

Global City Innovation Strategy Brief

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Introduction.

Established in 2020, DiSTEP is the research institute specializing in promoting emerging science-based industries, regional innovation, connecting Daedeok Innopolis and Daejeon City, while evaluating and analyzing science and technology innovation projects funded by Daejeon City. To achieve its mission, DiSTEP plans and designs international cooperation projects for Daejeon City, such as sustainable urban growth and collaborative urban problem solving.

As part of this initiative, DiSTEP is partnering with Solbridge International Business School, the university with the largest number of foreign professionals in Daejeon, to identify and learn from cities that are leading global innovation. Based on this research, DiSTEP aims to provide Daejeon's policy makers with basic information on the global science city strategy.

This brief provides an overview of science and technology innovation policies, science and technology innovation infrastructure, and related budgets in four cities - Calgary, Canada; Dresden, Germany; Durban, South Africa; and Málaga, Spain - that have abundant potential innovation resources and are systematically pursuing their strategies.

We hope that this report will be of great help to those involved in science and technology-based urban innovation, including stakeholders in Daejeon City.

Development and Innovation in the City of Dresden

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City Profile



Lord Mayor of Dresden (Oberbürgermeister)

Name	Dirk Hilbert
Date of Birth	23. October 1971
Party	FDP (Free Liberal Party)
Education	Industrial Engineering (Dipl., TU Dresden)
Term	Since 2005, re-elected on 11 July 2022
Priorities	Development of small and medium sized enterprises in Dresden

City of Dresden

Administrative	Capital of the Free State of Saxony, 10 administrative districts
Population	555,351 (City), 790,400 (Urban), 1,343,305 (Metro)
GDP (EUR per capita)	41,809 as of 2020 (annual change: -1,7%)
R&D	4.9%, as of 2019 (Federal Bureau of Statistics, 2023)
Industrial Structure	Primary 0.05%, Secondary 23%, Tertiary: 76%
Area	328.8 km ² (City)
Core Strategic Industries	Microelectronics/ ICT, Materials/ Nanotechnology/ Photovoltaic, Life Science/ Biotechnology
Traffic	<p>Important road and rail transport hub in east Germany.</p> <ul style="list-style-type: none"> • Direct rail links to Erfurt, Berlin, Frankfurt am Main, Wiesbaden, Hamburg, Hannover, Leipzig, Prague, Bratislava, Budapest (among others) • 4 motorways: A4 (Aachen - Gorlitz) , A13 (Berlin – Dresden), A14 (Magdeburg – Dresden), A17/ E55 (Helsingborg, Sweden – Kalamata, Greece) • International airport (servicing European destinations) • Trams: 12 lines covering a 200km network
Significant	<ul style="list-style-type: none"> • Hosts 4 Universities and over 40 research institutes, including 3 Max-Planck Institutes, 3 Leibnitz Institutes, and the Helmholtz Centre Dresden-Rosendorf (HZDR) • Home to “Silicon Saxony”, an association of nearly 300 companies in microelectronics and related sectors • Historical (Baroque) old town, with some 13,000 cultural monuments including the Zwinger Palace and the Semper Opera.

Key Points

- Dresden’s economy managed to rejuvenate whilst maintaining it’s strengths in industrial manufacturing and research following German reunification thanks, not least, to an early development focus on high-tech industrial clusters.
- The success of industrial clusters in Dresden depends on a number of factors, many of which originated in imperial Germany of the 18th and 19th century. Its unique history following the industrial decline of reunification proved particularly important in forming important links between industry and research.
- Despite demographic trends in Dresden being less severe than in many other places in Germany, it has an ageing society and relies on migration to attract skilled labor.
- Policy initiatives are shared between different levels of government (EU, federal, state, communal) and particularly aim at SMEs and start-ups and research funding.
- Higher education and research infrastructure put particular emphasis on applied sciences and excellence in vocational training whilst developing world-beating academic research clusters at the same time.
- Inter-connection between different parts of education, research, industry, and different – often complementary – value chain is another factor in Dresden’s success.

Economic Development

Dresden evolved as an industrial centre of imperial Germany before WWI and had to face successive rounds of reconstruction after WWII and German reunification. It could draw on its early industrial legacy, its people, and supportive policy to regain its competitiveness in industrial manufacturing and innovation. But, as for much of Germany - particularly the East - demographic trends are the main challenge to overcome.

Industrial Roots

Dresden's and also Saxony's economic development is commonly seen in the context of its post-war history inside the GDR as well as its development following German re-unification. Whilst these events are important, Saxony's industrial development is far preceding these episodes: Arguably, throughout the 19th and early 20th centuries several industrial clusters – notably Leipzig and Dresden – developed thanks to a combination of a long tradition of craftsmanship throughout the Ore Mountains, the development of a highly educated workforce following protestant Reformation of the late 16th century (which had its origins in Saxony), and its openness – Dresden and Leipzig in particular were located on important historic trade routes and benefited from foreign exchange and trade early on¹. Saxony became the industrial heart of Imperial Germany towards the late 19th/ early 20th century. Whilst much of its human capital and industrial capacity has been lost during WWII, it continued to benefit from its industrial history and developed into the GDRs industrial center, where it developed core industries that re-gained competitiveness after re-unification (pharmaceuticals, ICT, mechanical engineering). Against this background much of Dresden's post-reunification success is based on a long manufacturing tradition and has a close link to its demographic development.

Economic Development post 1990

Dresden's economy was subject to widespread privatization and de-industrialization, particularly in the early years after re-unification². Saxony, and within Dresden, was able to keep an over-proportional share of its industry and academic institutes. This, together with its long industrial tradition, helped attracting investments early on, which explains part of Dresden's success compared to less fortunate regions in former GDR states that faced industrial decline and emigration of particularly younger demographics. Another part is linked to policy initiatives that have early prioritized rejuvenation through offering support to competitive industries only in an almost Schumpeterian sense³. Saxony's

1. In a recent study Joachim Ragnitz gives an overview of Saxony's industrial history that argues for a better appreciation of its industrial roots. (Ragnitz, 2017)

2. After reunification former state-owned enterprises (SOE) were transferred into a trust agency ("Treuhandanstalt") that was tasked to modernize or liquidize SOEs between 1990 and 1994. Many SOEs had to be liquidated as the productivity-gap between private competitors proved too large.

3. A large number of Saxony's industrial companies were subject to the ATLAS (translated: State Selected Trust Companies for Reconstruction) initiative of 1992 that subsidized participating SOEs in order to prepare their subsequent privatization. Overall, industrial policy in Saxony has had a comparatively strong focus on establishing new rather than preserving old industries. (Ragnitz, 2017)

large skilled workforce – particularly craftsmen and technicians – was an important commodity in its post GDR development (Ragnitz, 2017). A further factor was think-tanks that emerged out of employee initiatives in R&D departments of former SOEs that faced liquidation. 71 private think tanks, called Research LTDs (German: "Forschungs-GmbHs") are able to provide valuable know-how to private companies that are unable to run own R&D departments. Research LTDs and an early recognition of Saxony's state government to establish key industries and define strategies to preserve existing R&D infrastructure have been an important factor in the development of industrial innovation clusters and innovation drivers, such as Silicon Saxony and the Helmholtz-Center Dresden-Rosendorf. Current challenges include a lack of knowledge-transfer through academic research institutes that often focus on basic research, the fact that much of Dresden's and Saxony's industry is downstream whilst upstream industries have not yet had time to develop, and demographic challenges implying a shortage of skilled labor. (Ragnitz, 2017)

Demographics

Demography is a common policy challenge throughout Germany, as an ageing society, particularly so, however, in its former GDR states. To understand policy challenges for Dresden, it is hence important to understand its demography.

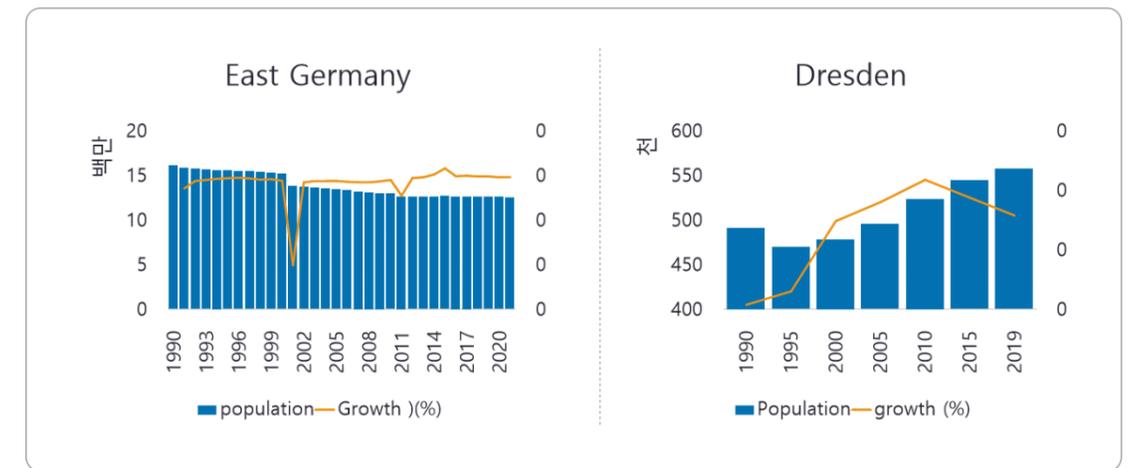
Dresden's demographics are in many respects unusual for Germany, particularly for eastern Germany: its population grew almost uninterrupted, following a short period of decline in the decade after German re-unification. Positive net-migration is the main driver of its population growth with the majority of migration coming from abroad, followed by migration from within Saxony (excl. Dresden's surrounding areas). On the other hand, Dresden's fertility rate, the number of children born per women, is low at 1.44 (2.1 is required to sustain population levels) whilst life expectancy is increasing (Dresden, Dresden.de, 2022). With this, Dresden is currently relying on net migration to sustain and grow its population.

Demographic trends for Dresden are in contrast to trends observed for Eastern Germany and Germany⁴ : Germany as a whole is an ageing society and as such has first started to see a decline in its population

4. Eastern Germany refers to states of the former German Democratic Republic (GDR): Brandenburg, Mecklenburg-Western Pomerania, East-Berlin, Saxony, Saxony-Anhalt, Thuringia. These states are subject to an industrial structure and economic development that is distinct from Germany as a whole and are hence analyzed separately.

around the Millennium. Much of its slower-moving demographic trend has been compensated by large net migration within the last decade so that with more than 83.2 Million, Germany has recorded its highest ever population in 2021. This should not distract from the fact that underlying demographic characteristics keep suggesting a population decline for Germany in the long run: With currently 1.47, fertility rates in Germany (Federal Bureau of Statistics, 2023) are still low and migration is subject to large volatility. This is why demographic forecasts predict a reversal of trends within the next decade (Federal Bureau of Statistics, 2023) (Descherimeier, 2017).

Eastern German states suffer from population decline since re-unification as eastern Germans emigrate to western Germany, where living standards are still higher, whilst industrial decline led to poor employment prospects particularly in the first two decades after re-unification. Negative net-migration in former GDR states, coupled with declines in domestic growth potential due to similarly low fertility rates (1.52 for Saxony as of 2021 (Federal Bureau of Statistics, 2023)) and increasing life expectancy. Net-migration for eastern German states has increased steadily and even turned positive in 2021. Observed trends vary regionally: Whilst small and medium sized cities increased over-proportionally, rural areas were lacking behind (Slupina, Damm, & Klingholz). Rural areas have more recently become more popular though due to an increasing number of employees working from home as well as cost pressures from urban house and rental prices (Beck, Sixtus, Nice, & Hinz, 2022).



