of the corporate and school networks and will expand the corporate and schools WiFi networks.

We will ensure our staff have modern devices and will introduce new technologies to support better collaboration and modern work styles.

We will ensure our data and our infrastructure platforms are secured to industry leading security standards.

We will strive to consolidate current disparate business applications into more common and reusable technology platforms.

We will work with partners across the city to make our technology platforms more interoperable and open and create a City Software Development Kit (SDK) that we will make available to staff and 3rd party developers.

DATA FOUNDATIONS
We will build on the foundation of GDPR by developing a data ethics framework to ensure that our use of data to transform services is done in a way that respects privacy, rights, and ethics.

We will develop online services that helps to put citizens in control of the data that is collected about them by allowing them to see how their data is used, and where it is applicable, can control consent.

We will increase the number of open data sets that we publish and expand the use of our City Data Platform in order to provide a scalable platform for publishing open data, and providing meaningful visualisations of data through maps and dashboards.

We will build communities of interest for data, and will facilitate engagement with city data through open innovation challenges.

OUR CITY

Glasgow is Scotland's largest city, with just over 620,000 citizens. It is a city with a great history and heritage built around the River Clyde and on the strength of its people, their pride in the city, their spirit and diversity. We are the centre of the only metropolitan area in Scotland, one of the most successful in the UK, and Scotland's most ethnically diverse city.

We are the economic powerhouse of Scotland and the fastest growing major city economy in terms of productivity in the UK, outside London. We are the academic heart of the country and home to over 130,000 further and higher education students from 135 countries. Around 200,000 people, almost 50% of the workforce in the city is educated to degree level, significantly above most cities in the UK. Educational attainment is improving year on year, employment is rising, the business base is increasing and the city was recently (in 2016) the European Entrepreneurial Region of the year.

Glasgow is one of the world's top five sporting cities with a reputation for hosting major events. This year we co-hosted, with Berlin, the European Sports Championships, and Hampden is one of the venues for the 2020 European Championships. We have a vibrant arts scene and we are the UK's first UNESCO City of Music, hosting major events such as the MTV Europe Awards, Celtic Connections and the MOBOs.

We remain, however, a city of contrasts. Parts of the city still suffer from unacceptable levels of poverty and inequality and too many Glaswegians still don't share in our city's prosperity. One in three of our children live in poverty after factoring in housing costs. We have significant long term health challenges which stop many citizens from reaching their full potential. We have a highly skilled workforce, yet many people living in Glasgow do not have the required skills to help them access work.

The Glasgow City Council Strategic Plan sets out a vision for Glasgow to be:

> "A world class city with a thriving, inclusive economy where everyone can flourish and benefit from the city's success, and sets out a clear priority to reduce inequality across Glasgow by creating inclusive growth – a thriving economy that we can demonstrate benefits the city, its citizens and businesses."

The Strategic Plan is structured within seven key strategic priorities:

1. A Thriving Economy
2. A Vibrant City
3. A Healthier City
4. Excellent and Inclusive Education
5. A Sustainable and Low Carbon City
6. Resilient and Empowered Neighbourhoods
7. A Well Governed City that Listens and Responds

Glasgow has the fastest growing major city economy in the UK with a diverse business and industry base and a highly skilled population. Our Glasgow Economic Strategy sets out an ambition for Glasgow to be the most productive city in the UK by:

1. Encouraging innovation,
2. Growing our business base,
3. Better linking skills provision with the needs of the economy,
4. Tackling longstanding health issues.

UNDERSTANDING THE DIGITAL REVOLUTION

We are living in a world where digital technology is evolving at an exponential rate. This means that the rate at which we experience technological change is constantly accelerating.

Since the dawn of computers in the 1950's the processing power that can be achieved from silicon chips has doubled every eighteen months. This has resulted in an ever increasing miniaturisation and sophistication of computing from the early "mainframe" systems through to desktop personal computers, through to tablets, to smart phones that are now more powerful than the computer that put a man on the moon.

In fact, computer processing is now so miniature that it is becoming increasingly embedded within everyday products such as smart thermostats, smart lightbulbs and so on, all of which can be connected (and controlled) globally using the internet (a concept called the "Internet of Things").

Intrinsically linked to the accelerating pace of technology is a corresponding growth in the volume of data that is created. The volume of information that has been generated in just the last two years exceeds the volume that has been created in the entirety of prior history. We've reached a tipping point.

Digital technology doesn't just sit on a desk anymore. It is no longer a back office consideration. The physical world and the digital world are becoming increasingly inter-twined and central to everyday life bringing social, economic, and environmental benefits.

From digital TVs, washing machines, cameras to smart cities technology such as intelligent street lighting and smart bins, to Amazon Alexa; it is all around us, and it is intelligent. Digital technology is now so advanced that the role of machines is no longer just limited to physical or "computational" tasks (that is, undertaking basic functional tasks), but through "artificial intelligence" technology can now learn and it can think and automate cognitive tasks.

Already, this is resulting in technology that would have been considered science fiction only a few years ago becoming reality in a very short space of time.

THIS IS A REVOLUTION

It is expected that the digital revolution (sometimes referred to as the "fourth industrial revolution") will be of a scale we've never experienced before. It will provide almost endless transformative opportunities, but will also present many challenges to both our society and economy.

ACKNOWLEDGING THE CHALLENGES

Glasgow's economic strategy pays particular attention to increasing productivity to increase income and living standards and tackle the endemic health and skills issues which contribute to inequality in the city.

Glasgow has a diverse set of key sectors that drive the city's economic growth. We are no longer dependent on a single sector. This has increased the city's resilience, which is a major key policy area of interest for cities across Scotland, the UK and globally. Resilience relates to the preparedness of cities and their people to survive and thrive in the face of both immediate disruptive shocks (such as a major incident) and broader, long term stresses such as demographic change.

Glasgow was one of the first cities in the world to be awarded membership of the Rockefeller Foundation's global **100 Resilient Cities (100RC)** network in 2013. Glasgow's resilience strategy has a strong people focus. The key message is that a more resilient Glasgow will be built from a fairer and more socially just Glasgow.

The digital revolution will provide many transformative benefits to Glasgow's businesses and its residents, but we need to embrace this opportunity in a way that is fair and socially just, and, in line with our resilience strategy, we need to proactively manage any stress that it might place onto our economy, productivity, skills and society.

DIGITAL DISRUPTION AND ITS IMPACT ON THE ECONOMY

Digital is having a disruptive influence across global economic markets. We have seen markets such as retail, tourism, transport, and media experience upheaval as new "tech" companies have entered their markets with novel business models and innovative new digital products and services that have displaced established businesses. In some cases, major household brands have gone altogether.

This is a trend that is likely to continue and affect other sectors in similar ways as digital evolves and becomes more and more embedded within everyday objects and becomes more intelligent. Already Artificial Intelligence is being applied within the health, finance, legal and insurance sectors. For example, some innovative companies can already now help people to navigate insurance quotations by speaking to Amazon Alexa rather than completing forms or speaking to a customer agent.

THE IMPORTANCE OF DIGITAL FOR BUSINESS SURVIVABILITY AND GROWTH

The degree to which businesses make use of digital to promote and market themselves, ensure they are safe and secure online, comply with data protection regulations, and engage with their staff, partners, and customers, is becoming a critical factor in their ability to survive and/or grow. Digital is no longer just a consideration for technology businesses and a "nice to have" for other businesses, but a critical success factor for the wider business community.

DIGITAL EXCLUSION AND ITS IMPACT ON SOCIETY

It is well proven that access to digital technology increases quality of life. The Centre for Social Justice published a report in September 2017 entitled "**Social Justice in the Digital Age**" which highlights the social benefits of digital but paints a stark picture of an increased social injustice across the UK caused by an inequality of essential digital skills. It states that:

"Personal, social and cultural benefits are directly linked to internet use. From social cohesion to political participation, health development to educational improvement, a full and meaningful digital engagement can fundamentally and vastly improve quality of life."
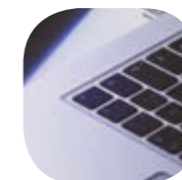
UNDERSTANDING THE
DIGITAL REVOLUTION – CONTINUED

But, since the year 2000, the digital divide amongst the UK population has grown. An estimated 5.8 million of the adult population have never used the internet and a further 12.6 million people are lacking in basic digital skills.

These are individuals commonly known as "**digitally excluded**."

Digital exclusion is not just caused by insufficient access to computers and the internet. Both the availability of superfast broadband and smartphone usage has increased dramatically over recent years.

A recent report from the Local Government Association suggests that the common challenges that are contributing to digital exclusion are:

- Affordability
- Capability (skills);
- Content (what the internet is being used for);
- Confidence (self-assurance);
- Continuity (sustaining access and use).

THE FUTURE OF WORK
Due to the exponential rate at which digital technology is transforming our world, it's becoming increasingly difficult to equip people with the skills that are required by the economy, let alone prepare people with the skills that will be required in the future. The CEO of Skills Development Scotland, Damian Yeates recently commented:

"The unprecedented change driven by advances in technology and demographic shifts has the potential to reshape every aspect of society – particularly, the economy, work and skills."

The unprecedented rate of change means that we don't know what technology and jobs will be available when children leave school and it is difficult to predict the impact that future technology will have on the work force and the skills that will be required. Two out of three children starting primary school will have jobs that don't exist yet.

What we do know is that increased automation will mean that technology will continue to take over from manual tasks which will have an inevitable impact on the jobs that are typically available today, but it is also likely to create new, high value jobs that are yet to be invented. Technology jobs tend to attract higher salaries; the average salary for tech jobs is around £37,500, over 30% higher than the Scottish average of £28,000.

The job markets that are likely to be affected by automation are wide-ranging. Through artificial intelligence (AI), technology has the potential to undertake cognitive tasks as well as computational and physical tasks.

This technological revolution is an exciting opportunity as it should bring a significant number of high value jobs bu also create a challenge for Glasgow. We need to plan for the impact that automation might have and proactively support our residents to develop the skills which these new roles require.

APPRECIATING THE OPPORTUNITIES

The challenges that are described in the previous section will only become a problem for Glasgow if they are not proactively managed.

The reality is that the digital revolution has the potential to have a transformative effect and provides new opportunities for the city, our economy, for its people, its businesses, and for how we deliver public services.

ECONOMIC GROWTH

Proactively managed, digital provides opportunities to transform and grow Glasgow's economy:

BUSINESS START-UPS, SURVIVABILITY AND GROWTH
Underpinned by good connectivity and the right skills, digital provides new businesses and existing businesses within all sectors in the city with opportunities to grow, whether they are a start-up or SME or a multi-national corporation. It provides opportunities to improve productivity, to open up new (global) markets, provide richer market insight to reach new customers, and can stimulate new levels of innovation that could lead to new products and services.

BUSINESS ENVIRONMENT
Digital provides an excellent opportunity to help improve the value chains across businesses. It has the potential to play an important role in developing circular economy models.

INWARD INVESTMENT
Good digital connectivity and access to the right (and affordable) skills, a vibrant technology community, and business support (together with the quality of life that the city offers) provides businesses with a compelling reason to relocate their creative, design, digital and engineering roles to the city, and to establish Glasgow as the home for their digital research and innovation.

QUALITY OF LIFE

Digital technology can improve quality of life of our residents.

ACCESS TO INFORMATION
Digital provides people with greater access to information that can keep us informed and help us make more informed decisions. The internet provides access to a wealth of information at our fingertips wherever we have a device and there is an internet connection.