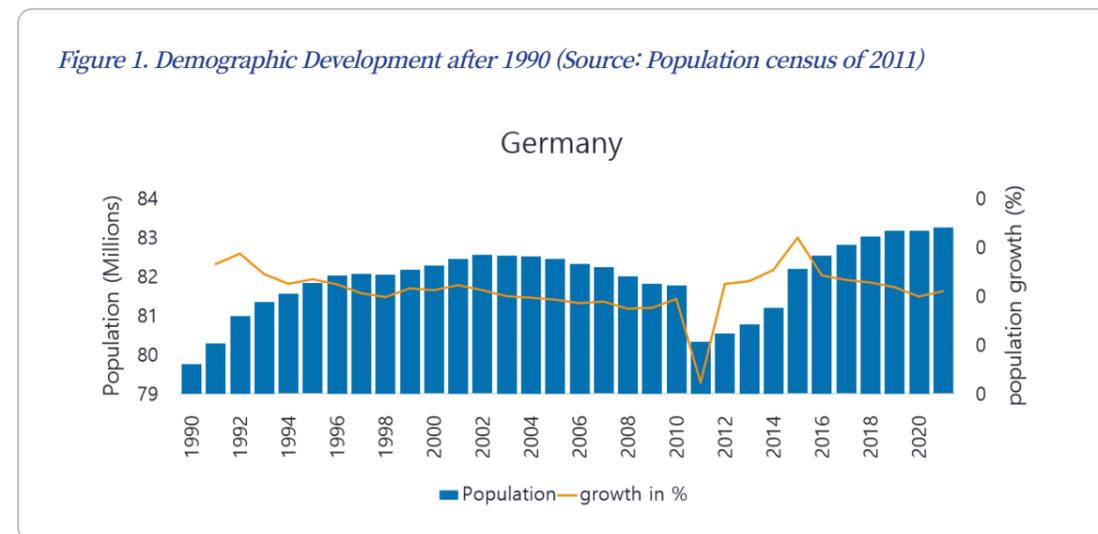
R&D Policy Initiatives

There is a number of policy initiatives in place to support innovative businesses in and around Dresden. The structure through which support is provided is complicated as Dresden lies inside a federal system (Federal Republic of Germany) that itself is part of the European Union. This means that there is a number of public sector entities – i.e. communal, state, federal, and European administrations – to consider. The following gives an overview of main innovation initiatives for each relevant administrative level.

European Union

The European Union (EU) has two initiatives that are particularly relevant for Dresden: The Horizon Europe initiative is the EU’s key program to fund research and innovation and has an overall budget of €95bn that Dresden joins in cluster 5 “Industrial Competitiveness Europe”. The EU Chips Act is a strategic pan-European investment initiative with an overall budget of up to €43bn aiming at the semiconductor industry and therefore of particular importance for Dresden and Saxony. Aside from its policy initiatives, the EU is an important actor as it regulates state aid provided through EU member states in Article 107 and 108 of the Treaty on the Functioning of the European Union. Here the role of the EU is in drafting policy directives that are ratified and then implemented by member states. The national implementation of EU directives is supervised by the European Commission. (European Commission, n.d.) (European Commission, n.d.)

Figure 1. Demographic Development after 1990 (Source: Population census of 2011)



FR Germany

The German federal government offers support through several programs, managed mostly by the Federal Ministry for Economic Affairs and Climate Action. These programs are particularly aiming at SMEs and the provision of venture capital for newly founded innovative companies as well as the facilitation of knowledge transfer. The implementation of support programs is coordinated with local chambers of commerce (here: IHK Saxony) and the “Kreditanstalt für Wiederaufbau” (KfW), which is a Germany’s main development bank that had its origins in the post-WWII Marshall-Plan and is now used to efficiently disperse subsidies (Federal Ministry for Business and Energy, 2021).

State of Saxony

Saxony has a number of initiatives to fund research, often in cooperation with the federal government as well as other administrative entities. It aims at University and higher education institutions, employment, academies, as well as think tanks and is often dispersed in combination other (European or federal) grants. Saxony distinguishes between four broad areas of funding: Research and technology support, cluster and network support, technology transfer and startup support, and international cooperation. Research and technology particularly aims at improving the ability of academic research institutions to attract grants. As of 2019 and 2020 €15M were dispersed for this purpose. €91.4M were approved to top up existing European regional support lines between 2014 and 2020. Over the same period Saxony approved further €17.7M to top up the European Social Funds (ESF), which is used to provide funding for junior academics in Saxony. The ESF and Saxony further jointly provide €82M to create and improve the environment for technology transfer from an employee point of view. Saxony is further explicitly supporting the development of regional research and industrial clusters and is offering support for local projects to attract grants from other entities. Examples include the states’ “go-cluster” initiative, the partnership for innovation, “Zwanzig20”, in collaboration with the Federal Ministry for Education and Research, the Central Innovation Program (ZIM) in collaboration with the Federal Ministry of Economic Affairs and Climate Action, as well as several European programs, such as the EFRE program or the “EIT RawMaterials – Regional Center Freiberg”, which is supported by Saxony’s EUPRONet program. EUPRONet is also a core pillar in Saxony’s international cooperation strategy (Federal Ministry for Education and Research, 2020).

City of Dresden

The City of Dresden offers an own initiative to support innovation on a project basis. Its program aims at SMEs that are either registered in Dresden or are planning on producing in Dresden. Supported projects include newly marketed products, innovative technologies and services as well as projects that are part of investments on the territory of the City of Dresden and are funded with up to 80% of relevant project costs and between 10,000 – 100,000EUR. (City of Dresden, n.d.) Further initiatives are in cooperation with other entities, such as the Chambers of Commerce (IHK) Dresden and the State of Saxony, who offer scholarships for apprenticeships and Master Craftsmen Diplomas (“Meisterbriefe”) as well as further funding to support lifelong learning. There is hence a focus on supporting applied education and excellence through apprenticeship-driven career-paths (which is a relatively unique feature of the German education system), whilst more academic career parts are predominantly supported on a federal level.

Dresden further offers support for international cooperation projects, particularly through its city partnership funds. Its currently 13 twin cities are eligible to apply for support for projects that aim at maintaining and intensifying city partnerships. In this respect, particular emphasis is put on projects that encourage collaboration among citizens, societies, schools and public offices. Dresden’s partnership with Brazzaville is a noteworthy example as it established a specific directive to support projects in Brazzaville and Dresden. Projects linked to a city partnership are further spearheading further collaboration with Dresden’s research and industrial clusters. An example here is the seminar project on autonomous driving between the TU Dresden and the cities of Columbus and Brazzaville (Dresden, dresden.de, 2022). Dresden engages with further city networks, particularly in Europe, where it is a member of the Council of European Municipalities and Regions (CEMR / RGRE), the URBACT network, the CIVITAS Initiative, the Sustainable Cities Platform, and the POLIS network. POLIS promotes innovation in local transport in partnership with TU Dresden, the Upper Elbe Transport Network (VO), Dresden’s public transport provider (DVB) and the Fraunhofer Institute for Transportation and Infrastructure (Dresden, City Networks, 2022). With Jerusalem (Israel) and Kadikoy (Istanbul, Turkey) POLIS also includes non-European members. A number of further international collaboration projects through stakeholders in Dresden aside from the City of Dresden itself can be accessed through Dresden’s website (Dresden, dresden.de, 2022).

Industrial and Innovation Clusters

Dresden has several key industrial clusters that developed not only as a result of its long industrial history but also due to its ability to attract new industries. Table 1 gives. Summary of contact details for coordinating organisations.

Table 1 Industrial Clusters - Contact Details

Name	Address	Email	Phone	website
Silicon Saxony e. V.	Manfred-von-Ardenne-Ring 20 F01099 Dresden	info@silicon-saxony.de	+49 (351) 8925-888	www.silicone-saxony.de
Biosaxony	Tatzberg 4701307 Dresden	info@biosaxony.com	+49 351 7965-500	www.biosaxony.com
AMZ Sachsen	World Trade CenterFreiberger Straße 3501067 Dresden	info@amz-sachsen.de	+49 351 8322 374	www.amz-sachsen.de
Robot Valley Saxony	Tharandter Straße 31-3301159 Dresden	info@robotvalley.eu	+49 351-418824811	https://dev.robotvalley.eu/

Silicon Saxony

The semiconductor industry is at the forefront of a high-technology cluster that developed after German reunification. Led by Infineon Technologies, GlobalFoundries, and Bosch, it is one of the largest semiconductor clusters in Europe. Silicon Saxony covers around 2,500 companies and employs more than 70,000 employees in ICT industries as well as 1,700 companies with 30,000 employees in software industries. Figure 2 below gives an overview of the spread of Silicon Saxony around Dresden and in wider Saxony.



Figure 2 Regional Distribution of Silicon Saxony

Biotechnology

Biosaxony is an industrial cluster for biotechnology, medical technologies and health industries in and around Dresden and Saxony. Building on several biotech support initiatives in Saxony since 2000, it was setup in 2009 and became part of Saxony's "go-cluster" initiative in 2016. It has more than 100 members, including notable companies such as GlaxoSmithKline (Sächsisches Serumwerk) as well as several institutes of the Fraunhofer Society.

Automotive Industries and Mechanical Engineering

The Saxony Automobile Suppliers Network (AMZ) clusters of 5 large automobile manufacturers as well as more than 200 suppliers that are producing along a common value chain. Notable production sites include BMW, VW and Porsche. Figure 3 below gives an overview of the geographic distribution of AMZ in Saxony. Other notable mechanical engineering companies in and around Dresden include Elbe Aircraft Works, Siemens and Linde KCS Dresden.



Figure 3 Regional Distribution of AMZ Members in Saxony

Robot Valley Saxony

The Robot Valley Saxony is a cluster of private companies and research institutes operating in the field of robotics in and around Dresden. It includes more than 300 companies and works closely with the TU Dresden as well as other research institutes.

Innovation and Research Infrastructure

Dresden has a rich environment for research and innovation, including leading research universities and independent research institutes as well as universities of applied sciences that are embedded into wider research networks in Saxony, Germany and beyond. Noteworthy is the density of independent research institutes – with the four leading organizations counting more than 4000 employees alone – as well as its universities of applied sciences that are engaged in cutting-edge research but also key

for knowledge transfer due to their focus on applied research. The Technische Universität Dresden (TU Dresden) prides itself with being one of eleven Universities of Excellence in Germany. Table 2 gives an overview of contact details for higher education institutions in Dresden.

Table 2 Universities and Higher Education Institutions - Contact Details

Name	Address	Email	Phone	website
Technische Universität Dresden	TUD-INFORMATION 01062 Dresden	infostelle@tu-dresden.de	+49 351 463-0	https://tu-dresden.de/?set_language=en
Hochschule für Technik und Wirtschaft (HTW) Dresden	Friedrich-List-Platz 101069 Dresden	info@htw-dresden.de	+49 (0)351 4620	https://www.htw-dresden.de/en/
Dresden International University GmbH	Freiberger Str. 37 01067 Dresden	nfo@di-uni.de	+49351 40470-00	https://www.di-uni.de
SRH Dresden School of Management	Georgenstraße 7, 01097 Dresden	studyindresden@srh.de	+49 351 40 76 17 20	https://www.srh-campus-dresden.de/en/
University for Applied Sciences Dresden	Campus Straßburger Platz Güntzstraße 1 01069 Dresden	info@fh-dresden.eu	+49 351 4445-400	https://www.fh-dresden.eu/

Research Universities

The TU Dresden is Dresden's main research University and with more than 30,000 registered students its largest higher education organization. It has 14 faculties, organized into engineering, humanities and social sciences, and medicine. The Faculty of Mathematics and Social Sciences forms a separate entity that houses the departments of Biology, Chemistry, Mathematics, Physics and Psychology. It is the second largest faculty of the University and hosts the DFG-funded Dresden International Graduate School for Biomedicine and Bioengineering as well as its associated cluster of excellence From Cells to Tissues to Therapies. Research at TU Dresden is organized in 11 research centers, three of which are recognized as clusters of excellence, which are in turn part of five research priority areas: Health Sciences, Biomedicine and Bioengineering; Information Technology and Microelectronics; Materials

Science and Engineering; Energy, Mobility and Environment; Culture and Societal Change (TU Dresden, 2023). The university closely cooperates with private and independent research bodies in the area.

Universities of Applied Sciences (UAS)

UAS are a particular feature of Germany's dual education system that puts a stronger emphasis on professional and vocational training to better facilitate knowledge transfer. Whilst UAS are accredited to award equivalent under- and graduate (and in some cases even postgraduate) degrees as research universities, they have an explicit focus on applied sciences. Four UASes are located in Dresden:

The University of Applied Sciences (HTW) is Dresden's second largest university with about 5,000 registered students. It is renowned for its courses in electrical engineering, computer sciences, mechanical engineering, business informatics, and industrial engineering. Its research is grouped into the profile lines Mobile Systems and Mechatronics, Sustainable Livelihoods, Information Systems, and Corporate Management and Incorporation. HTW is further associated with four research institutes that focus on interdisciplinary applied sciences, informatics, SMEs and start-ups.