SOCIAL INCLUSION
From social media to new ways of interacting with people remotely such as video-conferencing, digital helps us to stay in touch with friends and family and to build new relationships in new ways. For social inclusion to apply to all, access to and support for the use of digital has to be delivered to people disadvantaged by economic or social exclusion.

EDUCATION AND LEARNING
The wealth of information that is available online can help people to learn on a continuous basis, and provides new opportunities for enriching the quality and impact of teaching and education within and outside of the classroom, and in community learning and development programmes.

HEALTH AND WELLBEING
From reducing social isolation, through to having more information about conditions and medication, through to tracking physical activity and being able to monitor health characteristics such as weight, heart rate, glucose levels, blood pressure to help self-manage conditions, digital is increasingly seen as a way of helping to improve physical and mental wellbeing, and for helping people to live independent lives.

ACCESSIBILITY
If not managed carefully digital could exacerbate social exclusion for people with disabilities. Managed proactively, it can provide new opportunities for people with disabilities. It provides opportunities for improved self-management of conditions and provides opportunities to develop new innovative aids such as speech recognition, advanced hearing aids, and audio navigation for the blind.

EMPLOYMENT AND PROSPERITY
Essential digital skills can help people to seek new employment opportunities, apply for jobs online, and increase their employability. It can also help people to better manage their finances, and in many cases digital can provide people with better access to discounted rates and better deals.
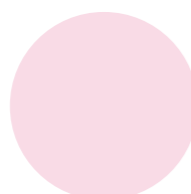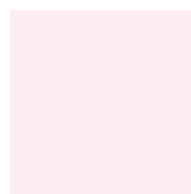
UNDERSTANDING THE DIGITAL REVOLUTION – CONTINUED

RECREATION AND ENTERTAINMENT
Digital has revolutionised recreation and entertainment through easy access to and creation of online content, games and social media.

ENVIRONMENT
Increasingly digital technology is being applied to improve environmental sustainability. Smart city technologies, such as intelligent street lighting and smart bins that were trialled and pioneered in Glasgow, and smart home technologies such as Nest and Hive smart thermostats, can help people to better manage their energy consumption. Smart grid technologies, together with digitally-enabled renewable energy sources are allowing energy companies to improve the efficiency of energy supply, and technologies such as electric vehicles and autonomous vehicles provide opportunities to transform transport and to reduce pollution.

COMMUNITY EMPOWERMENT
Greater access to accurate and trustworthy information can have an empowering effect on people, and provides new opportunities to empower communities. Using digital to provide citizens with access to information can improve transparency and can help to involve more people in decision-making

PUBLIC SERVICES

Digital provides an unprecedented opportunity to transform public services. Like all sectors, the introduction of digital technology into the public sector began over fifty years ago. However, much of the application of digital technology has historically been focused on internal processes, and how the public sector transacts with citizens.

It now however, provides opportunities to transform how services are designed and delivered, and provides new opportunities for delivering better, co-produced outcomes for people.

This can be described as three eras of digital technology within local government:

THE FIRST DIGITAL ERA OF LOCAL GOVERNMENT
During those early days of computers through to now, our initial application of digital technology has focused on helping our staff to undertake their duties and follow processes by helping them to manage information better using IT systems and enterprise software. This is the first era of digitisation in local government, and it still represents the lion's share of our investment; and the job is far from complete, as it is in any sector.

THE SECOND DIGITAL ERA OF LOCAL GOVERNMENT
In the nineties, the invention of the world-wide web acted as a catalyst for a new application of digital technology and wave of innovation: The online service. It allowed us to shift our focus for how we used digital technology away from our internal process, to how we transact with our users. This is the second era, and we are still building our online services and, frankly, we are still coming to terms with what this means to be truly customer-centric.

THE THIRD DIGITAL ERA OF LOCAL GOVERNMENT
Enabled by technologies such as the Internet of Things, data analytics, artificial intelligence, etc., the third digital era of local government moves the focus away from internal process and transactions and puts it firmly onto the role that technology can play to deliver better outcomes. Allowing us to make better use of data can enable local government to apply digital technology to better support communities, deliver better outcomes, improve how we work with partners and enable services to become more proactive. It provides an opportunity to reimagine and redesign how the public sector delivers services.

CELEBRATING OUR STRENGTHS AND OUR ACHIEVEMENTS

Glasgow is no stranger to technology revolutions.

In many ways, Glasgow is the city it is today because of the reputation for pioneering science and engineering it has built over many years, starting during the Industrial Revolution. This period saw the city's population and economy expand rapidly, with Glasgow becoming established as one of the world's pre-eminent centres for engineering (particularly ship building and marine engineering).

Glasgow's scientific and engineering heritage has gone on (and continues) to shape the modern day world through discoveries and inventions such as James Watt's steam engine, the pneumatic tyre, the Kelvin Scale, paraffin, and refrigeration. In fact, the world's first ever television broadcast by John Logie Baird was between Glasgow and London.

Whilst we are rightly proud of our industrial heritage we are no longer reliant on one sector. We have a thriving tourism industry and retail sector, are one of Europe's top financial centres, boast a world leading centre in new industries such as stratified medicine and advanced manufacturing, and are internationally recognised as a sporting city.

But with a GVA of £1.31bn employing 33,653 people in the city, the digital sector has now become **Glasgow's fastest growing sector**, and (according to TechNation) it has now become the largest digital cluster, in terms of GVA, in Scotland.

A DIVERSE AND RESILIENT DIGITAL CLUSTER

The growth in digital technology is no longer about traditional software and hardware technologies. Increasingly digital innovation is being driven by the power of data, data analytics and artificial intelligence.

Digital is more sophisticated and it is diversifying. It is becoming less about a single tech sector and more about how digital innovation and transformation is embedded within other sectors (coined by terms such as "FinTech", "GovTech", "EdTech", "PropTech").

Technologies such as the Internet of Things (IoT), Virtual Reality (VR), Building Information Modelling (BIM) and 3D printing begins to bring our digital environments and our physical world and built environment closer together. Developing digital products and services is increasingly less about IT and software development, and more about creativity, design, and engineering.

This new era of digital transformation is well suited to our city's skills and capabilities. Glasgow has a vibrant tech cluster however the city's digital economy is also intrinsically linked and overlaps with its key sectors, and draws from the city's wealth of creative, design, analytical, scientific and engineering talent, as well as traditional computer science.

CELEBRATING OUR STRENGTHS
AND OUR ACHIEVEMENTS – CONTINUED

THE DESTINATION OF CHOICE FOR DIGITAL CENTRES OF EXCELLENCE

Glasgow is fast becoming a destination of choice for businesses who seek to establish new digital hubs to drive innovation in new digital products and services. Examples of companies who have established Glasgow as their digital centres of excellence include: JP Morgan, BBC, Scottish Power, and most recently, Barclays who this year announced that they will establish a major campus south of the city centre on the River Clyde, bringing 2,500 jobs to the city.

A VIBRANT TECH CLUSTER

Key to developing any digital technology sector is a culture of collaboration, support, and sharing, and low cost co-working space. This is the very core of Glasgow's tech cluster

ROOKIE OVEN
Located in newly renovated offices of the Fairfield Shipyard in Govan (a hub of innovation for over 150 years), Rookie Oven provides co-working space for tech startups, plays a proactive role in nurturing and promoting Glasgow's tech community across the city, provides support, advice and guidance for startups, and even provides free resources on entrepreneurship to educators and students to help develop the pipeline of the next startups. Rookie Oven has achieved international acclaim for its achievements.

WHISKY BOND
Originally built as a bonded warehouse for Highland Distilleries in 1957, since 2012 The Whisky Bond (TWB) has been home to a growing community of designers, makers, creative businesses, artists and social innovators.

It produces and hosts a diverse programme of events in the building to ensure there are plenty of opportunities to meet the people working around you, share ideas and make connections.

The demand for co-working spaces in the city continues to increase, and plans are underway to create a new 3,200 sq metre co-working space for startups and SMEs called McLellan Works on Sauchiehall Street.

TECH MEETUPS
There is a vibrant tech meetup scene in Glasgow covering a range of technology disciplines. In general, the meetups help build communities around particular topics to share experiences and learning, help to develop new skills, and provide opportunities to share ideas and opportunities. Examples include the Rookie Oven Meetup, Lean Agile Glasgow, Glasgow AI, Code Craft, Digital Tourism Meetup, Glasgow Media Meetup, Glasgow Tech Social, Docker Glasgow, DevOps Glasgow, Glasgow PHP, Python Glasgow, The Gaitherin, Glasgow Wordpress, Glasgow Javascript, the Data Science and Technology meetup, the Glasgow Internet of Things Meetup, and UX Glasgow.

A THRIVING CREATIVE INDUSTRIES SECTOR

The British Council provides a useful summary of the inter-relationship between the digital and creative sectors:

"It's easy to confuse the creative economy with the digital economy. Equally, it's almost impossible to separate them because, in many ways, they depend on each other. Some prominent creative industries did not exist before the advent of digital technology, videogames for example, while others, such as film and publishing, pre-date digital technology but have been transformed by it."

It's no surprise that like Glasgow's digital sector, its creative sector is also a thriving sector. The Glasgow School of Art is internationally recognised as one of Europe's leading higher education institutions for the education and research in the visual creative disciplines. Amongst other design disciplines, it produces graduates with skills in product and service design, 3D modelling, and its research centres include a School for Simulation and Visualisation, and an Innovation School.

Channel 4 has recently announced that it will establish Glasgow one of its two UK Creative Hubs alongside Bristol. STV and BBC Scotland already call Glasgow their home. Close to their location on Pacific Quay, also within the Creative Clyde community, are the Glasgow School of Art's School of Simulation and Visualisation (one of Europe's largest labs for 3D visualisation), and Film City which has become a major base for film production in Scotland.

HELPING BUSINESSES TO GROW

TONTINE
Located in the Tontine, once the home of the workshop of legendary Scottish inventor James Watt, and positioned on the corner of Trongate and High Street in Glasgow's historic heart, Tontine was established in 2016 to support and sustain the development of high-growth companies in the enabling technology, advanced design and manufacturing, and creative economy sectors. It supports the growth and impact of businesses by providing flexible workspace, dedicated support, bespoke accelerator programme (i-GAP) and a positive environment to thrive.

DIGITAL CONNECTIVITY TO ENABLE ECONOMIC GROWTH AND INCLUSION

The UK Government's Future Telecommunications Infrastructure Review states that:

"In the coming decades, fixed and mobile networks will be the enabling infrastructure that drives economic growth."

Digital connectivity is a fundamental enabler to our aims for the digital economy and digital public services. Like any city, Glasgow needs to continue to attract investment in high-quality and next generation connectivity to continue to support economic growth and innovation, but we have already made enormous progress.

FIXED CONNECTIVITY

Statistics from Ofcom show that 710,000 properties in Glasgow are already connected to fibre-based broadband services and that 98.6% of properties will have access to superfast broadband (>30Mbit/s) by December 2018. Superfast broadband services are typically delivered using an optical fibre cable to a street cabinet, with the final transmission of signals being delivered electrically over a copper cable.

The next generation of broadband services is full fibre (or Fibre-to-the-Premises), which removes the copper from the network completely.

We are already working in partnership with CityFibre who are installing a 263km Local Full Fibre Network (LFFN) across the city that we will use to upgrade digital connectivity to our offices, community facilities and schools. CityFibre has also recently announced that Glasgow is one of the cities that will receive investment to extend this network to people's homes offering 1Gbit/s broadband services to the 5 million homes across the UK.

WIRELESS AND MOBILE CONNECTIVITY

Glasgow was the first city in Scotland to offer a free public Wi-Fi service. Launched in 2014 in readiness for the 2014 Commonwealth Games, the free public Wi-Fi service was made available across the city centre, and has subsequently been extended to community hubs and libraries across the city.