Dresden International University (DIU) is one of the largest private universities in Germany and, being affiliated with the TU Dresden, the only private university in Germany that is associated with a University of Excellence. DIU offers more than 40 under- and graduate courses, four of which offered fully in English. It is organized into six departments: Health and Nursing; Medicine; Management, Law and Economics; Digital Management; Education, Communication and Culture; Engineering.

The SRH Dresden School of Management is a private University that is part of SRH Berlin University of Applied sciences. It offers under- and graduate degrees in predominantly business and social studies with a particular focus on hospitality and tourism. Its graduate degrees are taught in English.

The University of Applied Sciences in Dresden offers undergraduate courses in business, tourism, design, media and digital education management, logistics management, social studies and nursing. Courses are offered both in full-time and part-time.

Independent Research Institutes

Dresden has over 40 independent research institutes, including a substantial presence of the three main research societies in Germany, Helmholtz-, Max-Planck-, and Leibniz-Society. Table 3 gives a summary of contact details.

Table 3 Independent Research Institutes - Contact Details

Name	Address	Email	Phone	website
UNU FLORES	Ammonstr. 74 01067 Dresden	e-mail	Tel: +49 351 892193 70	https://flores.unu.edu/en/
Helmholtz Centre Dresden Rosendorf (HZDR)	Bautzner Landstraße 400, 01328 Dresden	kontakt@hzdr.de	+49 351 260 - 0	https://www.hzdr.de/db/Cms?pNid=0
Max-Planck-Institute for Molecular Cellbiology and Genetics (MPI CBG)	Pfotenhauerstr. 10801307 Dresden	info@mpi-cbg.de	+49 351 210-0	www.mpi-cbg.de
Max-Planck-Institute for Chemical Physics of Solids (MPI CPFS)	Nöthnitzer Straße 4001187 Dresden	cpfs@cpfs.mpg.de	+49 (0) 351 4646-0	www.cpfs.mpg.de
Max-Planck-Institute for Physics of Complex Systems (MPI PKS)	Nöthnitzer Straße 3801187 Dresden	info@pks.mpg.de	+49 351 871-0	www.mpi-pks-dresden.mpg.de
Centre for Systems Biology	Gene Myers (MPI CBG) Frank Juelicher (MPI PKS) Ivo F. Sbalzarini (TU Dresden)	myersmpi-cbg.de julicherpks.mpg.de ivo.sbalzarini-tu-dresden.de	+ 49 351 210-1220 + 49 351 871-1202 + 49 351 210-2525	www.mpg-sysbio.de https://www.csbdresden.de/

Leibnitz Institute for Polymer Research Dresden (IPF)	Postfach 120 41101005 Dresden	ipf@ipfdd.de	+49 (0)351 4658-0	www.ipfdd.de
Leibnitz Institute for Solid State and Materials Research Dresden (IFW)	Helmholtzstraße 2001069 Dresden	postmaster@ ifw-dresden. de	+49 351 4659-540	www.ifw-dresden.de
Leibnitz Institute of Ecological Urban and Regional Development (IÖR)	Weberplatz 101217 Dresden	info@ioer.de	+49 (0)351 4679 210	www.ioer.de
Senckenberg Leibnitz Institution for Biodiversity and Earth System Research	Senckenberg Naturhistorische Sammlungen DresdenAusstellun gsgebäude Japanisches PalaisPalaisplatz 11, 01097 Dresden	info@ senckenberg. de	+49 351 7958414408	www.senckenberg.de
ifo Institute Dresden	Einsteinstraße 301069 Dresden	dresden@ifo. de	+49(0351)26476-0	https://www.ifo.de/en/research/ifo-dresden
Fraunhofer Dresden	Annett Arnold Fraunhofer-Institut für Organische Elektronik, Elektronenstrahl- und Plasmatechnik FEPWinterbergstr. 2801277 Dresden	E-Mail	+49 351 2586-452	https://www.dresden.fraunhofer.de/

• **Helmholz Centre Dresden Rosendorf (HZDR)**

The HZDR is a research centre specializing in materials, health and energy. It was emerging from the former Central Institute for Nuclear Physics, which was the largest research institute on nuclear physics in the GDR. Renamed in 1992 it became a member of the Helmholtz Association of German Research Centres in 2011. It operates a number of research laboratories, most notably the ELBE Center for High-Power Radiation Sources, the Dresden Laser Acceleration Source (DRACO), the Dresden High Magnetic Field Laboratory which is partnering with the European Magnetic Field Laboratory and the Positron Emission Tomography (PET) Center in partnership with TU Dresden and the University Hospital Dresden. With the HZDR Innovation GmbH it has an affiliated consultancy that is tasked with offering the HZDRs know-how and infrastructure for industrial application. This has allowed the HZDR to play a crucial role in Dresden's knowledge transfer.

• **Max Planck Society**

The Max-Planck Society engages in research that is deemed particularly innovative across Germany. Dresden hosts four Max-Planck Institutes that count a total of about 800 employees: The Max-Planck-Institute for Molecular Cellbiology and Genetics (MPI CBG), the Max-Planck-Institute for Chemical Physics of Solids (MPI CPfS), the Max-Planck-Institute for Physics of Complex Systems (MPI PKS), and the Centre for System Biology .

• **Leibnitz Society**

Leibnitz Institutes in Dresden are particularly important for their research in application of basic science and the provision of scientific infrastructure. Dresden's has 5 Leibnitz Institutes that employ a total work force of more than 1,000 employees, including the two largest Leibnitz Institutes in Germany: The Leibnitz Institute for Polymer Research Dresden (IPF), the Leibnitz Institute for Solid State and Materials Research Dresden (IFW), the Leibnitz Institute of Ecological Urban and Regional Development (IÖR), the Senckenberg Leibnitz Institution for Biodiversity and Earth System Research (which has its headquarter in Frankfurt a.M.), the Ifo Institute for Economic Science (which has its headquarters in Munich).

• **Fraunhofer Society**

The Fraunhofer Society is the biggest organization for applied research in Europe. Dresden hosts

• **UNU-FLORES**

The United Nations University Institute for Integrated Management of Material Fluxes and of Resources (UNU-FLORES) focuses on sustainable management of resources, particularly in the context of developing and emerging economies. It is affiliated with the United Nations and works closely with the TU Dresden as well as other research entities.

its largest presence with 10 institutes and more than 2,000 employees. As for the HDZR, Fraunhofer Institutes have been established as successors of existing GDR research infrastructure, in this case the Central Institute for Solid State Physics and Material Sciences at the GDR Academy of Sciences. Fraunhofer Institutes in Dresden have established their research focus in micro- and nanoelectronics, new materials, thin layers and photovoltaic, traffic and infrastructure systems.

Implications for Daejeon City

Dresden has a rich industrial history and has long been a locus for research excellence in Germany and Europe. It could revive and modernize its industrial heritage thanks to not only its long tradition in manufacturing and research but also due to policy initiatives, particularly on a state and local level that focused early on developing industrial and scientific clusters of excellence and an education and research infrastructure that focuses on knowledge transfer above else.

Daejeon and Dresden face very similar challenges and opportunities. Both are at the center of large scientific clusters that produce cutting-edge research, with research areas such as semi-conductors, biotechnologies, ICT, and robotics being prominent in both cities. Both cities also operate in the context of an ageing society and with it challenges linked to a shortage of skilled labor in key industries.

Dresden has managed to address these challenges through its higher-education and innovation infrastructure by putting emphasis on applied sciences that are embedded in Germany's dual-education system of vocational and academic education. This allows for a great variety of educational career tracks which provides flexibility to adapt to needs of the local labor market and facilitates knowledge transfer.

The historical context of its research and innovation environment, such as the HZDR and Silicon Saxony, which provide outsourced R&D services for local industry as a result of the collapse of former GDR industries, proved further beneficial for knowledge transfer and to developing industrial clusters and attracting investment capital.

Lastly, innovation policy through the City of Dresden but also Saxony and other layers of government, focusses on support SMEs and start-ups, which allowed it to grow substantial parts of its industrial clusters locally and embed them into wider regional and global networks. The focus on SMEs and start-ups is important as it reduces market entry barriers for firms that are often particularly innovative.

But industrial clusters in Dresden developed thanks to a combination of factors including higher education that focusses on academic excellence and industrial application, research institutes that are embedded in the industry, private enterprises that can benefit from economies of scale within clusters, and also large industrial manufacturers at the heart of clusters that benefit from knowledge transfer and the depth of existing value chains.

Dresden and Saxony are further attractive for the formation of industrial clusters as existing clusters are complementary and can therefore benefit from further economies of scale. In this respect, the aim of industrial policy should be to integrate within other regional clusters and allow for links and spillovers.

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bevoelkerungsentwicklung.html#:~:text=Bei%20einer%20moderaten%20Entwicklung%20der,2070%20auf%2083%20Millionen%20zur%C3%BCckgehen.

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Calgary's Innovations & Development

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Strategic industries

Education

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Development related initiatives

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Further reading

Overview of the city

Mayor	
Tenure as mayor	Jyoti Gondek (Full name: Prabhjote Kaur Gondek)
Birthplace	London, England; 1969 Moved to Canada at age 4 Resident of Calgary since 1997
Education	PhD in urban sociology, University of Calgary
Career history	Policy analyst Urban development consultant City councillor for Calgary Ward 3, 2017-2021
Tenure as mayor	Elected on 2021/10/25 Next mayoral election in 2025
Key policies	Focus on improving development in suburban areas
City	
Website	Calgary.ca
Population	1,306,784 (2021 census) (source) Largest city in Alberta, 3rd largest city in Canada (4th largest population centre)
GDP	111.259 billion CAD (2019, source) \$79,885 CAD per capita (2022, source); highest in Canada
Land area	820 km ²
Industrial structure	29% Agriculture, mining, quarrying, oil & gas 20% finance, insurance, real estate 7% Professional, scientific, technical services
Location	Centre of southern Alberta One other large city (Edmonton) is ~200km to the north

Politics

National level

Alberta, the province Calgary is located in, is centre-right leaning, politically. Calgary is the urban centre of that political movement, roughly akin to how Daegu is the conservative stronghold in South Korea's politics. Edmonton, the other large city in the province, is relatively left-leaning.

Compared to South Korea, Canada's politics as a whole are left-wing. For instance, Calgary, while regularly voting for right-wing political parties in national elections, has hosted an LGBT+ pride parade every year since 1996. Calgary's current mayor is a Sikh woman who was born outside of Canada. Calgary's previous mayor was a Muslim man who served for three terms.

City level

A major issue at the municipal level is balanced development and provision of city services. Calgary has little to no geographic features limiting development, leading to "suburban sprawl", or the tendency for new residential development to occur primarily at the outer edges of the city, straining city infrastructure while leaving viable space near the downtown cores underutilized. Providing an equal level of services to the suburbs and revitalizing the city's downtown are major ongoing projects.

Location, transportation & logistics

Calgary is physically isolated from other major population centres in Canada. Vancouver is 1,000 km to the west, and Toronto is 3,500 km to the east. Alberta's second largest city, Edmonton, is 200 km to the north. However, this degree of physical isolation is not unusual when compared to most cities in central Canada (Alberta, Saskatchewan, Manitoba) or central United States.

Despite this isolation, Calgary has established itself as a major distribution hub. Calgary sits on Highway 1 (also known as the Trans-Canada Highway), which is a major route for shipping goods via truck across Canada. Calgary is also a hub for Canada's major railway companies, Canadian Pacific Railway and Canadian National Railway. Calgary is also a part of the CANAMEX corridor, a series of highways

linking central Canada, central U.S. and Mexico.

Calgary International Airport (airport code: YYC) handles the majority of Calgary's air cargo and offers direct flights to cities in Central America, Europe & Asia.

Challenges

Attracting talent

While not a problem exclusive to Calgary, finding ways to attract and retain talent is essential for the city. In Canada more broadly, despite an open and robust immigration policy that attracts international talent, Canadian industries and businesses are still hampered by a lack of highly skilled professionals with advanced STEM degrees.