Glasgow has also been one of the first places in the world where companies have begun to invest in "smart kiosks"
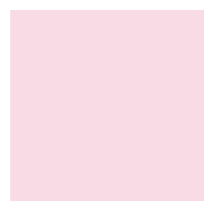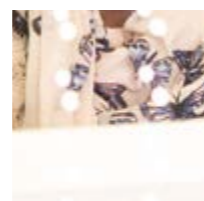
CELEBRATING OUR STRENGTHS AND OUR ACHIEVEMENTS – CONTINUED

(such as BT InLink) which also provide access to free hi-speed Wi-Fi, as well as providing telephone and internet access, way-finding capability and advertising space.

Both the University of Glasgow and the University of Strathclyde have significant 5G research interests. The University of Glasgow has plans to establish a 5G testbed within the Waterfront and West End Innovation Quarter. Meanwhile, commercially, mobile operators are already prioritising Glasgow for 5G investment. Glasgow will be the second city in the UK where Vodafone will trial 5G, one of seven trials that they have planned within the UK.

INTERNET OF THINGS (IOT) CONNECTIVITY

Glasgow is also served by a 12km² "Low-power Radio Wide Area Network" (known as "LoRaWAN"). This is a network technology that is specifically designed to enable Internet of Things (IoT) and sensor devices to communicate with lower power consumption than other typical mobile technologies. The network is delivered through a consortium between CENSIS, Boston Networks and Stream Technologies, the University of Glasgow, University of Strathclyde, and Glasgow Caledonian University.

AN ABUNDANCE OF TALENT AND OPPORTUNITY

Glasgow has one of the most highly skilled and flexible workforces in Europe. 42.8% of the current working age population in the City Region is educated to degree level or above.

GLASGOW'S UNIVERSITIES

Glasgow is home to three of Scotland's largest and most prestigious universities: University of Glasgow, University of Strathclyde, and Glasgow Caledonian University as well as the world-renowned Glasgow School of Art and the Royal Conservatoire of Scotland.

- Glasgow's universities are among the best in the world, regularly topping league tables, winning prestigious awards and securing highly-competitive funding grants.
- Glasgow is number 1 amongst the UK's Core Cities for producing the highest number of digital technology students and graduates (computer science and mathematics).
- The city educates 50% of Scotland's engineering students in electronics, mechanics and software.
- Business schools at the University of Glasgow and the University of Strathclyde are both triple-accredited – only 1% of business schools worldwide hold this accreditation.

The student experience in Glasgow is among the best in the UK and many choose to stay in the city after graduation. Retention rates in Glasgow are some of the highest in the UK, offering businesses access to the best and brightest talent.

CODECLAN

CodeClan is a Digital Skills Academy that is based in Glasgow and Edinburgh. It has recently doubled the size of its Glasgow presence due to demand. CodeClan works in partnership with industry to provide a certified Professional Software Development course that allows graduates to reskill and enter software development careers. 90% of its graduates secure employment within six months.

GLASGOW'S COLLEGES

Glasgow's colleges (City of Glasgow College, Glasgow Kelvin College and Glasgow Clyde College) are the three largest in Scotland and between them deliver nearly a quarter of Scotland's further education. They are integral to developing the talent pool in Glasgow. The three colleges provide advanced digital skills programmes with progression routes to both university and employment and embed digital skills in other courses through the use of online learning environments as part of their blend of learning support.

Together, they actively collaborate within a regional approach in order to harness their collective strengths to ensure that people from across Glasgow can benefit fully from the City Region's economic growth by:

- Sharing skills and knowledge
- Offering a coherent and consistent student experience
- Developing a regionally responsive curriculum
- Building effective regional structures with schools, colleges, and universities.
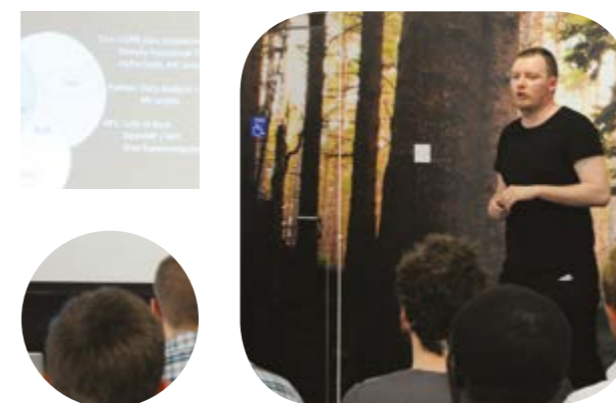
STEM GLASGOW

Recognising that all of Glasgow's key sectors are dependent upon the development of science, technology, engineering, and mathematics (STEM) skills in our young people, STEM Glasgow was established to enable practitioners and partners to work collaboratively to support the development of STEM based skills, knowledge and opportunities. It provides a range of learning resources, competitions and challenges for young people and often has a digital focus, using digital resources to inspire.

GLASGOW LIBRARIES

Glasgow's libraries support communities to engage with digital technologies and provide community-based supported access opportunities on both an ad hoc basis by library staff and in certificated skills development programmes delivered by its Digital Learning team.

Glasgow Life is already collaborating with Glasgow Kelvin College to develop and deliver the Glasgow Code Learning programme providing the beginner and coding skills required to support communities and SMEs.

Glasgow Life also supports digital inclusion through its support for Universal Credit, through its Digi-Pals volunteer service and it hosts CoderDojo services for young people in libraries.

A COLLABORATIVE AND SUPPORTIVE APPROACH TO TACKLING DIGITAL EXCLUSION

Glasgow City Council is a signatory of Scotland's Digital Participation Charter which means that we have signed up to the following pledges:

"**Skill Up** – We ensure that our staff and volunteers have the opportunity to develop essential digital skills.
Support Staff – We support our staff and volunteers to help others learn essential digital skills and embrace digital tools.
Support Scotland – We support our nation by contributing resources and practical support for Scotland in whatever ways we can.
The Essentials – We support a common language based on digital participation and essential digital skills to make our thinking and actions as clear as possible.
Come Together – We channel our efforts through the Digital Participation programme so that our activities are coordinated and build on each other."

CELEBRATING OUR STRENGTHS AND OUR ACHIEVEMENTS – CONTINUED

Some key assets within the city that support the commitment include:

JOHN WHEATLEY LEARNING NETWORK

The John Wheatley Learning Network has developed since its 2002 origins supporting the Greater Easterhouse area to extend across Glasgow. The learning network is a unique example of the sharing of public service (Glasgow Kelvin College) infrastructure and support capacity with community groups and services as a means of delivering digital inclusion.

The network supports approximately 8,000 people each year with free internet access and the use of PCs, software, security and account services, providing portability of accounts, email and files between main college campuses and local neighbourhood centres.

It comprises 40 community learning centres and three main campus progression hubs, providing a variety of access points supporting the needs of diverse communities. The network's learning centres are hosted by community centres, youth services and centres supporting homeless people and family services, and involve over 30 independent agencies in exploiting the connectivity and support services of Glasgow Kelvin College. The network supports, through its host partners, a variety of digital inclusion services depending on partner services including:

■ Staff or volunteer support for drop-in access to the Internet and Office software;
■ Employability and work club services;
■ Access to a tutor-supported flexible learning programme;
■ Access to an evening and weekend youth service for young people aged 12-17.

CLICK AND CONNECT

The Wheatley Group has also provided investment in the John Wheatley Learning Network through its Click and Connect initiative to support its residents in accessing digital inclusion services. The Wheatley Foundation continues to provide revenue support to learning network services.

DEMONSTRATING SMART CITIES TO THE WORLD

Glasgow has achieved international recognition as a world-leading smart city.

In 2013 Glasgow was awarded £24 million to become the UK's future city demonstrator. This successful programme delivered a number of smart city foundations for the city, has acted as a catalyst for digital transformation of public services, and has helped the city to attract further investment in smart city innovation.

GLASGOW OPERATIONS CENTRE

The Glasgow Operations Centre was established in readiness for the 2014 Commonwealth Games. It is a central control room where real-time data about the city is made available to better coordinate city services such as traffic management, security and public safety. This multi-functional operations centre allows us to better understand the city and better coordinate our different services, helps our public services to become more joined-up and efficient, and improves the resilience of the city.
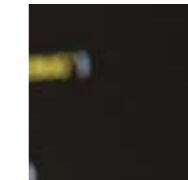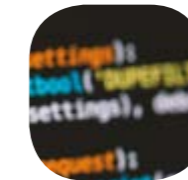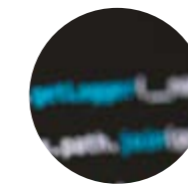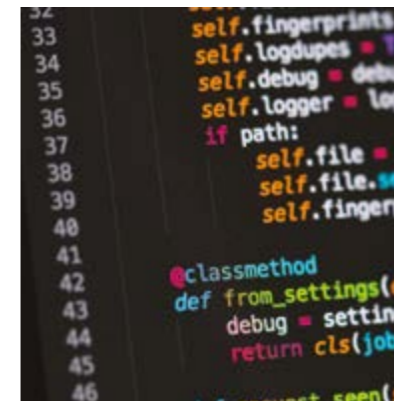
SMART INFRASTRUCTURE (INTELLIGENT STREET LIGHTING)

The Future Cities Demonstrator project showcased a technology called "intelligent street lighting" which is now being scaled up across the city. Three sites were chosen to initially demonstrate the technology in the city:

1. The Clyde Walkway near the SEC,
2. Gordon Street,
3. Merchant City.

At each site, the existing carbon filament lamps were replaced with Internet of Things-enabled LED lamps which were connected digitally through a wireless network which was also used to connect air quality and footfall sensors.

This enabled:

■ Lighting levels to automatically adapt to how busy the area is,
■ Providing the Operations Centre with the ability to increase the intensity of lighting in emergency situations,
■ Providing engineers with real-time information on how street lights are performing, enabling them to maintain street lights in a more proactive manner, improving safety and reducing the need for the public to report broken lights.
■ A wireless "mesh" network that can be re-used for other smart city infrastructure and sensors.

SMART ENERGY

The Future Cities Demonstrator showcased a number of pioneering smart energy initiatives such as a smart grid "Demand-Side Management" project, an online mapping service that allowed people to understand planning constraints associated with renewable energy, a 3D city energy efficiency model, and the installation of environmental sensors into residential homes to measure the impact of insulation retrofit.

The learning from the Future Cities Demonstrator has been far reaching. We have established new ways of working, have made investment plans to scale our smart infrastructure, and have continued to deliver additional smart city innovation, such as:

THE SMART STREET

Glasgow is a lighthouse city for a collaborative smart city programme (called "Ruggedised") which is being delivered in collaboration with the cities of Rotterdam, Umeå, Parma, Brno, and Gdansk through the European Union's Horizon 2020 programme.

Glasgow's programme focuses on the development of a Smart Street. The street is located in the city centre along a section of George Street and Duke Street, in an area of mixed residential, academic, community, retail, and industrial buildings. It seeks to address the challenges Glasgow faces from ageing infrastructure, fuel poverty and air pollution by integrating planned regeneration and development with smart city capabilities.

The Smart Street will include: district heating, an innovative roof mounted solar PV canopy, ducted wind turbines, energy arbitrage, power storage, EV charging, and smart grid controls.