Reducing reliance on oil & gas industry

Alberta has vast reserves of oil and natural gas. Production of these resources has long been a pillar of the province's economy. Calgary directly benefited from this since it became the location of large offices and headquarters of various fossil fuel industry companies. The period of record high crude oil prices (2003-2013) following the U.S.-led invasion of Iraq coincided with significant expansion of oil sands mining and hydraulic fracturing in Alberta, leading to considerable wealth for the province and Calgary. During this time the province paid off all of its public debt and eliminated its provincial sales tax.

The economy of Calgary (and Alberta more generally) has long been dependent on mining Alberta's vast oil and gas reserves. Calgary in particular served as the site of headquarters or major offices of many oil and gas companies, as well as a large financial sector and logistics network that built up around the fossil fuel industry. However, a significant drop in the price of crude oil in 2015 put the province's economy into a recession and caused much of its talent to leave the city. Since 2015, the city has been looking to diversify its economy to reduce the city's reliance on the oil & gas sector.

Greater Downtown Plan

Calgary's downtown office space housed many large corporate offices. The post-2015 drop in oil prices, the transition to sources of renewable energy, and the shift to working from home triggered by the COVID pandemic have created a high vacancy rate in the downtown office real estate market, creating many negative knock-on effects for other businesses located in the downtown core.

The city government does not expect the downtown office space occupancy rate to recover to pre-pandemic levels. The city has created an incentive program to encourage the conversion of these spaces to other purposes. Some examples include converting the buildings to be used as residential units, hotels, schools, or performing arts spaces; and demolishing older buildings that are not suitable for conversion to other uses.

[Calgary's Downtown Strategy; Calgary's Greater Downtown Plan](#)

Strategic industries

Calgary Economic Development lists nine key sectors of Calgary's economy: agribusiness, aerospace, creative industries, energy, financial services, digital media & entertainment, life sciences, technology, and transportation & logistics.

Historically, Calgary's major industries are agriculture, energy, financial services, transportation & logistics.

Innovation / research clusters

Autonomous & Unmanned Technology Cluster

[Report \(PDF\)](#)

Calgary is home to an autonomous and unmanned technology cluster. The cluster consists of 55 companies, representing each of the primary disciplines involved in autonomous & unmanned systems.

Educational components of the cluster include University of Calgary's Geospatial Science Research

Group, SAIT's Centre for Innovation and Research in Unmanned Systems, and Bow Valley College. ACAMP & TECTERRA are connected with this technology cluster as well.

Education

27% of degrees obtained from post-secondary institutions in Calgary in STEM fields. Reportedly, many of these degrees are focused in fields related to fossil fuel extraction & financial services, two industries whose relative contribution to Calgary's economy has shrunk considerably. To address this, the city commissioned a report on how the educational institutions of Calgary as a whole can adjust to help give students the skills needed for Calgary's future economic goals. (See CityXLab section below.)

Major research institutions & selected research centres

University of Calgary

University of Calgary is a public research university with ~36,000 students and ~1,800 faculty. Selected major research centres are :

- [Geospatial Science Research Group](#)
- [Calgary Centre for Innovative Technology](#)
- [Life Sciences Innovation Hub](#)
- [Energy Transition Centre](#)
- [Social Innovation Hub](#)

[Research to startup pipeline](#)

In 2020 & 2021, University of Calgary ranked as the number one startup creator among Canadian research institutions. (source)

Two of the centres within the university for supporting innovation and startups are the Hunter Hub for Entrepreneurial Thinking and Innovate Calgary.

Southern Alberta Institute of Technology

Southern Alberta Institute of Technology is a public technical institute, offering primarily two year

diplomas along with a small number of four year undergraduate degrees. It houses two research centres of note for this reports :

- [Centre for Innovation and Research in Unmanned Systems](#)
- [School for Advanced Digital Technology](#)

Economics

Highlights

\$111.259 billion CAD GDP (2019, [source](#))

\$79,885 CAD GDP per capita (2022, [source](#)) (highest in Canada)

102 large corporate head offices (2nd highest in Canada)

55,434 small businesses (2020, [source](#)) (2nd highest per capita of major cities in Canada)

27% of bachelors (or higher) degree from Calgary institutions are in STEM

\$2.0 billion CAD digital transformation spending by businesses (2023)



Source: [Why Calgary? Our Economy in Depth \(June 2022\)](#), page 23

Organizations

[The City of Calgary](#)

This is the central management body of Calgary, consisting of the City Council and the administration.

[Calgary Economic Development](#)

Calgary Economic Development is the city's primary economic development organization. It conducts research, runs development programs, and promotes Calgary as a place to do business. It also operates Platform Calgary & Tourism Calgary.

Calgary Economic Development operates through partnerships with local universities, local businesses, the City of Calgary, provincial government & federal government. It is directly funded by the City of Calgary, other orders of government, community partners and the private sector.

[Platform Calgary](#)

Platform Calgary is an organization under Calgary Economic Development that promotes technological development to support the local economy. It provides technology-based support for startups, such as training & mentorship of company founders, attracting investors, and connecting companies with potential talent pools.

Platform Calgary is funded by Calgary Economic Development.

Strategy

[“Calgary in the New Economy”](#)

Calgary Economic Development's strategy for economic development in the city is titled "[Calgary in the New Economy](#)" (PDF).

This development strategy has five pillars: talent, livability, business environment, innovation, and brand. Of note for the purposes of this report are the innovation and business environment pillars. Each of the significant initiatives that contribute to these two pillars are listed here and detailed in the sections below.

Initiatives at a glance

- Attracting R&D investment, centres of excellence, accelerators and incubators

Development related initiatives

Calgary has a large number of development related initiatives. The broad focus on these policies is encouraging the digitization of existing businesses and development of new digital technology companies.

It should be noted that Alberta has the lowest overall 5% sales tax rate (5%) of all the provinces in Canada. This helps to attract companies and talent from other parts of the country.

Business policies

- The application process for creating a small business can be done entirely online.
- The [business development section](#) of the City of Calgary's website is well designed and makes finding useful information easy.

City of Calgary programs

[Digital Service Squad](#)

Digital Service Squad offers free digital services for small businesses to help establish an online presence, digitize their processes, and set up online POS solutions. These services include creating websites, social media marketing plans, and creating customer databases.

The services are provided by post-secondary students. Funding is provided by federal and provincial governments.

[Living Labs & pilot areas](#)

The Living Labs program allows companies to pilot their technology in Calgary on city-owned assets, including public spaces, transportation infrastructure, and city-owned land and facilities.

The aim of the program is to formalize and streamline the application process for companies, and

further support product development and research.

The program also aims to accelerate the implementation of Smart City technology in Calgary.

• [OCIF](#)

Opportunity Calgary Investment Fund (OCIF) is a \$100M CAD investment fund available to support organizations that commit to making investments that drive economic growth in Calgary. Private companies, non-profit organizations and public institutions are all eligible recipients, and up to 50% of a proposal's funding can come from OCIF funds.

OCIF is funded by the City of Calgary and administered by Calgary Economic Development.

Calgary Economic Development programs

• [EDGE UP](#)

Energy to Digital Growth Education and Upskilling Project (EDGE UP) is a free retraining / upskilling program for professionals displaced from the fossil fuel industry. Students are provided with online courses taught by local universities on foundational skills for jobs in the digital economy. The program lasts six months, after which students are given the opportunity to complete a work-integrated learning (WIL) program (similar to an internship) with partner companies.

Example skills taught include data analytics, full stack software development, IT project management, product management with a specialization in digital marketing, cyber security, AWS cloud computing, and IT network management.

The program is run by Calgary Economic Development and funded by the federal government.

• [TalentED YYC](#)

TalentED YYC is a consolidated platform for Calgary companies to attract post-secondary students for work-integrated learning (WIL) opportunities. Instead of connecting with each of Calgary's seven universities individually, employers can post their openings on the TalentED YYC website and receive applications from students from the partner universities. Businesses also receive support in finding the right model to create partnerships with local universities and how best to engage students in their businesses.

This also establishes a talent pipeline between universities and employers.

TalentED YYC appears to be run under partnership with Calgary Economic Development. It is funded by the federal and provincial governments.

WIL includes internships, apprenticeships, co-operative education, and field placements. A full list of WIL models is available here. Students generally receive academic credit towards their degrees for completing a WIL program.

• [TAP](#)

The Trade Accelerator Program (TAP) supports businesses looking to expand to international markets. The program provides entrepreneurs with individual coaching, access to experts, information about global trade and best practices, and assistance in developing an export plan.

The program is run by Calgary Economic Development and funded by the federal government.

• [Live Tech, Love Life](#)

Live Tech, Love Life, is a promotional campaign to encourage digital technology businesses and talent to choose Calgary as a site to expand their business or start their career.

The website lists many of Calgary's notable technology companies, organized by industry, and provides links to the currently open positions at each company.

• [CityXLab](#)

Includes Calgary's Skills Development Framework.

Platform Calgary programs

• [Platform Innovation Centre](#)

Platform Innovation Centre is a technology incubator in downtown Calgary. It holds over 100 partners, offers educational programs for entrepreneurs and professionals, conducts community building events to connect business owners with investors, and provides resources for prototyping and testing products.

Innovation Centre is operated by Platform Calgary and funded by federal, provincial and municipal governments.

• Innovation District

Platform Calgary is currently pursuing a plan to create an innovation district (akin to a 혁신 도시), most likely in the city's downtown. [\(source\)](#)

Other programs

• ACAMP

Alberta Centre for Advanced MNT Products (ACAMP) is an industry-led product development centre focusing on micro nano technology (MNT). The centre provides product developers access to engineers, technology experts, specialized equipment, and industry connections and knowledge.

The centre focuses on products related to electronics hardware, firmware, ML & AI software, sensors, and embedded systems. It boasts support for each stage of the product development process.

ACAMP has two locations, one in Calgary and one in Edmonton. ACAMP is funded by the provincial government.

• TECTERRA

TECTERRA is a geomatics technology innovation support centre. Its aim is to advance geospatial sciences and related companies. The organization engages young students in geospatial thinking, provides university scholarships, and subsidizes the hiring of new employees in companies working on geomatics technology.

TECTERRA's headquarters are in Calgary. TECTERRA is funded by the provincial government.

• Micro-credential programs

Micro-credential programs are short reskilling / upskilling programs.

The provincial government runs an initiative to offer an array of micro-credential programs through various post-secondary institutions in the province.

Potential partnerships within Calgary

Calgary Economic Development

The ultimate goal of Calgary Economic Development is most similar to DISTEP's objective with this program: further their respective cities' economic development.

• General contact information

Phone : +1-888-222-5855

Email : info@calgaryeconomicdevelopment.com

• Geraldine Anderson

Vice-President of Marketing & Communications, Strategy & Strategic Alliances

(No public email or phone number listed)

• Megan Zimmerman

Senior Director, Business Development

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• Chris Brown

Senior Director, Business Development

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How to approach

In contrast to typical cities in Canada, Daejeon (and South Korea more broadly) do two things very well: maintaining a vibrant city core (by redeveloping older, underused buildings and spaces); and creating walkable, livable neighbourhoods (by encouraging or requiring that new developments have a mix of office, residential and commercial space).

Both of these can be solutions to the issue of suburban sprawl (detailed in the "Greater Downtown Plan" section above) that Calgary is facing.

Daejeon can offer examples and expertise in these two areas, while in return learning from Calgary's successful startup support systems.

Summary

Calgary is a city in the middle of transitioning from a fossil fuel and finance centred economy to one driven by growth from innovation and startups, largely related to digital technology. Data made available by Calgary Economic Development suggests that the city's programs and initiatives thus far have been successful in this pursuit. Calgary has implemented many programs that Daejeon can emulate, and a direct partnership between the cities would be mutually beneficial.