THE SMART CAMPUS

The expansion of the University of Glasgow's campus in the West End has provided the opportunity for the University to invest in smart technology to establish a Smart Campus. The Smart Campus is intended to:

■ Enable the demonstration and innovation of smart urban infrastructure and sensors
■ Enhance the learning environment
■ Improve staff and student health and wellbeing

THE SMART CANAL

The pioneering Smart Canal project (the first of its kind in Europe), will use sensor and predictive weather technology to provide early warning of wet weather before moving excess rainfall from residential and business areas into stretches of the Forth and Clyde canal where water levels have been lowered by as much as 10cm. It will create 55,000 cubic metres of extra capacity for floodwater -
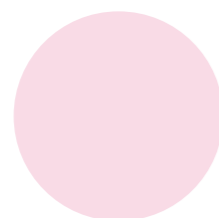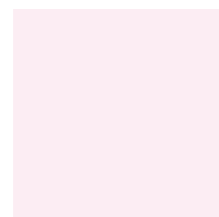
CELEBRATING OUR STRENGTHS AND OUR ACHIEVEMENTS – CONTINUED

equivalent to 22 Olympic swimming pools. It is expected that the scheme will unlock 110 hectares across the north of the city for investment, regeneration and development

DEMONSTRATING (AND CREATING) VALUE OF CITY DATA OPEN GLASGOW

As part of our Future Cities Demonstrator, our Open Glasgow initiative showcased the potential of open data within the city, and allowed us to establish a scalable (city-wide) platform for bringing together non-sensitive data about the city (including real-time data such as real-time traffic data) to a single place to enable us to create richer insight into the city. This aimed to:

- Improve Transparency
- Engage Communities
- Provide a basis for public services to be re-designed
- Stimulate Innovation

These outcomes were demonstrated through a programme of community engagement, service design, and hackathon events.

The underpinning platform (the City Data Platform) provides real-time data processing, large-scale data storage, data analytics and artificial intelligence capabilities, and also provides the means to publish application programming interfaces (APIs) to provide access to city data and digital services to developers across the city.

CENTRE FOR DATA ANALYTICS AND VISUALISATION

Our experience from the Future Cities Demonstrator inspired the creation of a new centre of excellence within the Council known as the Centre for Data Analytics and Visualisation. The Centre brings together data, spatial, and statistic analytics skills together with design skills to provide a central resource for undertaking data-driven service design work, and for engaging with the broader data community across the city, Scotland and the UK.

CITY OBSERVATORY, UNIVERSITY OF STRATHCLYDE

Located within the Institute of Future Cities, in the University of Strathclyde's Technology and Innovation Centre within the City Centre Innovation District, the City Observatory provides a physical workspace that allows researchers to explore data about Glasgow and other cities around the world, and for new insight about cities to be showcased and explored with stakeholders.

URBAN BIG DATA CENTRE, UNIVERSITY OF GLASGOW

The Urban Big Data Centre (UBDC) was established by the UK Economic and Social Research Council to address social, economic and environmental challenges facing cities.

The UBDC brings together interdisciplinary expertise of urban social scientists and data scientists from the University of Glasgow and six partner universities of Edinburgh, Bristol, Cambridge, Reading, Sheffield and Illinois-Chicago to seek solutions in addressing such challenges. The Urban Big Data Centre provides the following services:

- Access to a wide spectrum of data on urban areas in the UK.
- Data management support for researchers who want to use our data resources.
- Data acquisition services for researchers including data discovery, licensing, capture and extraction.
- Consultative support for data owners who wish to share data with our user community.
- Training and skills development for different audiences, including technical, methodological and policy-focused sessions.
- Knowledge partnerships and innovation with organisations to scope and develop solutions for substantive urban issues, both local and global.

CREATING A NEW ENVIRONMENT FOR URBAN INNOVATION

Glasgow's vision for its Innovation Districts is to push Glasgow into the top rank of global innovative cities. The aim is to establish three innovation centres, two within the city, and one, the Advanced Manufacturing Innovation Centre, based next to the city's airport in neighbouring Renfrewshire.

As a global trend, Innovation Districts reflect the re-urbanisation of innovation to create a close proximity between start-ups, incubators, research, education, and public policy institutions.

THE GLASGOW CITY INNOVATION DISTRICT

The Glasgow City Innovation District encapsulates a walkable and liveable 6 x 6 city block area that is home to the University of Strathclyde and the city's creative Merchant City quarter. The District is centrally located with direct access to the motorway network.

With over £100 million+ of innovation investment, Glasgow City Innovation District is bringing together government, industry and academia to harness and build upon a base of research expertise, industry engagement and a pipeline of high-quality, work-ready graduates.

THE WEST END INNOVATION DISTRICT

Only three miles from the city centre and 6 miles by road from Glasgow Airport, the West End and Waterfront area of the city provides an exceptional environment for innovation, boasting internationally significant clinical and research infrastructure, a talented workforce and an enviable cultural vitality. The Innovation District will consist of two zones – the Clinical Innovation Zone will have a biomedicine focus and will be anchored by the new Queen Elizabeth University Hospital, while the Interdisciplinary Zone will provide a broader cross-discipline environment, anchored by the University of Glasgow.

INNOVATION CENTRES

Both the UK and Scottish Governments have established innovation centres to enhance innovation and entrepreneurship across specific economic sectors, create jobs and grow the economy. Many of them have made Glasgow their home, and they play a vital role within
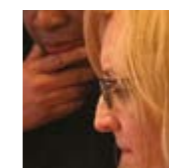
CELEBRATING OUR STRENGTHS AND OUR ACHIEVEMENTS – CONTINUED

Glasgow's innovation community. Of particular relevance to the digital economy, and digital public services are:

CENSIS – Located within the Inovo building of the Glasgow City Innovation District, and funded by the Scottish Funding Council, CENSIS is a centre of excellence for Sensor and Imaging Systems (SIS) technologies. It aims to enable leading industry innovators and world-class university researchers to collaborate at the forefront of market-focused sensor and Internet of Things (IoT) innovation, developing products and services for global markets.

Digital Health and Care Institute (DHI) – Also located within the Inovo building, and funded by the Scottish Funding Council, DHI brings together people and organisations in the health and social care, charity, technology, design and academic sectors to develop new ideas for digital technology that will improve the delivery of health and care services for the people of Scotland.

The Data Lab – Although headquartered in Edinburgh, the Data Lab has a base in Glasgow and is very active within the city's data and innovation communities. The Data Lab enables industry, public sector and university researchers to innovate and develop new data science capabilities in a collaborative environment. Its core mission is to generate significant economic, social and scientific value from data.

Transport System Catapult – Although headquartered in Milton Keynes, the Transport System Catapult, which is the UK's innovation centre for intelligent mobility and which is being merged with the Future Cities Catapult, has recently launched a base in Glasgow at the University of Strathclyde's Technology and Innovation Centre within the Glasgow City Innovation District.

Industrial Centre for Artificial Intelligence Research in Digital Diagnostics (iCAIRD) – Recently announced, iCAIRD will be a Scottish centre of excellence and focus on the application of AI in digital diagnostics, ultimately enabling better and earlier diagnosis and more efficient treatment for patients. It is also predicted that iCAIRD will create new jobs centred around AI and digital technology

in healthcare. Centred at the University of Glasgow's Clinical Innovation Zone at the Queen Elizabeth University Hospital, iCAIRD will bring together teams across Scotland (in Aberdeen, St Andrews and Edinburgh) to enable joined-up academic and commercial technology development, alongside academic researchers locally and nationally.

CENTRE FOR CIVIC INNOVATION

Based within Tontine in the heart of the Glasgow City Innovation District, the Centre for Civic Innovation was created to help foster a collaborative approach to problem solving between Glasgow, its citizens and businesses. By bringing together people from all sectors; industry partners, academia and business, the physical space helps to stimulate the co-creation of innovative concepts that could be used to address a range of problems including some of Glasgow's biggest societal challenges as well as redesigning services efficiently using data to inform decisions.

The Centre for Civic Innovation places our citizens at the heart of the design process – from developing challenge briefs right through to co-designing solutions and testing and validation – in a creative and inclusive environment.

Providing citizens with more opportunities to become involved in local decisions that affect their neighbourhood will facilitate greater participation, uptake and use of the products and services we develop. The aim of the Centre for Civic Innovation is to empower the people of Glasgow to work with us to develop and lead the change in the city and develop the brand to attract further funding to scale-up ambitions.

The Centre wants to develop a network of solvers that can be called upon to co-design solutions that help to address the challenges the city faces and to build a better Glasgow for all. Working for the Glasgow family we will collaborate with partners in innovation, academia and industry to harness the power of design to co-produce future Glasgow.

OUR AMBITION

The accelerating rate of change of digital technology, the disruption that it is creating across sectors and the dawn of the fourth industrial revolution cannot be treated as a side issue for the city. It has to be positioned as a critical factor to our economic success and resilience, our quality of life, and the sustainability of our public services.

We do not want to be a follower of the digital revolution – we want to be recognised for leading it.

The Scottish Government strategy "**Realising Scotland's full potential in a digital world**" sets out a vision for Scotland to be recognised throughout the world as a vibrant, inclusive, open and outward-looking digital nation. We want Glasgow to be at the forefront of this strategy.

Our vision for Glasgow is to be:

> "A world class city with a thriving digital economy and community, where everyone can flourish and benefit from the best digital connectivity and skills, where technology is used to improve everyone's quality of life, drive our businesses' innovation and service design and improve our city, its neighbourhoods and its success."

To achieve this we are setting out the following goals for the city:

OUR GOALS FOR THE DIGITAL ECONOMY

1. We want businesses across all of our sectors to realise the potential that digital provides, to stimulate innovation, and to establish Glasgow's tech sector as a **top 20 global digital economy**.
2. We want to inspire people to develop **digital skills** and attract more people into **digital careers**.
3. We want to tackle **digital exclusion** and improve **digital participation** as a matter of social inclusion.
4. We want to attract investment in next-generation **digital connectivity** and improve connectivity where there has been insufficient and/or unaffordable broadband or mobile coverage.

OUR GOALS FOR DIGITAL PUBLIC SERVICES

1. We want to embrace the potential that digital technology provides to **redesign our services around the citizen**, enabling services to become more integrated, more proactive, and more personalised.
2. We want to **empower communities** through better access to information and using digital technology to increase civic participation.
3. We want to develop a culture of **digital leadership** and innovation.
4. We want to strengthen the **digital foundations** that enable us to deliver sustainable and secure digital public services.

OUR ACTION PLAN FOR THE DIGITAL ECONOMY

We believe that we have the right ingredients to become one of the top digital economies in the world. We have the talent, we have a vibrant tech scene, and more importantly, we have a diverse digital economy that spans and overlaps with a number of our key sectors. We are already becoming a hub for digital innovation across a number of sectors, with national and international companies moving their digital centres of excellence into the city.

Whatever way you look at it, digital will play a critical role in Glasgow's economic success. Our dependency on it is not just limited to the success of our digital and technology sector(s) but it is a key contributor to the success of all of Glasgow's businesses, across all of our sectors.

Scotland's digital strategy "**Realising Scotland's full potential in a digital world**" has a vision for:

OUR GOAL FOR DIGITAL BUSINESS

"We want businesses across all of our sectors to realise the potential that digital provides, to stimulate innovation, and to establish Glasgow's tech sector as a **top 20 global digital economy**"

"Scotland to stimulate innovation, welcome investment, and promote its digital technologies industries."

"Developing internationally competitive, digitally mature businesses across all sectors"

To grow our digital economy we need to better promote the city and our tech community, attract more technology events to the city, create a new environment to stimulate innovation, support all businesses to embrace the opportunities that digital technology can provide, and we need to prepare our sectors and communities for the fourth industrial revolution as a matter of city resilience, and to act as a catalyst for innovation.