Further reading

[City of Calgary website](#)

[Calgary Economic Development - June 2022 report \(PDF\)](#)

[Calgary in the New Economy \(PDF\)](#)

Future Development in Durban (eThekweni), South Africa

Author

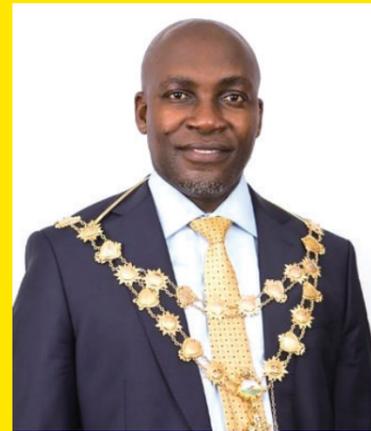
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School of Business

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Overview of the city and metropolitan municipality

City Mayor



Source: <https://durban.gov.za/>

Source: <https://durban.gov.za>

Name : Mxolisi (Thomas) Kaunda

Date and Place of Birth : 13 September 1972 in Inanda, South Africa

Career : KwaZulu-Natal MEC for Transport, Community Safety and Liaison (2016-2019); Chairperson of Transport Portfolio Committee on the Provincial Legislature (2009-2019); City Mayor since 2019

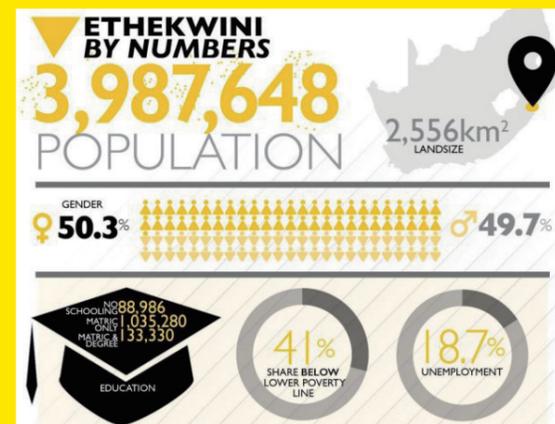
Political Affiliation : ANC

Key areas of focus : Smart City and 4th Industrial Revolution; Port City Industrial Programme; Addressing inequality through jobs creation, catalytic projects, skills revolution, socio-economic transformation, and enterprise supplier development; “Nothing for the community without the community”; Infrastructure and energy reforms to address climate change; Enhancing trade integration and socio-economic development in Africa through efficient local procurement.

Source: <https://municipalities.co.za>



eThekweni Metropolitan Statistics



Source : Profile: eThekweni Metro

City Mayor

Population City: ~595,000; Metro: 3,987,648 (Approximately 6.59% of the national population)

Area City: 225.91 km² ; Metro: 2 556 km²

Transportation Located on the eastern coast of South Africa in the province of KwaZulu- Natal; Accessible via major highways (N2, N3) as well as King Shaka International Airport; The Port of Durban is the largest and busiest shipping terminal in sub-Saharan Africa and one of the largest in the southern hemisphere

GDP R468 billion (2018)

Key GDP Sectors Finance (21%); Community Services (21%); Manufacturing (19%); Trade (17%); Transport (14%)

Core Values Sustainability; Economically successful city; Caring city; Smart city; Poverty reduction and Democratic and equal city

Strategic Economic Sectors

- Port, ocean economy, and logistics
- Manufacturing (export orientation)
 - Automotive
 - Agri-processing
 - Chemicals
 - Clothing, textiles, leather, footwear
 - Wood products
 - Electronics and electrical machinery
- Innovation, services, and technology
- Green economy
 - Renewable energy
 - Biodiversity protection and regeneration
 - Carbon efficiency
 - Circular economy
 - Eco-tourism and conservation
- Tourism
- Creative industries

Innovation and Technology Related Development Projects

- Catalytic Project
 - Aerotropolis Master Plan (DURAMP)
- Clusters relevant to technology and economic development
 - Maritime and Logistics
 - Chemicals
 - Materials Recovery and Green Economy
 - USE-IT – Waste Materials Recovery Industry Development Cluster
 - ICT and Electronics
 - SmartXchange - Centre of Excellence

Special Notes

- 1) Key strategic partnerships in innovation, technology, and start-up sectors:
 - Research and Education:
 - University of KwaZulu-Natal
 - Durban University of Technology
 - Innovate Durban
 - Trade and Investment KwaZulu-Natal
- 2) Durban is one of Daejeon's Sister Cities (since 2011)
 - Like Daejeon, Durban is a former host of the United Cities and Local Governments (UCLG) Congress (2019)

Relevant Government / Industry Contacts

• Mayor's Office

His Worship Mayor MT Kaunda
Telephone : (+2731) 311 2110
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• Governance and International Relations Siphon Cele

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Innovation Co-Lab

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• Trade and Investment KwaZulu-Natal Neville Matjie (CEO)

Telephone : +27 31 368 9600

General Enquiries

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Email : info@tikzn.co.za

History, Culture, and Demographics

eThekwini, also known as Durban, has a rich historical background that predates recorded history. The land was originally inhabited by the Khoi/San people before the arrival of the Nguni people and European colonialists. Portuguese explorer Vasco da Gama named the area Rio de Natal (Christmas River) in 1497 and this area subsequently became a popular anchorage point for traders.

The first European settlement arrived in 1823 when the Julia, a British trading ship, explored the bay while an accompanying vessel under the command of Lieutenant James King, the Salisbury, sought shelter due to stormy conditions. The settlement grew, aided by the friendship between Lieutenant King and King Shaka Zulu, who granted him land. In 1835, a town was proclaimed and named Durban in honour of Sir Benjamin D'Urban, the Governor of the Cape.

The region witnessed conflicts between the British and the Boers over control of Durban in the late 1830s and early 1840s, culminating in the British annexation of southern Natal in 1844.

Durban's development was closely tied to the suppression of the Zulu kingdom as well as the British importation of indentured laborers from India in 1860 for the purpose of working on sugar farms (the region's primary industry). The discovery of gold and coal further boosted the port's importance contributing to Durban being granted city status in 1935.

The implementation of apartheid defined Durban's history. Racial segregation shaped the city's urban form, with racially homogenous residential areas separated by buffer strips. In 1994, South Africa held its first democratic election, bringing significant changes to Durban. The city expanded to become the Durban Metropolitan Region in 1996 and later the Durban Unicity in 2000, renamed eThekwini to reflect its indigenous history.

Today eThekwini is a sprawling metropolitan (the third largest in the country) with a young and diverse population (according to the 2016 national census, 71% of the population are under 40 years of age). The most commonly spoken language is isiZulu (62.82%), followed by English (26.77%). Zulu and Indian cultures are especially prevalent as can be gleaned from colourful local customs and cuisine. The city is particularly known for its well-managed port, manufacturing sector, tourism, and the Chief Albert Luthuli International Convention Centre.

Innovation and Technology Related Development Projects

Catalytic Project

Durban Aerotropolis Master Plan (DURAMP)

THE DURBAN AEROTROPOLIS MASTER PLAN

32 000 hectares of total land 42M m² of total development 750 000 jobs 1.5M residents 10 000 hectares of green space

Source: Durban Aerotropolis Master Plan Report (2018)

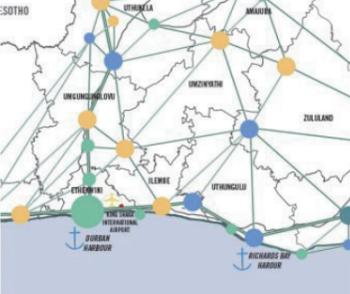
Connecting South Africa to Global and Regional Markets

The Aerotropolis Master Plan develops and improves multiple passenger, freight, logistics, road, rail, marine and air connections, enabling South Africa to be better connected to fast-growing global and regional markets.



Reconnecting Regional Assets

The master plan improves the national and regional road and rail networks, facilitates access to the Durban and Richards Bay harbours. It aims to connect to Johannesburg and other national and regional centres.



Creating a Logistics Platform

Initiatives like the Dube Inyaninga Logistics Gateway and Industrial Zone aid in achieving a connected economy. The development incorporates rail, multi-modal logistics and industrial / special economic zone functions with a secured and bonded dedicated freight link to the Dube Tradeport.



High-Value, Diverse & Accessible Beach Front

The master plan includes a high-density, mixed use beach front strategy, augmented by dynamic public recreational space. This strategy provides opportunity and access to recreation. The beach front capitalises on its real estate and tourism value.



Transit Orientated Development

The Aerotropolis leverages multi-modal transport networks, co-locating the highest intensity zones along major transport routes. Strong public transport corridors, complete street design principles, priority lanes, and multi-modal interchanges will catalyse growth and optimize development value through efficient mobility.



Leveraging Digital Infrastructure

Proximity to EASSy, SEACOM and SAT3/SAFE undersea cables, deployment of backbone fibre connectivity, and expanding LTE and LTE Advanced networks facilitate global connectivity. By democratising technology through open internet access for previously disadvantaged communities, citizens are empowered to engage with their government and their world.



Source: Durban Aerotropolis Master Plan Report (2018)

Summary : The Durban Aerotropolis is a large-scale development project in South Africa, spanning an area of 32,000 hectares between Ballito and Durban. It aims to attract both public and private sector investments, with green spaces covering about 10,000 hectares. The total potential investment in the project is estimated to be around R1 trillion. At the centre of the development is the Dube Trade Port, which serves as the core and hub of the aerotropolis. The master plan for the project spans a 50-year development horizon and offers 42 million square meters of developable land for various

purposes. The Durban Aerotropolis takes advantage of the Dube Trade Port's Special Economic Zone, benefiting from its air connectivity and proximity to the seaports of Durban and Richards Bay.

The King Shaka International Airport (KSIA) and its surrounding areas play a crucial role in the Durban Aerotropolis strategy. The airport, located approximately 35 km north of Durban, is considered a vital infrastructure development for economic growth in the KwaZulu-Natal province and South Africa as a whole. It features a 2,000-hectare site, a runway of 3,700 meters capable of accommodating wide-bodied aircraft, and facilities to handle millions of passengers and tons of cargo annually.

Key concepts : Smart City; Connected and Green Economy; Integrated Community; Inclusive Opportunity

Objective : The objective of the Durban Aerotropolis initiative is to create a modern airport city and position the province as a trade gateway to Africa and the world. The plan is to stimulate economic activity, generate job growth, and establish the region as a significant economic force. The development will include various components such as businesses, manufacturing facilities, residential housing, recreational spaces, and technological hubs.

Lead Initiatives:

- Aerotropolis Institute Africa (R9 million, started 2018) → Education
- Public Transit Development Spine (R15 billion, started 2019) → Public Transport
- Alternative Energy Cluster (R1 billion, started 2018) → Renewable / Sustainable Energy
- Open Wifi Programme (R10 million, started 2018) → Connectivity
- Techno-Hubs (R500 million, started 2018) → Technological Development

- Small Business Connector (R72 million, started 2018) → Entrepreneurship / Start-Ups

Clusters relevant to technology and economic development

USE-IT – Waste Materials Recovery Industry Development Cluster



Summary : USE-IT is a non-profit organization established to research and advance waste beneficiation technologies, with the goal of diverting waste from landfills and creating employment opportunities in the green economy. USE-IT operates as a specialized entity that serves as a hub for the waste materials recovery industry in the eThekweni Municipality. The governance of USE-IT is overseen by a diverse board of directors with expertise in waste material recovery, business, and environmental management.

Additionally, USE-IT has constructed a state-of-the-art facility in Hammarsdale, which accommodates ten incubators dedicated to training and skills development for small and medium-sized enterprises (SMEs) in the upcycling and recycling industry. To support the operations of the facility, USE-IT obtains additional funding through on-site tenancy and partnerships, ensuring the sustainability of enterprises operating under USE-IT's waste license.

Cluster Objective : To serve as a waste beneficiation initiative and to facilitate the development of job opportunities in the green economy. Specialised services include:

- Research and Development
- Project facilitation, advice, and support
- Network facilitation with the public and private sectors
- Enterprise development at the Micro to Medium Enterprises through incubation
- Facilitate partnerships in the Green Economy
- Skills development within the waste industry

- Wealth creation through waste
- New innovations to upcycle waste

Flagship Projects :

Funded Projects :

- Compressed Earth Recycled Blocks
- Glass Beneficiation Project
- HWBC - Hammarsdale Waste Beneficiation Centre

Small Enterprise Development Projects :

- Waste Upcycling
- E-Waste Recyclers
- Local Plastics Recycling
- Organics / Composting

Durban Chemicals Cluster



Summary of the Chemicals Sector : The Chemical Industry in the region is highly developed, consisting of a few large plants and a diverse range of medium-sized specialist companies. In the downstream sector, there are numerous small, medium, and micro-sized enterprises (SMMEs) that specialize in chemical formulation, playing a crucial role in the distribution chain. The industry's backbone is formed by the two major oil refineries that supply the Petro-Chemical sector.