OUTCOMES

1. Economic Growth (GVA) through inward investment and productivity
2. Business growth for Glasgow digital businesses
3. Increase in the number of tech start-ups
4. Recognition as a leading UK digital/tech economy with a coherent identity across diverse sectors
5. Recognition as a leading destination for digital/tech inward investment
6. Recognition for our vibrant and active tech community
7. Glasgow companies embrace digital to transform their business and understand the risks of digitisation and automation to their sector, and their own business.

KEY ACTIONS

1 We will establish and promote a vibrant calendar of digital events and conferences, and will seek opportunities to attract more digital events to the city.

2 We will commission a review of the tech cluster to identify opportunities to better support and grow the community, and we will work with the sector and partners to implement the findings of the review.

3 We will promote and support the tech start-up community.

4 We will embed digital as a theme within the Innovation Districts and support the communities that can facilitate digital technology innovation (e.g. Innovation Centres).

5 We will undertake a review of the potential impact of digital to Glasgow's key sectors and develop case studies to promote digital innovation across the key sectors.

6 We will work in partnership to develop a greater focus and integration across the city's business support to help companies in Glasgow make more effective use of digital technologies to increase their competitiveness, trade online and improve their productivity.

7 We will develop coherent promotion and marketing messages and material focused on the diversity of Glasgow's digital sectors, including an inward investment proposition.

Technology is giving life the power either to flourish like never before or to self destruct

Futureoflife.org

OUR ACTION PLAN FOR THE DIGITAL ECONOMY – CONTINUED

OUR GOAL FOR DIGITAL SKILLS AND EMPLOYMENT

"We want to inspire people to develop digital skills, attract more people into digital careers, and ensure that the skills we develop meet the needs of the economy."

It is an exciting time for digital technologies as there is an unprecedented demand for individuals to fill digital technology roles. At a Scottish level there is an estimated 12,800 technology job vacancies each year. This is a 16% increase on the previous demand forecasts and represents a significant opportunity for both young people and other new entrants to access high value jobs in growth sectors.

Scotland's digital strategy "**Realising Scotland's full potential in a digital world**" has a vision for:

"Focusing its education and training systems on expanding its pool of digital skills and capabilities"

"Tackling the current gender gap in digital skills and careers"

To support our businesses and our citizens it is imperative that we match the sector's ambition for growth with highly-focused investment in skills to ensure that Glasgow can maximise the economic and employment potential this represents.

Glasgow already produces excellent digital technology talent and there is much we should be proud of, but we must continue to target our interventions effectively using the best available evidence. This will ensure that we invest in quality and impactful interventions which are accessible to all.

Central to success will be the establishment of a coordinated approach to enhancing digital technology skills development opportunities, to minimise duplication and benefit from existing national initiatives.

OUTCOMES

1. The current skills gaps that exist in the city have been reduced through a targeted increase in the availability of skills and talent
2. People have the digital technology skills that are relevant and important to Glasgow companies
3. Education at all levels in the city is more responsive to the needs of employers and the future impact of digitisation and automation
4. All digital technology skills interventions are targeted effectively, by taking an evidence based approach
5. The city achieves diversity in its digital technology workforce

KEY ACTIONS

1 We will establish a city digital skills research programme to include commissioning a review of current digital technology skills gaps, and research into the future digital technology skills needs of Glasgow's economy.

2 We will promote national activities which support schools in their delivery of computing science education (e.g. Digital Schools Award, teacher CPD), and work with schools to develop a tailored regional programme of support.

3 We will establish an industry partnership to support a coordinated approach for employers to engage with the development and delivery of digital skills education.

4 We will establish a programme to promote the availability, high quality and diversity of digital careers in Glasgow.

5 We will expand the pool of digital technology talent by promoting the range of re-skilling opportunities which enable individuals to re-train for Glasgow technology roles.

6 We will promote and expand the network of Glasgow tech clubs to ensure that all young people have access to informal opportunities to develop their digital technology skills and interests.

OUR ACTION PLAN FOR
THE DIGITAL ECONOMY – CONTINUED

OUR GOAL FOR DIGITAL INCLUSION AND PARTICIPATION

"We want to tackle digital exclusion and improve digital participation as a matter of social inclusion."

Barriers to digital inclusion have a multiplier effect on other inequalities, preventing full participation in economic, social and civic life – and lack of access to digital hinders Glasgow's businesses and services in taking advantage of digital channels to their customers.

Our ambitions for Glasgow's digital development require interconnection between its workstreams. Partnership and cross-development are essential to its progress.

To this end, the Digital Resilience Group is developing work to include care-experienced young people and linking it to work with looked-after older people.

Support for digital participation connects to work that develops opportunities to participate in economic, social and civic life. For example, seeking opportunities to use digital technologies in support of Participatory Budgeting, and priority setting using tools like the Place Standard. Glasgow's key digital access services will continue to build on the infrastructure of Glasgow's public libraries and the John Wheatley Learning Network.

The digital inclusion and participation workstream also underpins Glasgow's Community Learning and Development Plan and supports the community development work that drives the Thriving Places initiative. This work will include development of training programmes to develop digital agility for community workers supporting adult literacy and numeracy services, English for Speakers of Other Languages programmes, adult learning and youth services.

The city's partners will work together to deliver the outcomes listed below in order to meet the pledges made as signatories of Scotland's Digital Participation Charter.

This will involve ensuring that their staff and volunteers have the opportunity to develop essential digital skills; supporting them to help others learn essential digital skills and embrace digital tools, and work as part of Scotland's digital participation framework.

OUTCOMES

1. Everybody in Glasgow who needs it has supported access to digital technology and skills development opportunities
2. Access and support services are designed to include everybody
3. Everybody in Glasgow has the opportunity to learn how to use digital to participate in the city's economic life
4. Everybody in Glasgow has the opportunity to learn how to use digital to participate in the city's social life
5. Everybody in Glasgow has the opportunity to learn how to use digital to participate in the city's civic life

KEY ACTIONS

1 We will work in partnership across all sectors in the city to promote and collaborate to deliver the pledges of Scotland's Digital Participation Charter.

2 We will work in partnership across all sectors in the city to collaborate to develop, share resources, and deliver a coherent programme of staff/volunteer training.

3 We will establish a coherent city-wide catalogue of digital inclusion and participation training in partnership with all sectors in the city.

4 We will deliver the Digital Inclusion and Participation work within Glasgow's Community Learning and Development Plan 2018 – 2020.

5 We will deliver a targeted Digital Inclusion programme that ensures that everybody has access to Universal Credit.

6 We will provide opportunities for people to further develop their essential digital skills by signposting opportunities to develop advanced digital skills for the work-place.

7 We will encourage companies to promote digital inclusion and participation programmes to their staff, and will provide opportunities for companies to actively support digital inclusion and participation initiatives through their corporate social responsibility and/or volunteering.

OUR ACTION PLAN FOR THE DIGITAL ECONOMY – CONTINUED

OUR GOAL FOR DIGITAL CONNECTIVITY

> "We want to attract investment in next-generation digital connectivity and improve connectivity where there has been insufficient and/or unaffordable broadband or mobile coverage."

The quality of Glasgow's digital connectivity is another contributing factor to Glasgow's current competitiveness and inward investment successes.

The UK Government's Future of Telecommunications Infrastructure report positions digital connectivity as a fundamental enabler for economic growth. The report sets out goals for improving access to local full fibre networks, and establishing the UK as a world-leading centre for innovation in 5G mobile technology.

Scotland's digital strategy "**Realising Scotland's full potential in a digital world**" has a vision for:

> Providing high quality connectivity across the whole of our country; and Ensuring that Scotland is recognised internationally as a natural test-bed for innovation in connectivity.

Unlike other parts of Scotland, investment in Glasgow's digital connectivity is almost wholly dependent upon the market forces within the telecommunications industry.

There is a confidence in Glasgow's telecommunications market. CityFibre are already investing in a 300km gigabit network across the city which will provide the backbone for upgrading the Council's and school connectivity. They have further announced that Glasgow will be one of the first cities in the UK to benefit from a £2.5bn UK-wide investment in gigabit Fibre-to-the-Home connectivity.

We need to build upon this confidence to continue to make Glasgow an attractive place for all (fixed and mobile) telecommunication providers to invest in the best connectivity that is available, address gaps in provision within the city, and recognise Glasgow as an attractive and compelling location for trialling innovative products and services.

OUTCOMES

1. We have achieved economic growth (GVA) from inward investment, increased productivity and employment through the availability of excellent digital connectivity such as Fibre-to-the-Premises, and 5G.
2. Everybody in Glasgow has access to good quality affordable digital connectivity such as Superfast Broadband (>30Mbit/s)
3. Glasgow is recognised as an attractive environment to undertake research and innovation for industry, SMEs, and Universities due to the availability of excellent digital connectivity such as Fibre-to-the-Premises, 5G, and LoRaWAN.
4. Glasgow is recognised by communications providers as an attractive city for investment in communications infrastructure
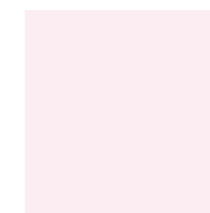
KEY ACTIONS

1 We will establish a partnership which will invest, build and manage a shared digital communications infrastructure.

2 We will undertake a programme of "Barrier Busting" to address local authority-enabling (process and assets) aspects of digital connectivity deployment.

3 We will establish "Digital Master-planning" as a key activity within overall city planning.

4 We will ensure that local and national agencies promote the value that city-wide connectivity enables, and support companies to make better decisions about their digital connectivity.

OUR ACTION PLAN FOR DIGITAL PUBLIC SERVICES

The role of technology is no longer to optimise what we do, but to re-imagine what we do, and how we do it. We have gained valuable experience of how technology such as the Internet of Things (IoT) and data analytics can completely transform our services through our Future Cities Demonstrator and our subsequent smart cities investments. Our learning from the demonstrator programme has (for instance) led to the creation of our Centre for Civic Innovation, and our Centre for Data Analytics and Visualisation.

We have built a global reputation for our smart city successes to date and this gives us something to build upon. Glasgow's size, our existing smart cities experience, and the growth (and diversity) of our digital sector puts Glasgow in a very strong position to become one of the most pioneering and innovative smart cities in the world; a city that is a testbed for smart city solutions, helping industry to trial new technology, and helping cities to learn from Glasgow's experience.

OUR GOAL FOR DIGITAL AND SMART PUBLIC SERVICES

> "We want to embrace the potential that digital technology provides to re-design our services around the citizen, enabling services to become more integrated, more proactive, and more personalised."

Our goal of achieving global recognition for smart city innovation could be considered to be a target in its own right. However, we want innovation to be relevant and act as a catalyst for digital transformation. We do not want to become a testbed for gadgets. Similarly we don't want to apply data analytics for academic value alone; we want to apply it to real problems, tackle city challenges, and to help us to re-design our services. We want to be a testbed for truly transforming services, and delivering better outcomes in our city, and (if proven) taking that learning to other cities.

> "We want Glasgow to be recognised as one of the most pioneering and innovative smart cities in the world, and we want to apply this innovation to transforming our public services."

We therefore want to create an environment where we bring together smart city innovation and public sector transformation; an environment that allows us to embrace the potential that digital technology provides for re-designing our services around the citizen, enabling services to become more integrated and proactive, and more personalised.