In the chemical and petro-chemical sub-sector of KZN, industrial chemicals account for one-third of the gross output, amounting to R1.1 billion. Petroleum and coal products make up 30% of the output, totaling R1 billion, while chemicals contribute 21% at R0.7 billion. The remaining balance is

represented by rubber and plastic products. Significant investments are also seen in other sectors such as paint, agricultural chemicals, plastics, and synthetic resins.

Cluster Objective : To develop the competitiveness of the local chemicals manufacturing industry.

The DCC is an industry-driven initiative focused on developing the following strategic priorities:

- Compliance and innovation
- Investment attraction and growth
- Export development
- Operational excellence
- Health and safety
- Green manufacturing
- Youth training and skills
- Skills development

SmartXchange – Centre of Excellence (Durban Technology Hub)



Summary : SmartXchange is an incubator that aims to provide business development services to Small, Medium, and Micro Enterprises (SMMEs) in the sectors of Media, Information Communication Technology (ICT), Electronics, and Arts.

SmartXchange runs a program that identifies and supports the growth of high-quality skilled SMMEs in the MICTea sector in KwaZulu Natal. Moreover, SmartXchange serves as a specialized platform for public and private organizations to cooperate and realize the vision of transforming eThekweni into Africa's leading ICT hub.

To achieve its goals, SmartXchange collaborates with corporate entities from the MICTea industry, educational institutions, and the government sector. These partnerships focus on empowering entrepreneurs and the youth through skills development. By leveraging these collaborations, SmartXchange also contributes to the creation of sustainable employment opportunities, economic growth, and the overall competitiveness of the province.

Cluster Objective : To develop and transform local ICT businesses through skills development, providing an incubation facility and promoting local small medium and macro enterprises (SMMEs) in Durban and in KZN; To serve as a special purpose vehicle for public and private organisations to collaborate and realise the vision of eThekweni becoming Africa's ICT Hub:

- To identify and assist in developing a quality ICT SMME landscape in KwaZulu-Natal
- To develop a pool of skilled ICT workers
- To support initiatives which seek to bridge the digital divide.

Programmes :

- Incubation and skills development of SMMEs
- Research, development, and innovation
- Provision of shared central services, to ensure the efficient management of the SmartXchange ICT hub and its tenants
- Developing public private partnerships for ICT collaboration

eThekweni Maritime Cluster



Summary of Maritime Sector : According to current estimates, the ship-building sector in the local area generates more than R1 billion annually, with 68% of this revenue coming from foreign currency. KwaZulu-Natal is the second most active province in boat-building, with approximately 6,000 vessels visiting the ports of Durban and Richards Bay each year. This consistent flow of vessels creates opportunities for potential repairs. In 1993, only 15% of South African boat-building companies were based in KwaZulu-Natal, but this number has since increased to 25%, with around 40% of companies entering the industry since 2006. The Western Cape dominates South Africa's freshwater aquaculture sector, followed by Mpumalanga, while KwaZulu-Natal holds the third position. The province's midlands are home to most trout farms, and throughout the province, ornamental fish

like koi carp, catfish, and tilapia can be found.

Cluster Objective : To position the maritime sector for sustainable economic growth through:

- Training and Skills Development
- Enterprise and Supplier Development
- Research, Development, and Innovation
- Coastal and Marine Tourism
- Maritime Industry Promotion Locally, Regionally, and Internationally.
- Marine Manufacturing – Ship and Boat Building, Repair and Services.

More on: Enterprise Development

The Enterprise Development Programme aims to promote the growth and assistance of specific emerging enterprises so that they can effectively operate in the maritime sector. This program plays a crucial role in driving economic transformation in the maritime industry by supporting initiatives that target small businesses, including those owned by youth and women. In 2015, the EMC (Enterprise Development Programme) established **incubator** and **business accelerator programs** to provide assistance to small businesses seeking to enter the maritime industry.

More on: Marine Manufacturing Programme

Presently setting up a **Boat Building Park** in Durban closer to mooring and launching facilities to position Durban Boat Builders as world class competitive. Supporting the Marine Industrial Hub Development.

Key Strategic Partnerships in Research and Education

University of KwaZulu-Natal

A public university with expertise in the following science and technology research areas:

Biotechnology; Energy and Technology for Sustainable Development; HIV/AIDS, Tuberculosis and Health Promotion; Maritime Studies; Water, Environment and Biodiversity.

- Established in 2004 after the merger of the University of the Natal (founded in 1910) and the University of Durban-Westville (established in the 1960s).
- ~ 45,000 enrolled students; ~ 10,000 graduates per year; ~ 1,200 permanent academic staff
- Makes research available the institutional repository, ResearchSpace at <https://researchspace.ukzn.ac.za/>.

Durban University of Technology

A public university with the following established science and technology related institutes, centres, research groups, and focus areas:

- **Composite Research Group** → Development of smart materials, nano-sensors, nano-coatings, nano-membranes, and polymer nanocomposites for a variety of applications including aerospace and mass transit systems.
- **Space Science and Smart Grid** → Satellite & Space-based Engineering; Satellite E- solutions; Stratospheric Platform Systems for CNS; Airships and Aircraft; Intelligent Transport Systems ; Augmentation of GNSS Solutions. DUT Smart Grid RFA engages in research relating to renewable energy and innovation for intelligent cities, using Industry 4.0 tools and applications in electrical power and energy systems.
- **Institute for System Science** → Research into real-world questions using multidisciplinary computational and mathematical systems methods.
- **Institute for Water and Wastewater Technology** → Wastewater treatment technology, algal biotechnology, and environmental biotechnology.
- **The Urban Futures Centre** → Hub geared towards shaping urban spaces that are vibrant, resilient, accessible, egalitarian, caring and well-designed.
- **Computational Modelling and Bioanalytical Chemistry** → Ionic Liquids, Synthetic Organic Medicinal Chemistry, Phase Equilibria and Environmental Chemistry.

- **Enzyme Technology** → Discovery, improvement, production and application of microbial enzymes. Applications span agricultural, biomedical and industrial sectors. Expertise in screening, cloning and expression of enzymes and production by fermentative processes. Also researching the degradation of biological macromolecules to produce derivatives of industrial importance.
- **Plant Biotechnology** → Vegetative, generative and propagative technologies that extend ways to produce bio-chemical and pharmaceuticals from plants.

The university also caters to start-up development through:

- **innobiz DUT Centre for Entrepreneurship and Innovation** : DUT private entity is registered as a Non-Profit Company (NPC). The entity serves as an umbrella body for all DUT entrepreneurial units offering both theoretical and technical learning, business support, and related activities. Its core business is to produce entrepreneurs with a strong focus, while nurturing confident, knowledgeable, thriving, innovative, adaptive, problem-solving business leaders.
- Established in 2002 after the merger of ML Sultan and Technikon Natal.
- ~ 33,000 enrolled students; ~ 850 permanent academic staff

Innovate Durban



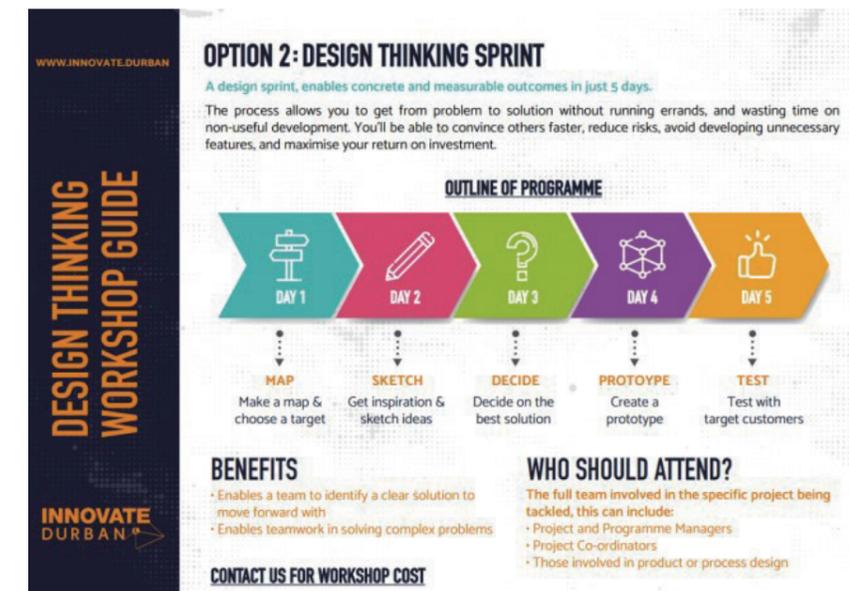
Innovate Durban (RF) is a registered non-profit company that supports the innovation ecosystem through programmes, research, and capacity building & skills development. The company aims to foster inclusive innovation amidst the fourth industrial revolution to ensure economic growth and job creation.

Focus Areas:

- Projects that address social, systemic, or structural issues that perpetuate poverty
- The provision of tools, training, and access to resources for business startups and community building projects
- The wish to support business and attract investment
- Public sector, SMMEs, and marginalised communities

Programmes:

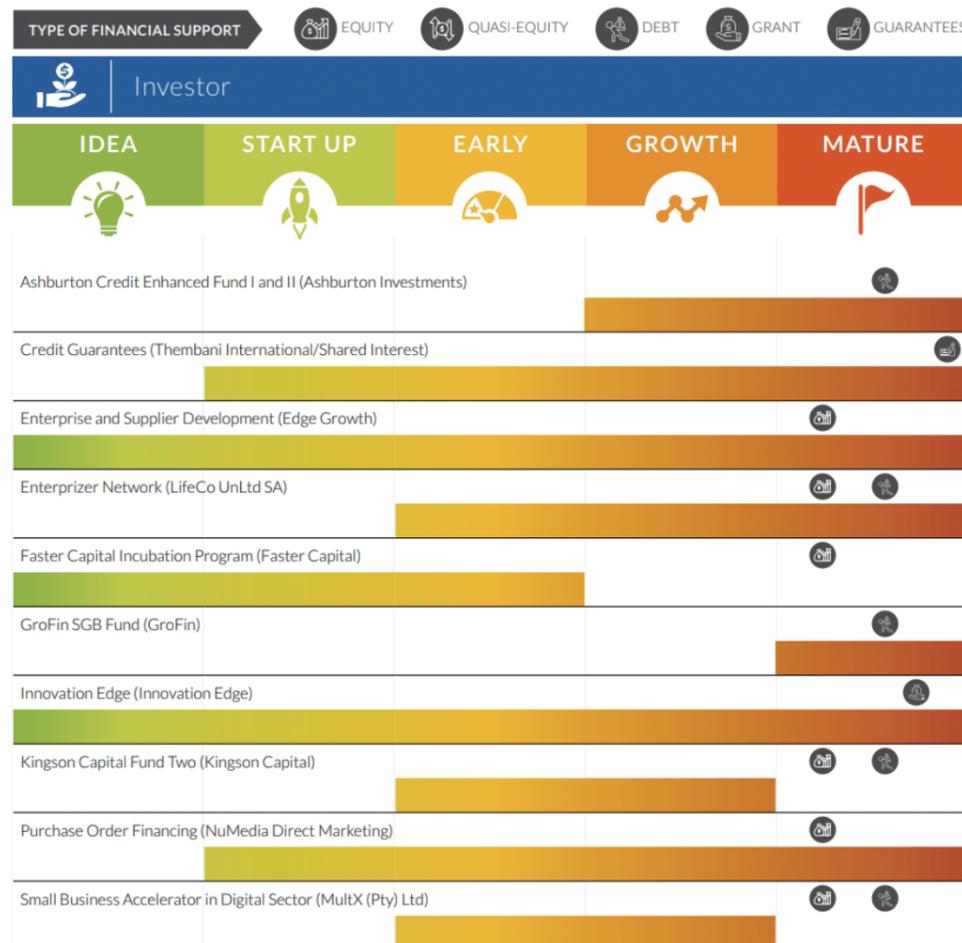
- **Innovation Support**
 - Youth Innovation Challenge
 - Start Up Support Programme
 - Innovation Support Programme and Fund
 - Pitching Den
 - Open Exchange
- **Capacity Building and Skills Development**
 - Future Skills and Digital Literacy Workshops
 - Design Thinking Workshops