Our focus for our action plan for Digital and Smart Services is therefore applied to the priorities set out in the Council Strategic Plan as follows:

A Thriving Economy	The previous Digital Economy action plans
A Vibrant City	Digital Tourism and Heritage
A Healthier City	Digital Health and Care
Excellent and Inclusive Education	Digital Learning and Teaching
A Sustainable and Low Carbon City	Smart City Management / Smart Mobility and Transport
Resilient and Empowered Neighbourhoods; and A Well Governed City that Listens and Responds	Digital Customer Experience / Digital Community Engagement and Empowerment

The actions that we include for Digital and Smart Services in this strategy represent an important step forward in putting digital technology and smart city approaches at the heart of the city's public services. However we recognise that to realise the full potential, we need to provide an opportunity for all partners, and all sectors in the city to collaborate across a number of cross-cutting themes.

We cannot do this on our own; nor should we. There is an intercept between our two strategic aims. They are by no means mutually exclusive. The foundations that we lay down in this strategy are designed to facilitate innovation across the city that can help to shape the future of digital public services. Examples of these foundations include:

- Establishing digital as a theme within our innovation districts and increasing collaboration with innovation centres
- Building upon and expanding our Centre for Civic Innovation, and further developing our capability for (and pipeline of) open innovation challenges
- Making more non-sensitive data about the city available as open data
- Establishing a "Glasgow SDK" which provides a single place for software developers to get access to open application programming interfaces (APIs) for the city in order to develop innovative applications on top of city services.
- Establishing a "living lab" infrastructure that can be used to trial smart city, Internet of Things, and sensor technology within the built environment of a city
- Exploring opportunities to make better use of smart technology and data to help people to live independently.

This strategy is not the innovation, the intention for the strategy is to provide the environment that stimulates the innovation.

To ensure that we create a coherent programme of innovation engagement that makes best use of the foundations set out above (and across the strategy), we intend to establish a "**smart city challenge**" programme that will provide opportunities for communities and the city's public, private, voluntary, and academic sectors to all shape their city's digital future.

This will be achieved through a coordinated range of engagement events (for example, meetups, unconferences, hackathons, data jams, service jams, and (if applicable) even more formal further open innovation challenges if identified. The challenge will also be split into the themes identified within this strategy (e.g. Smart City Management, Digital Health and Care, Digital Learning and Teaching, Digital Planning, etc.), and potential other themes (such as smart mobility).

OUTCOMES

1. Public Services better meet the needs and expectations of our citizens and communities
2. Decision-making across the city is improved through better use of data.
3. Public services are redesigned around the needs of citizens and businesses using digital technology and better use of data.
4. Partnership working within the city is improved through the use of joined-up digital services
5. The lives of the people of Glasgow are improved by making better use of smart technology and data to enable services to become more preventative.
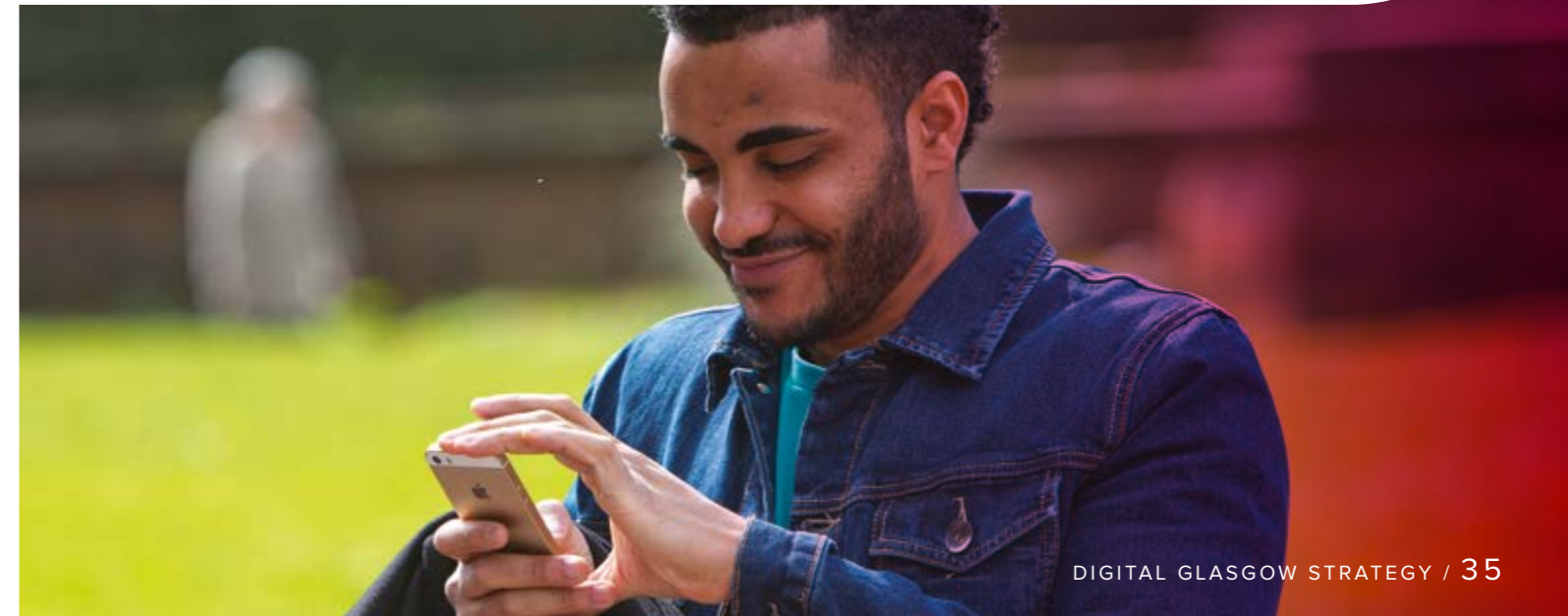
OUR ACTION PLAN FOR DIGITAL PUBLIC SERVICES – CONTINUED

DIGITAL CUSTOMER EXPERIENCE

Whilst recognising that we need to ensure that people have a choice in how they contact the Council, we want to make it easier for people to interact with us using digital technology. We have gained a great deal of experience over recent years through the re-design of our website, and through our smartphone app.

We want to build upon this, but it isn't just about digitising forms. Where it is appropriate (and possible), we will make better use of data and keep people better informed to reduce the need to contact us unnecessarily where we can. We will achieve this through the following set of actions:

KEY ACTIONS

1 We will increase the number of transactions that can be completed online, and where possible make forms simpler and easier for people to use.

2 We will improve the integration between our online services and the operational systems that are used by our staff to ensure that the customer experience is as joined up as possible.

3 Where online services provide access to personal and/or sensitive information we will integrate our online services with relevant national online identity assurance platforms.

4 We will implement a new platform that can send email and/or text notifications to allow customers to be kept better informed.

5 With the consent of our residents we will make better use of data to remove the need to apply for grants and services if our data tells us that they are entitled to them.

DIGITAL HEALTH AND CARE

**Scotland's Digital Health and Care Strategy** sets out a vision to deliver the following;

> "We wish to empower citizens to better manage their health and wellbeing, support independent living and gain access to services through digital means"

Within Glasgow, a key goal of the Glasgow Health and Care Partnership is to "deliver transformational change in service provision, leading to positive health and well-being outcomes for Glasgow's citizens". The priorities that underpin this goal include enabling early intervention, prevention and harm reduction, providing greater self-determination and choice and enabling independent living for longer.

Whilst recognising the need to ensure that any application of digital technology within health and care is inclusive and people-centred, we recognise that digital technology can play a major role in enabling these priorities and therefore set out the following actions:

KEY ACTIONS

1 We will work with **NHS Greater Glasgow and Clyde** to provide seamless access to digital services across health and social care services and provide better integration between health and care services.

2 We will explore opportunities to expand the use of digital engagement tools which allow people to have video calls with health and care professionals.

3 We will migrate our telecare service to digital technology in advance of the switch-off of the public switch telephony network (PSTN) in order to provide a new "digital telecare/telehealth platform" that can enable advanced digital services that help people to live independent lives

4 We will deliver a "Digital Resilience" programme with children and young people in care and will expand this to older people's residential homes.

5 We will seek opportunities to engage with partners, Innovation Centres, industry, and universities to stimulate innovation in digital health and care that will allow us to explore how digital technology can help us to deliver our health and care priorities.
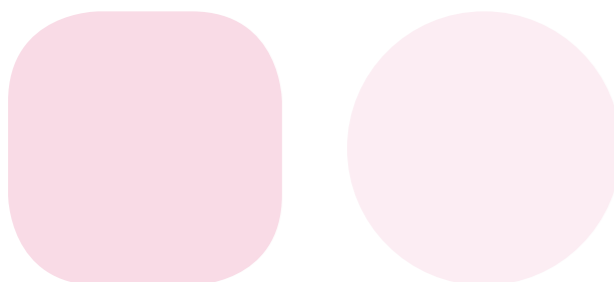
OUR ACTION PLAN FOR DIGITAL PUBLIC SERVICES – CONTINUED

DIGITAL LEARNING AND TEACHING

The **Digital Learning and Teaching Strategy for Scotland** sets out four key objectives:

1. **"Develop the skills and confidence of educators in the appropriate and effective use of digital technology to support learning and teaching"**
2. **"Improve access to digital technology for all learners"**
3. **"Ensure that digital technology is a central consideration in all areas of curriculum and assessment delivery"**
4. **"Empower leaders of change to drive innovation and investment in digital technology for teaching and learning"**

We believe that digital technology can deliver better achievement and attainment, and increase parental involvement. What's more, by making innovative use of digital technology we can also help young people to improve their confidence, allow them to develop new digital skills, and potentially inspire them to consider digital careers.

We have already established a Digital Learning and Teaching group that has begun to embed digital leadership across our schools, and have established a Digital Learning and Teaching strategy which includes the following actions:

KEY ACTIONS

1 We will provide access to over 50,000 Apple iPads to every child from P6 and above (the largest deployment of Apple iPads to schools in the world).

2 We will expand the availability of Wi-Fi across classrooms.

3 We will upgrade the network connectivity provided to schools to (up to) 100 times faster than its current speed.

4 We will place digital leadership at the heart of School Improvement Plans and will undertake an extensive programme of digital leadership development and professional development for school staff.

5 We will work with SEEMiS and the Improvement Service to roll-out the national "Parent Portal" (which will provide parents with greater access to information about the school and their child's performance).

DIGITAL PLANNING

The Scottish Government's Economic Strategy recognises the need to improve efficiency in the delivery of public sector services. Local authorities have an important role to play in ensuring this is done, particularly in functions such as building standards, where effective and efficient decision making provides the private sector with the certainty required to drive forward investment and deliver sustainable economic growth.

To support this strategy the Scottish Government introduced a national eBuilding Standards portal for the submission of building warrant applications in August 2016. The eBuilding Standards portal sits alongside the ePlanning portal which was re-launched in January 2016. The portals sit within the new overarching eDevelopment.scot website.

We have tried to maximise the potential from the electronic submissions received via the portal by introducing full end-to-end electronic workflow. Automated workflow and tasks reduce process delays which have improved performance and introduced process cost savings in terms of time saved on manual data entry and a reduced need for printing, consumables, postage and storage of files.

We have also now provided our building standards staff with iPads equipped with mobile apps that help them to better undertake their tasks (such as inspections) remotely and which automatically update our planning system. We are now rolling this technology out to other services such as planning, and planning enforcement.

Having already focused on the digitisation of planning submissions and the associated processes and tasks, we now turn our attention to establishing a richer digital model of the city (including planned and existing buildings) to improve the quality of decision-making using Building Information Modelling (BIM), and 3D modelling.

KEY ACTIONS

1 We will develop a 3D strategy. This strategy will include plans to enable 3D planning application submissions and the development of an intelligent 3D City Model ("I3DC") that could be re-used across a range of public services in the city.

2 We will establish a Building Information Modelling ("BIM") Framework that will set out our data requirements or 3D building and city modelling.

3 We will proactively explore opportunities to reuse the Intelligent 3D City model in novel and innovative scenarios (such as augmented reality simulations of developments) across a range of public services.

4 We will publish the 3D City model as open data and will seek opportunities to stimulate open innovation that makes use of the model.

OUR ACTION PLAN FOR DIGITAL PUBLIC SERVICES – CONTINUED

SMARTER CITY MANAGEMENT

As well as showcasing smart city innovation within the city, the Innovate UK Future Cities Demonstrator established some key assets that the city can (and is already beginning to) build upon to improve the management of the city;

THE GLASGOW OPERATIONS CENTRE
A state-of-the-art operation centre that allows us to better coordinate and integrate our city services so that they are more responsive to the needs of the city, and improve the city's resilience.

INTELLIGENT STREET LIGHTING
Pioneering trials of intelligent street lighting at three sites in the city centre (Gordon Street, Merchant City, and the Clyde Walkway).

SOCIAL TRANSPORT PLATFORM
A new integrated platform for scheduling, booking, and tracking social transport.

SMART ENERGY
A number of Smart Energy demonstrators such as "demand-side management", sensors to monitor the impact of insulation retrofit, and 3D building energy-efficiency modelling.

These demonstrators have given the city confidence that approaches like this can transform our city management and so the actions we set out are designed to expand our smart city infrastructure, transform how we work as a consequence, and continue to stimulate and drive smart city innovation.

KEY ACTIONS

1 We will expand the use of the Glasgow Operations Centre for coordinating other city services.

2 We will continue our deployment of mobile devices for staff to help to keep them connected in the communities they serve.

3 We will migrate infrastructure asset management and job scheduling and workflow from disparate software systems into a single common platform.

4 We will scale up our smart city infrastructure such as Intelligent Street Lighting and Smart Bins across the whole of the city.

5 We will continue to attract and deliver smart city innovation projects such as our current Horizon 2020 "RUGGEDISED Smart Street" project.

6 We will provide opportunities for SMEs to innovate with smart city infrastructure by creating a "living lab" environment for smart city innovation, aligned to the Centre for Civic Innovation, and our innovation districts.

DIGITAL TOURISM AND HERITAGE

Tourism is one of Glasgow's key sectors. The **Glasgow Tourism and Visitor Plan** identifies the following priorities:

1. **"Promoting the city's vibrant cultural experiences"**
2. **"Offering tourists a high-quality joined up visitor experience"**
3. **"Building upon the city's strong credentials to grow and invest in business tourism"**
4. **"Providing inspiring experiences which encourage day visitors (for example those attending sporting events) to return more often"**

Digital technology can play a vital role in achieving these goals and providing unique and inspiring experiences of the city and its attractions, so we set out the following actions:

KEY ACTIONS

1 We will make better use of data about potential, current, and past visits to inform our marketing and promotion of the city, and to better understand the future demand on our tourism sector.

2 We will use digital technology to enrich the visitor experience at our museums, for example using augmented reality.

3 We will use digital technology to enrich the visitor experience within the built environment of the city, for example using digital wayfinding, and augmented reality applications.

SMART MOBILITY AND DIGITAL TRANSPORT

Underpinning modern use of transport is an increasing appetite for demand-responsive transport opportunities and an interest in Mobility as a Service (Maas). Innovative use of data provides opportunities for increasing efficiency and better passenger experience through provision of real-time information as well as real-time intervention (such as traffic management).

A recently commenced review of the West of Scotland Regional Transport Strategy provides a suitable opportunity for stakeholders to co-produce a Digital Transport Strategy to provide a vision for harnessing digital technologies.
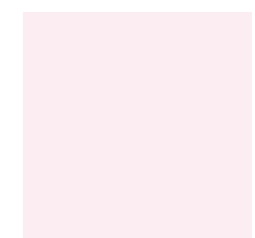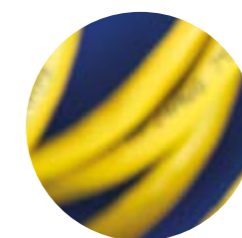
OUR GOAL FOR DIGITAL COMMUNITY ENGAGEMENT AND EMPOWERMENT

The Glasgow City Council Strategic Plan sets the following outcomes;

"The Council has open and transparent decision-making"
"Citizens are more involved in local and citywide decision-making"
"We listen to citizens and respond"
"We take account of equality issues and the impact of poverty in our decision-making"

Digital technology provides us with opportunities to increase transparency, ensure that local communities are well informed, and increase participation by helping to remove time and location barriers to getting involved.

Our ambitions for community engagement will be supported by cooperation across workstreams, in particular the digital inclusion and participation workstream, many of the members of which are also key influencers within the Glasgow Community Learning and Development Strategic Partnership.

The city's work in supporting Participatory Budgeting and in supporting community development through the Thriving Places initiative will build, partly through digital means, on the ongoing dialogue and cross-sectoral work that underpins Glasgow's Community Planning Partnership and the CLD Plan.

In order to increase civic participation, we will build on the outcomes of the Future Cities programme, such as extending the Council's GIS mapping services to support community asset mapping. This work will include developing the use of tools like the Place Standard for community-led priority setting and linking such tools to information about opportunities to engage with elected representatives, planning officers and community planning partners.

> **"We want to empower communities through better access to information and using digital technology to increase civic participation"**

OUTCOMES

1. Our communities are better informed by having better access to information.
2. Our communities are regularly consulted using digital means in order for us to broaden participation.
3. Our communities are regularly involved in the design and evaluation of our services.
4. Our communities regularly collaborate on local challenges using digital means in order to broaden participation.
5. Our communities are regularly empowered to make local decisions through digital means so that we can capture the views of as many people as possible.

KEY ACTIONS

1 We will work with communities to design and launch a new digital service which will provide communities with better access to real-time information about their area including community assets, demographics, planning applications, and statistics on reports that have been made to (and are being managed by) the council.

2 We will expand our use of digital tools from a focus on consultation to engaging and involving Glasgow's citizens in setting general priorities, and in making decisions about how best to prioritise Council spending.

3 We will involve communities in the design of our services, particularly where we are re-designing services using digital technology, and supporting involvement in public service evaluation and planning through a variety of means.

4 Working with Scottish Government, COSLA, and the Digital Office for Scottish Local Government, we will introduce new digital apps that allow people to vote on local community matters. These can be used to maximise participation in Participatory Budgeting as it is deployed within the city.

5 We will explore opportunities to use digital tools to support general community empowerment actions such as supporting community councils, participation requests, and asset transfer.

OUR GOAL FOR DIGITAL LEADERSHIP

> "We want to develop a culture of digital leadership and innovation"

The opportunity to redesign public services using digital technology represents a significant step-change in local government. It provides an opportunity to completely rethink and reimagine how we deliver services.

The vision set out in Scotland's Digital Strategy '**Realising Scotland's full potential in a digital world**' is:

> "Designing digital public services around the needs of their users"

To enable us to do this we need to adopt new leadership styles, establish new ways of working, develop new methodologies and equip our workforce with the skills that they will need to deliver and adapt to the change.

OUTCOMES

1. We want our elected members, senior council officers and partners to be committed to realising this strategy, and provide leadership for redesigning our services using digital technology
2. We want to establish new ways of working and new methodologies (such as agile development, service design, and open innovation) to better equip us to keep up with the rate of change, and to enable us to transform our services using digital technology.
3. We want all of our staff to have essential digital skills, and have opportunities to develop new advanced digital skills to deliver and adapt to the change.
4. We want to build an active and extensive programme of open innovation and research for digital public services

KEY ACTIONS

1 Working with partners such as the Digital Office for Scottish Local Government we will deliver a cultural change programme for elected members and council officers, and create synergies with similar programmes across city partners.

2 We will deliver a programme of communication, engagement, consultation and dialogue aimed at key stakeholders as well as a network of 'digital leaders' and 'disrupters' to challenge existing thinking and ways of working.

3 We will create a programme to develop and implement new transformation capabilities such as agile, service design, and open innovation.

4 We will establish an advanced digital skills programme to develop digital skills within the workforce. We will deliver in partnership with the Digital Office for Scottish Local Government, and in line with our broader digital skills and employment programme within the city.

5 We will establish an essential digital skills programme for our staff which will be delivered through our Digital Inclusion and Participation project.
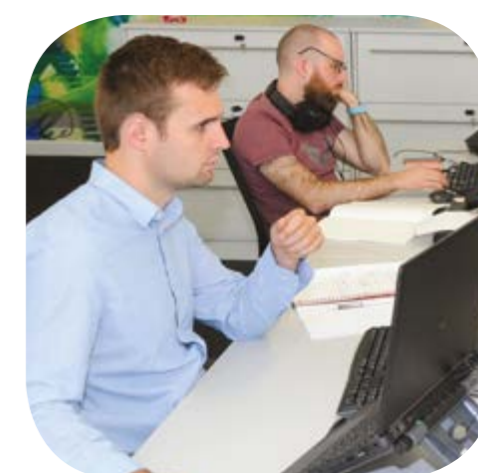
OUR GOAL FOR DIGITAL FOUNDATIONS

"We want to strengthen the digital foundations that enable us to deliver sustainable and secure digital public services"

The redesign of public services using digital technology is intrinsically dependent upon the underlying technologies that we already use to deliver our services.

The public services that we deliver within the city are already critically dependent upon the technologies that our staff use, and the technology that supports our citizens to interact with us online, by telephone, or face-to-face.

We need these "foundations" to be:

- Reliable and resilient
- Scalable and flexible
- Standardised and value for money
- Secure

It isn't just about technology though. Data will be the source for re-designing public services, rather the technology itself. We also need to be able to make better use of data; we need to improve how we process it, how we make it available, and how we make use of it. Importantly we need to do this in a way that is ethical and respects people's rights and privacy.

Scotland's digital strategy "**Realising Scotland's full potential in a digital world**" has a vision for:

"The public sector to operate contemporary, digital, platform-based business models"

"Being secure and resilient against cyber threat and risk"

We believe that our digital foundations action plans (which we have split into technology and data foundations) address these goals, but also recognise that to stimulate innovation within the city we need to make our digital services available to third party developers through Application Programming Interfaces (APIs). We have done this already; we publish traffic information via APIs. We want to do more.

## REINFORCING THE CITY'S TECHNOLOGY FOUNDATIONS

We operate a complex and diverse set of the technologies to deliver the range of public services that we provide within the city. It underpins most things that we do and we need it to be resilient, scalable, standard, and secure. We also need it to be modern and up-to-date so that it can be used as the basis for redesigning our services. We need it to be easy to use, and for it to continue to help our staff to better collaborate with others, wherever they are in the city.

Traditionally, the focus of our technology has been internal and the primary focus of technology has been to help staff to undertake their tasks.

We recognise that this needs to change. We need to help stakeholders across the city to embed our digital services within a broader digital ecosystem across the city, so we are delighted to announce that as well as a focus on strengthening our digital foundations, we will also launch a City Software Developer Kit (SDK) that allows anyone to develop applications using application programming interfaces (APIs) made available by the city.