Source: Innovate Durban Design Thinking Brochure

• Research

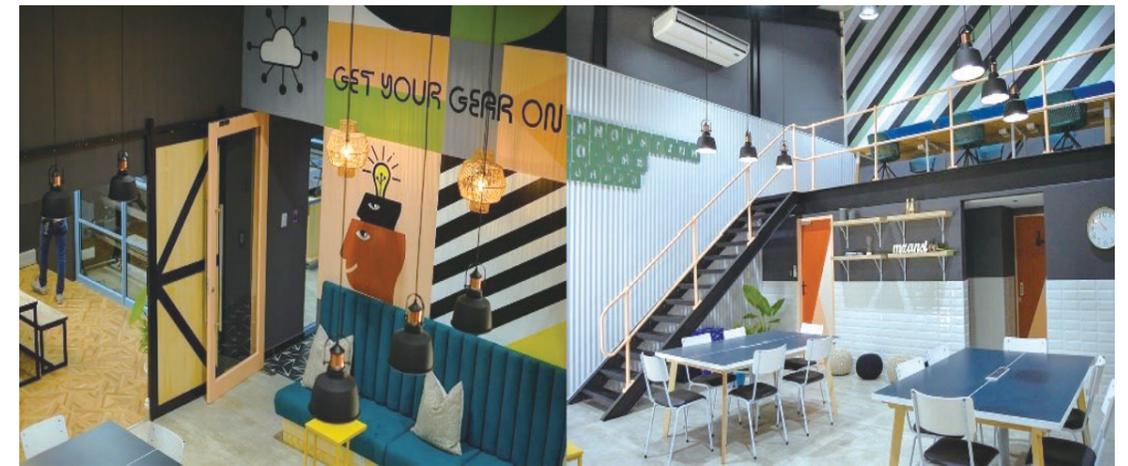
- During 2019, Innovate Durban partnered with a specialist NPO, the Aspen Network of Development Entrepreneurs, to compile an **Entrepreneurial Ecosystem Snapshot Map**. The Ecosystem Map shows the various support organisations in Durban who work with entrepreneurs and innovators, and the support they provide on a programmatic level.



Source: Durban Ecosystem Snapshot 2019

Facilities:

• Innovation Co-Lab



Source: <https://www.innovate.durban>

- **Programmes** : ▲ Design Thinking ▲ App Development ▲ Digital Skills Literacy ▲ Hackathons ▲ Coding Classes ▲ Robotic Classes ▲ Prototype Development Support ▲ Youth Innovation Challenges ▲ Innovator Support Programme
- **Technology** : ▲ Drones ▲ Robotics ▲ Virtual Reality ▲ Vinyl Cutter and Large Format Printer ▲ 3D Printers ▲ Laser Cutting Machines ▲ Artificial Intelligence Tools
- **Facilities** : ▲ Digital Training Studio ▲ Hot Desks ▲ Co-working Space ▲ Venue Hire ▲ Café
- **Prototype development facilities, including** : ▲ Spray booth ▲ Laser cutting facilities ▲ 3D printing facilities ▲ Assembly room

Events :

• Innovation Festival Durban



The IF Durban is an annual festival aimed at businesses, entrepreneurs, designers, academics, government, and thought leaders who participate in panel debates, robotic and gaming workshops, consultations with industry experts, provide keynote speeches, and explore trends in innovation.

Trade and Investment KwaZulu-Natal

Trade and Investment KwaZulu-Natal is a South African trade and inward investment promotion agency who promotes the province as an investment destination by identifying, developing and packaging investment opportunities. The company also facilitates local access to international markets in order to retain and expand trade and export opportunities.

- **Relevant sectors in science and technology, as well as business:**

- Energy and Water
- Health Services
- Manufacturing
- Business Services

Conclusion

eThekweni Metro is actively seeking collaboration with foreign partners in order to strengthen its economic position and reach its development goals. Aside from the ESG and SDG opportunities that working with the city would offer Daejeon, knowledge sharing between the two cities would be fruitful for both partners in tackling local and global problems surrounding smart-city development and within the green energy sector. Despite the significant challenges that eThekweni faces in terms of informal settlements, infrastructure, poverty and inequality, as well as the ongoing South African energy crisis, there are many potential avenues for investment and collaboration between these twin cities, both at the level of local government and its strategic partners.

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Innovation Policy in Malaga

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Overview of the city

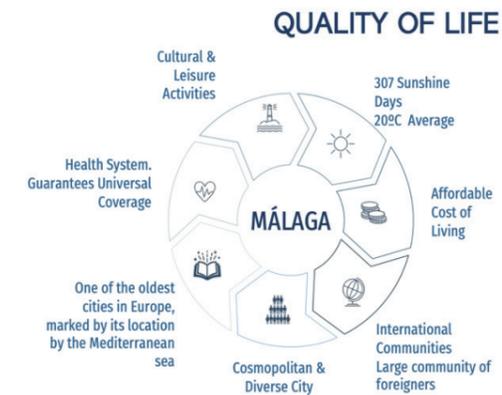


Mayor of Malaga Metropolitan City

Name	Francisco de la Torre Prados
Date and Place of Birth	December 21, 1942, Málaga, Spain
Career history	Mayor of Malaga since 2000 and has been re-elected.. He is a member of the People's Party (PP) and is considered to be a moderate politician. He is known for his focus on economic development and social welfare.

Five Key Strategies	<ul style="list-style-type: none"> ▲ Boost economy based on technology and innovation ▲ Enhance quality of life with affordable cost of living and diverse communities ▲ Develop smart city infrastructure ▲ Focus on sustainable development goals ▲ Promote cultural & leisure activities
----------------------------	--

Item	Details
Population	580,000 people (253,153 Foreign Inhabitants 15%) (6th largest in Spain)
GRDP	77.1 billion euros / 15,600 euros per capita
R&D costs	Multinationals such as Ericsson, Oracle, IBM, Accenture, Telefónica, Huawei, TDK, EPAM, and Google investing in innovation
Industrial structure	Málaga TechPark with +635 companies, +20,000 jobs; Málaga city with +4,000 companies, +30,000 jobs
Area	398km ² (City) / 561km ² (Metropolitan Area)
5 key strategic industries	Technology, tourism, maritime, logistics, creative, renewable energy
Transportation	<p>Malaga-Costa del Sol Airport (4th in Spain, capacity for 35 million passengers/year, 152 destinations)</p> <p>AVE high-speed train (Madrid in 2h 30min, Barcelona in 4h 40min)</p> <p>Port of Malaga (2nd most important passenger port in Spain, 6th in the Mediterranean)</p>
Special notes	<p>Technology and innovation concentrated in Málaga TechPark with multinationals like Ericsson, Oracle, IBM, Accenture, Telefónica, Huawei, TDK, EPAM, and Google</p> <p>Urban Lab for SMEs & Entrepreneurs offering a space to experiment, test, and pilot ideas and prototypes in SmartCity, IoT, Big Data Technologies, and Urban Solutions for Energy, Mobility, Water, and Environment</p> <p>Málaga, a source of technological talent with successful local startups like Freepik, Uptodown, and BeSoccer; Vodafone's European R&D Center of Excellence and Google's upcoming center of excellence for cybersecurity in the city</p> <p>Cluster of Smart Cities of Andalusia and Nature-Based Solutions Cluster (NbS-Cluster) promoting efficient, sustainable, and comfortable living in the city</p>



Key strategic industries

Tourism Industry: The tourism industry is one of the **most important sectors** in Malaga's economy, accounting for a **significant portion** of the city's GDP. The city attracts **millions of tourists every year**, thanks to its sunny weather, beautiful beaches, and rich cultural heritage. Malaga is home to several world-renowned tourist attractions such as the **Alcazaba fortress**, the **Picasso Museum**, and the **Cathedral of Malaga**. The tourism industry has been growing steadily over the years and has created numerous job opportunities for locals.

On a business perspective, the Trade Fairs and Congress Center of Málaga (FYCMA) is a state-of-the-art international facility designed to accommodate a wide range of **events and conferences that host events such as GreenCities, or Gamepolis**. With 183,000 square feet of exhibition space divided into two main halls, it provides ample room for diverse gatherings.



Source: fycma.com

The center attracts **numerous international and domestic events, conferences, and exhibitions**, which in turn draw a significant number of visitors to the city. This influx of visitors increases demand for local accommodations, restaurants, and leisure activities, generating revenue and creating employment opportunities for the local population.

Technology Industry: The technology industry is another key strategic sector in Malaga's economy. The city has become a hub for technology startups and innovation centers due to its favorable business environment and access to skilled labor. Some notable companies that have established their presence in Malaga include **Oracle Corporation, Huawei Technologies Co., Ltd., and Ericsson AB**. The technology industry has been growing rapidly over the years and has contributed significantly to job creation.

The city is home to several technology parks and incubators that support startups and established companies alike. **The technology industry in Malaga includes software development, cybersecurity, artificial intelligence (AI), and internet of things (IoT) solutions.**

Logistics Industry: The logistics industry is an essential sector in Malaga's economy due to its strategic location as a gateway **between Europe and Africa**. **The city's port serves as a major hub** for shipping goods between these two continents. Additionally, Malaga's **airport is one of the busiest airports** in Spain and serves as a major transportation hub for cargo shipments across Europe. Some notable logistics companies that have established their presence in Malaga include **DHL Express Spain S.L.U., FedEx Express España S.L.U., and UPS España S.L.U.**

Creative Industries: The creative industries are a growing sector in Malaga's economy, thanks to the city's rich cultural heritage and vibrant arts scene. The city is home **to several world-renowned artists, musicians, and writers, and has become a hub for creative professionals**. Some notable creative industries in Malaga include **film production, music production, and graphic design**. The city hosts several international film festivals such as the **Malaga Film Festival** and has attracted several major film productions over the years.

Renewable Energy: Renewable energy is a growing industry in Malaga that has the potential to **create jobs and reduce the city's carbon footprint**. The region's sunny weather makes it an ideal location

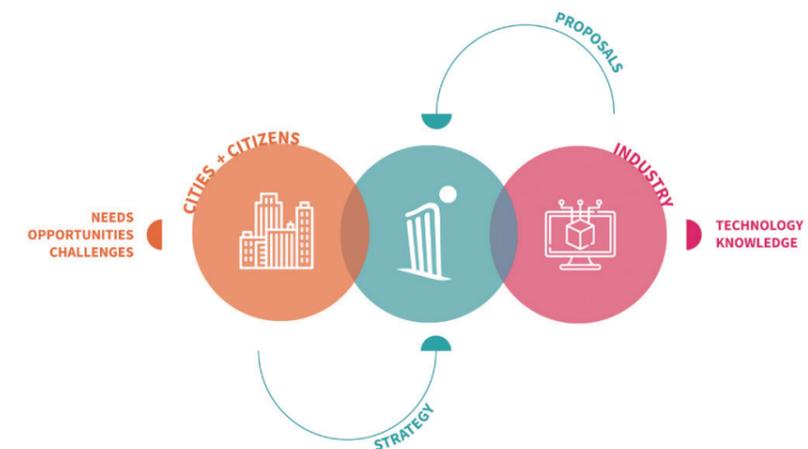
for solar power, while its proximity to the sea makes it a prime location for offshore wind farms. One example of a company that **is leading the way in this sector is Abengoa, which specializes in developing renewable energy projects such as solar thermal power plants and biofuels.**

Innovation clusters

The Smart City Cluster: is an innovation cluster that focuses on promoting the development of smart cities in the region. It was founded in 2016 with the goal of promoting **collaboration between research institutions, universities, local governments, and companies in the region**. The cluster is concentrated around Malaga and has become a hub for startups focused on developing innovative solutions for smart cities such as **energy efficiency, mobility, and citizen participation**. Its purpose is to provide a supportive environment for businesses to grow by offering access to **funding, mentorship programs, networking events, and other resources**. The Smart City Cluster's status is promising with continued investment from both public and private sectors.

At this moment the city of **Malaga has developed more than 198 Smart City Projects**. Key initiatives include the Urban Mobility Plan, electronic government services, micro-energy generation through solar panels and wind turbines, and waste management systems with biogas energy generators.

The city has also embraced efficient building designs, **open data, big data analytics, and Internet of Things technology with connected city sensors**. Urban Lab for SMEs & Entrepreneurs and the



Source: [Smartcitycluster.org](https://smartcitycluster.org)

New Technology Demonstration Centre support local innovation, while the public can access various apps for parking availability, bus schedules, city events, and more. Málaga has successfully executed pilot projects in partnership with major companies like **Mitsubishi, Hitachi, and Endesa, earning recognition as an IBM Smart City Challenge winner in 2012.**

The Nature-Based Solutions Cluster (NbS-Cluster): is another emerging innovation cluster that focuses on promoting **sustainable development through nature-based solutions.** It was founded in 2019 with the goal of promoting collaboration between research institutions, universities, local governments, and companies in the region. At this moment, it has more than **30 affiliated companies.** The cluster is concentrated around Malaga and has become a hub for startups focused on developing innovative solutions for environmental challenges such as climate change adaptation and mitigation. Its purpose is to provide a supportive environment for businesses to grow by offering access to funding, research facilities, and talent. The NbS-Cluster's current status is promising with continued investment from both public and private sectors.

The Andalusian Maritime-Marine Cluster (CMMA): is an established innovation cluster that focuses on promoting economic growth in the maritime sector. It has the goal of promoting collaboration between research institutions, universities, ports, and maritime companies in Andalusia.



Source : openforbusiness.malaga.eu

The cluster has 60 partners and has become a hub for companies focused on developing innovative solutions for maritime industries such as shipping logistics and marine renewable energy. Its purpose is to provide a supportive environment for businesses to grow by offering access to funding, research facilities, talent development programs among others. The CMMA's current status is strong with continued investment from both public and private sectors.

National Industrial Complex

The industry of Malaga has experienced a constant and gradual loss of weight in recent decades, which is a trend that is not unique to Malaga but is part of a general deindustrialization process. However, there are some positive signs of growth and development in certain sectors. For example, the **Technology Park of Andalusia**, which is one of the **most important innovation clusters in Malaga**, has played a significant role in driving innovation and economic growth by providing access to state-of-the-art research facilities, skilled labor, and funding opportunities. Additionally, there are other important innovation clusters in Malaga that specialize in **aerospace, biotechnology, and smart city technologies.** These clusters have also contributed to the development of their respective industries by **promoting collaboration among local companies and research institutions** to drive innovation. Overall, while there are challenges facing the industry of Malaga, there are also opportunities for growth and development through innovation and collaboration.

For example, in **2019, the percentage of contracts in industry was 6.5%**, and the percentage of affiliates in industry was 5.5%. The number of establishments in industry accounted for only 4.4% of



Málaga TechPark;
Parque Tecnológico de Andalucía

Source: pta.com

the total number of establishments in Malaga. However, there are some positive signs as well. For instance, there **are 639 companies located at PTA (Parque Tecnológico de Andalucía)** with more than **20,000 jobs created**.

Moreover, Malaga has more than **4,000 industrial companies** and business parks providing **30,000 jobs for the city with excellent logistical centers**.

There is potential for growth and development in certain sectors such as advanced industries related to sustainable mobility and transportation infrastructure. These sectors have a multiplier effect on other economic sectors and could help to reindustrialize the province. Overall, while Malaga's industry has faced challenges due to **deindustrialization trends**, there are opportunities for growth and development through innovation and collaboration among local companies and research institutions. The **innovation clusters in Malaga have played a significant role in driving innovation** and economic growth by providing access to state-of-the-art research facilities, skilled labor, and funding opportunities.

Status of Innovation Institutions in Malaga —

Málaga Valley Urban Lab

The **Málaga Valley Urban Lab** is an initiative aimed at promoting innovation, entrepreneurship, and the development of new technologies in the city of Málaga, Spain. This urban lab serves as a testbed for startups, small and medium-sized enterprises (SMEs), and other organizations to experiment with **and implement cutting-edge solutions** in areas such as **smart city technologies, digital services, and sustainable urban development**.

The Málaga Valley Urban Lab fosters collaboration **between the public and private sectors, providing a platform** for businesses, researchers, and local government to work together in driving economic growth and improving the quality of life for residents.

- An urban laboratory with the **most innovative technologies** where you can experiment, test and pilot your ideas and prototypes in terms of “SmartCity”, Internet of Things, Big Data Technologies

and Urban Solutions for Energy, Mobility, Water and the Environment.

- The 4-storey building houses the Malaga Traffic Control Center, Telefónica's Innovation/ Demonstration Center, Europe's Fi-Ware servers, Telefónica's Open Future Accelerator and a Digital Content Center.

Research-oriented universities

University of Malaga (UMA):



Source: uma.es

- Offers a wide range of **undergraduate and graduate programs in science, engineering, humanities, and social sciences**.
- Has a strong research focus and is home to several research centers and institutes.
- Collaborates with local companies and institutions to drive innovation and economic growth.
- **Has partnerships with universities around the world** to promote international cooperation and exchange.
- The University of Malaga (UMA) **has 35,354 students, offers 59 degrees, 53 masters, and 42 doctorates**. It also provides courses exclusively in English, promoting internationalization and academic excellence.

Andalucía Tech University of Seville and Malaga:

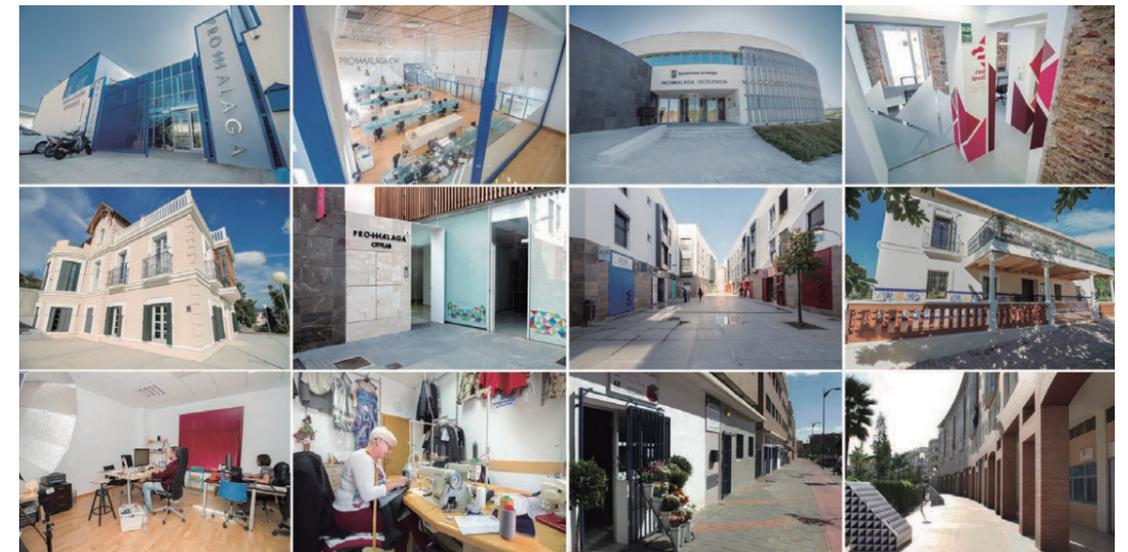
- Andalucía TECH, a collaboration between the University of Seville and the University of Malaga, represents a formidable educational and research alliance.
- Specializes in engineering and technology.
- Has a strong focus on research and innovation. Offers undergraduate and graduate programs in engineering, computer science, telecommunications, aerospace engineering, among others.

ProMálaga

ProMálaga, situated in the city of Malaga, plays a crucial role in **fostering entrepreneurship and economic development**. Anchored by the Municipal Network of Incubators (RMI), ProMálaga provides invaluable **support to budding startups and entrepreneurs**. With its **13 incubator centers**, **ProMálaga** offers a conducive environment for the creation and consolidation of companies across various sectors.

The objective of the Municipal Network of Incubators is to **fuel the economic growth of the city by nurturing entrepreneurial talent**. These incubators, classified as technological, creative-cultural, coworking, and district-based, provide tailored support and resources to startups at different stages of their development. **By offering workspace, mentorship, networking opportunities, and access to essential resources**, ProMálaga empowers entrepreneurs to transform their innovative ideas into successful ventures.

Currently, ProMálaga **hosts over 200 startups**, highlighting the thriving entrepreneurial ecosystem within the city. The network's incubators have a combined capacity to **accommodate these enterprises**, creating a dynamic and **collaborative environment** where entrepreneurs can learn, share knowledge, and collaborate to drive their businesses forward. ProMálaga's steadfast commitment to supporting startups and fostering entrepreneurship makes it a **pivotal player in the economic development of Malaga**.



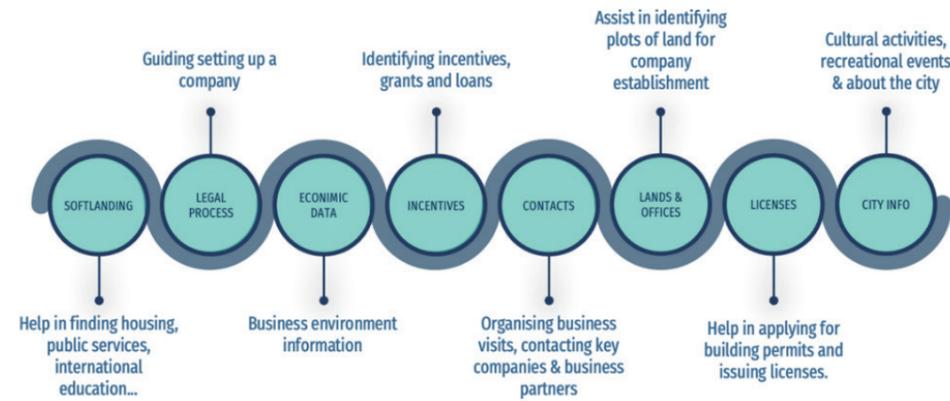
Source : Promalaga.es

MalagaWorkBay

MalagaWorkBay is an **investor office that** caters to digital nomads and remote workers, forming a community for teleworkers. They focus on **providing a space for these professionals to connect, collaborate, and integrate into the innovation ecosystem**. MalagaWorkBay achieves this by organizing events that promote the integration of remote workers and digital nomads into the local innovation scene.

Service	Description
Personalized Information and Attention	Assistance both before arriving in Málaga and after you have settled in.
Bureaucratic Procedures	Help with managing NIE/VISA and registration processes.
Translation	Assistance with reading and translating (Spanish/English) documents related to bureaucratic procedures.
Accommodation	Information on hotels and short and long-term rentals in Málaga, tailored to your needs.
Networking	Opportunities to develop professionally in Málaga, join the #BayWorkers community, and participate in interesting events.
Cultural and Leisure Activities	Information on Málaga's cultural and leisure possibilities, and facilitating experiences within the community.
Education	Information on schools, universities, and other educational opportunities in Málaga to help you find the right fit.

Coworking	Assistance in identifying office spaces or coworking locations.
Discounts and Benefits	Access to exclusive discounts and benefits at unique places and events just for being registered.



Source: malagaworkbay.com

institutes driving innovation in areas such as sustainable **construction, environmental sustainability, and technology**. Malaga is also home to several **technology parks and incubators that support startups** and entrepreneurs in developing new products and services. The city has a well-established ecosystem for innovation and entrepreneurship, with events such as the Malaga Innovation Festival bringing together innovators from around the world to share ideas and collaborate on new projects. Additionally, the city government has implemented policies to support innovation and entrepreneurship, such as **tax incentives for startups and funding programs for research projects**. Overall, Malaga is a **dynamic hub of innovation** that is attracting **talent and investment from around the world**.

Conclusion

The city of Malaga has become a **popular destination for cultural tourism** with international appeal. The city has a strong focus on **sustainability** and is working to balance its tourism industry with the needs of its residents. Malaga is also home to **several universities and research institutes that are driving innovation** and economic growth in the region. The city has developed a strong brand identity and is **recognized internationally for its cultural offerings, quality of life, and talented people**. Overall, Malaga is a diverse, innovative, and inspiring city that continues to attract visitors from around the world.

From an innovation perspective, the city of Malaga has made significant progress in recent years. The city has a strong focus on **research and development**, with several universities and research

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