OUTCOMES

1. Our public services are more integrated and seamless by reducing duplication, and by better integration between our technology platforms.
2. We have improved productivity and efficiency of our public services by providing staff with the means to receive and update information, and collaborate with others effectively wherever they are.
3. We have improved the resilience of public services by ensuring that our underlying technology platforms are secure and resilient.
4. We have reduced the whole-lifecycle cost of our technology platforms by procuring technology as a service wherever it is possible.
5. Our underlying technology platforms are flexible and responsive to future needs.
6. Organisations and individuals are developing innovative products and services that make use of digital city services that are made available through a City Software Developer Kit.
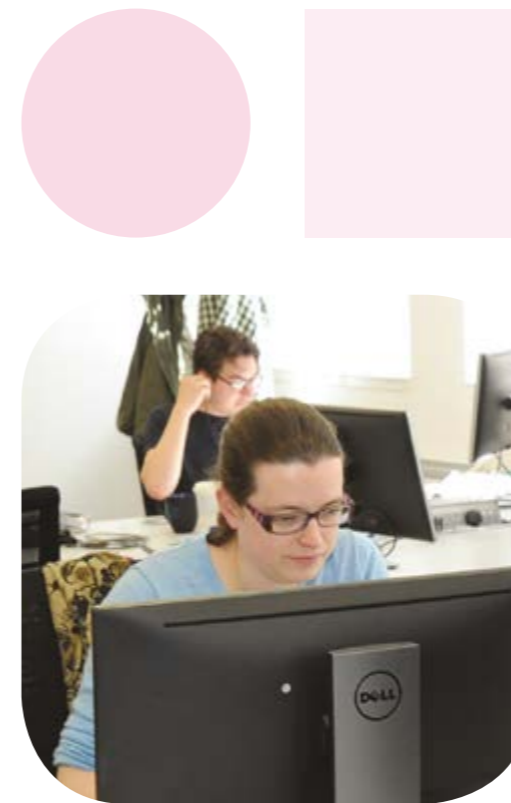
KEY ACTIONS

1 We will ensure our technology platforms are hosted in secure, modern and efficient datacentres.

2 We will upgrade the capacity of our corporate and school networks and will expand the corporate and schools Wi-Fi networks.

3 We will ensure our staff have modern devices and will introduce new technologies to support better collaboration and modern work styles.

4 We will ensure our data and our infrastructure platforms are secured to industry-leading security standards.

5 We will strive to consolidate current disparate business applications into more common and reusable technology platforms.

6 We will work with partners across the city to make our technology platforms more interoperable and open and create a City Software Development Kit (SDK) that we will make available to staff and 3rd party developers.

ENHANCING THE CITY'S DATA FOUNDATIONS

Learning from the successful delivery of the Future Cities Demonstrator, Glasgow City Council established a Centre for Data Analytics and Visualisation to bring together skills and resource to make better use of data to improve transparency, enable data-driven decision-making, community empowerment, and service re-design. This has been a real success and has acted as a catalyst for data-driven innovation in a number of areas within the Council.

Scotland's Digital Strategy "**Realising Scotland's full potential in a digital world**" sets out a vision for:

> "Sharing and opening up non-personal data as a source of innovation and efficiency"

Our Open Glasgow programme and the subsequent achievements of the Centre for Data Analytics and Visualisation has proven the benefit of creating a culture of sharing of non-sensitive information, and the opportunities this brings. On this basis, we are delighted to announce that we will be "Open by Default", reinvigorating our open data programme, and seeking support from all of our partners across the city to make more data freely available.

Our data strategy is not just about open data however. Open data is a catalyst. To make better use of data we need to work on the supply and demand side of data.

On the demand-side, we set out actions to introduce a new ethical framework for how data is used, actions to establish a new data exchange that can facilitate better data sharing where it is required and applicable, and we will seek to develop cross-sector communities of interest around the city's data.

On the supply-side, we recognise that we need to strengthen internal processes to ensure that publishing good quality open data is sustainable. We also set out plans to establish an online service that provides people with greater transparency of how any personal information is used, and where appropriate, allows them to control their consent to its use.

This is a bold data strategy and to deliver this we will develop and implement a scalable, flexible operating model, with the right people, right skills and right technology to deliver business intelligence, spatial analysis, and data analytics across the Council.

OUTCOMES

1. We have embedded a culture of data driven decision making across the city
2. The data and information we process is well managed.
3. We are trusted for how we process and use data.
4. We make data accessible and 'open by default' to help citizens, communities, businesses, academics, and visitors better understand the city.
5. We have established an active community of people and organisations from across the public, voluntary, academic, and private sector who use city data as a basis for research and innovation.
6. We will make better use of data to re-design public services.

KEY ACTIONS

1 We will establish a new awareness and training programme that helps our staff to better understand the value of data and further develops awareness of the need for data standards and data quality for making better use of data to transform services.

2 We will build on the foundation of GDPR by developing a data ethics framework to ensure that our use of data to transform services is done so in a way that respects privacy, rights, and ethics.

3 We will develop online services that help put citizens in control of the data that is collected about them by allowing them to see how their data is used, and where possible, control consent.

4 We will catalogue data that is collected across the city so that everybody has a better understanding of what data is collected, and where it is processed and used.

5 We will increase the number of open data sets that we publish and expand the use of our City Data Platform in order to provide a scalable platform for publishing open data, and providing meaningful visualisations of non-sensitive data through maps and dashboards.

6 We will build communities of interest for data, and will facilitate engagement with city data through open innovation challenges.
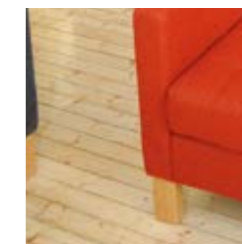
OUR APPROACH

Our Strategic Plan sets out the following values which provide the basis behind our approach to developing and realising the Digital Glasgow Strategy:

1. Creating more opportunities for our citizens to become involved in local decisions that affect their neighbourhoods, on how money is spent and how services are developed.

2. Focussing on early intervention and prevention approaches.

3. Partnership working with all those who can help us build a better Glasgow including:

   ■ Citizens
   ■ Third sector and community groups
   ■ Community planning partners
   ■ City businesses and academic sector
   ■ Our neighbouring local authorities
   ■ The Scottish and UK Governments.

Underpinning this approach are a set of values that are enshrined within our Citizen's Charter, which has informed our approach to developing and realising the Digital Glasgow Strategy;

1. Be an **open, transparent** and **easily accessible** organisation which communicates freely with city residents and involves them in decision making.

2. Be **fairer** and **more equal**, giving everyone in Glasgow the chance to flourish and improve their life chances and choices.

3. Work to **uphold and protect people's basic human rights**, including treating them with dignity, fairness, equality, and respect, regardless of their background.

4. **Promote pride in what the city has achieved**, its people, its heritage, its facilities and appearance and be proud to live and work in Glasgow.

5. **Work in partnership**, allowing people to contribute and allowing ideas from any source to be heard and considered.

OUR LEADERSHIP APPROACH

The implementation of our Digital Glasgow Strategy will be overseen by our new Digital Glasgow Board which is chaired by the City Government's Depute City Convener for Inclusive Economic Growth. It is attended by seven elected members (in total) across all political groups, the Chief Executive Officer, Chief Digital Officer, and Regional Director for Economic Growth.

This board will be underpinned by a Digital Glasgow Delivery Group which will be attended by all of the key city partners who will play an active role in implementing the strategy.

In addition, given the significance of the digital sector to Glasgow's economy, the implementation of the digital economy element of the strategy will also provide support to, and be overseen by the Glasgow Economic Leadership Forum (which includes representation from commerce, the public sector, and academic sector).

OUR PARTNERSHIP APPROACH

The Digital Glasgow Strategy has been prepared in collaboration with partners across the public sector, third sector, private sector, and academic sector in the city and this will continue through to implementation. All parties involved in the implementation of the strategy will become part of a Digital Glasgow Reference Group which will allow everyone involved in the implementation of the strategy to shape and inform our plans.

COLLABORATING WITH OTHERS

Engaging with other local authorities, and other cities across Scotland, the UK, and globally will allow us to learn from the experience of others and share Glasgow's experience, and provides us with an opportunity to promote the city in order to help to deliver our goals for the digital economy. Glasgow will take a proactive approach to collaborating with others, and will facilitate and lead collaboration with others where it is required. Glasgow will seek to engage with other cities and local authorities on areas including:

■ The Digital Office for Scottish Local Government
■ The Scottish Cities Alliance
■ Core Cities
■ Eurocities
■ European Union Horizon 2020 and Interreg Programmes
■ Rockefeller 100 Resilient Cities
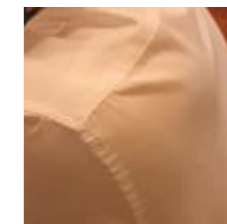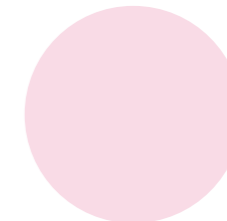
OUR APPROACH – CONTINUED

OUR DELIVERY APPROACH

We cannot deliver this strategy with a "one-size fits all" delivery approach. We will need to adopt different delivery approaches according to the nature of the action. In line with the values of our Strategic Plan we will work in partnership and will engage with communities to deliver the strategy.

We will adopt three key delivery styles to deliver the actions of the project that are in line with the digital leadership styles and methods to be developed under our "**We will establish a culture of Digital Leadership**" theme:

DELIVERY STYLE 1 – OPEN INNOVATION

Where the actions of the Digital Glasgow Strategy relate to complex city challenges, where there is a need to engage with communities, and where there are opportunities to engage with small to medium enterprises to stimulate product and service research and development we will adopt our open innovation processes, co-ordinated by our Centre for Civic Innovation at the Tontine. We will work with appropriate partners who can help us to deliver open innovation programmes including (but not limited to):

- CivTech™
- Construction Scotland Innovation Centre (CSIC)
- The Data Lab

- The Digital Health & Care Institute
- GovTech
- Innovate UK (e.g. Small Business Research Initiative, SBRI)
- Scottish Enterprise (for example the "Can Do" Challenge")

DELIVERY STYLE 2 – AGILE & SERVICE DESIGN

Where we need to re-design our services we will engage with residents in a formal process of user research and service design, and to enable us to prototype and engage with residents in an iterative ("co-production") manner, we will adopt agile development. Where we need to optimise our processes to deliver the service we will adopt LEAN methods to re-design our processes.

DELIVERY STYLE 2 – LARGE-SCALE AND COMPLEX IMPLEMENTATIONS

Where we are undertaking large and complex migrations of known technologies (for example technology infrastructure) and where there is no impact on the service as it's experienced by users, and where there is a need to minimise the potential impact of something going wrong with the implementation, we will adopt a more traditional "Prince 2" style.
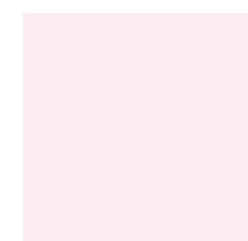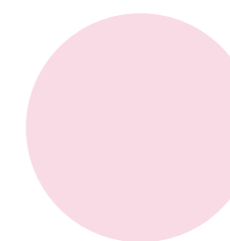
CLOSING REMARKS

We know that a strategy document in itself cannot drive the level of transformation for the city that is described within this strategy.

The strategy will now form the basis for an active city-wide programme that will be continually monitored by the Digital Glasgow Board. Our partners from across the city will play an active role in the delivery of the programme based upon the approach that we have set out.

The implementation of the strategy will be continuously monitored in terms of both the delivery of the actions, and the realisation of the expected outcome that we have set out.

The strategy also exists within the context of rapid evolution of the digital sector on a global scale. Our Smart City Challenge will provide an opportunity for partners and communities across the city to continuously explore new ideas, and drive innovation above and beyond the actions that we have set out. We will review the relevance and importance of the actions that are specified in the strategy on an annual basis, and if it is required, we will reprioritise actions, and issue updated versions of the strategy to reflect changes in circumstances.
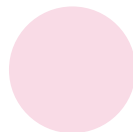
ACKNOWLEDGEMENTS

DIGITAL GLASGOW