



More than a smart city – Data, innovation and digitisation

29 October 2020

POLICY NOTE

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Publication date

29 October 2020

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Preface

The COVID-19 crisis has demonstrated the importance of an accelerated digital transformation in virtually all aspects of our society. As a municipal administration, we have switched smoothly to videoconferencing and teleworking to the maximum extent. A considerable number of entrepreneurs have made a virtue out of necessity and developed webshops and online platforms. Our educational institutions have invested in distance learning through digital channels and our healthcare institutions have also faced major challenges. We are on the cusp of a digital transformation which will completely redefine the way we work, teach, are taught, provide care, etc.

In Ghent, we want to prepare for the imminent digital revolution through collaboration and while giving consideration to all stakeholders. The Flemish government has called for more cooperation and greater compatibility of applications and systems, and we also wish to work together with other cities, knowledge institutions and companies towards a smart city that embraces technology for the common good.

However, we wish to be more than a smart city. Instead of striving for the most advanced technology or the greatest possible number of sensors, our goal is to put new applications at the service of the citizens. The digitisation process is taking place in many areas, ranging from the provision of solutions to societal challenges in our public space to the quality of the services we provide.

This policy note sheds light on the importance of innovation, data en technology in these times and how we intend to respond to the current trend with different actors. Since technologies are evolving quickly, this policy note looks at the current situation as well as new opportunities that may present themselves in the future.

Sofie Bracke
Executive Councillor for digitisation

Mathias De Clercq
Mayor

Ghent, 29 October 2020

1. Course of the project

This combined policy note with regard to data, digitisation and innovation is not just aimed at becoming a smart city, but also at future-proofing the city and preparing it for sustainable growth. This policy note is based on collaboration and alignment between different services, departments and executive councillors. Now that we are in the grip of the coronavirus crisis, the (digital) turning point seems to be closer than ever. We hold digital meetings, make online purchases, come to agreements via the Internet, etc. The coronavirus crisis has accelerated the digital transformation that was already underway and has also impacted the writing process of this policy note.

The current coalition agreement leaves no doubt about our firm commitment to turning Ghent into a European technology capital through partnerships with all stakeholders (knowledge institutions, entrepreneurs, citizens and other levels of government). Investment in the further digitisation of our city is crucial to strengthening the well-being and quality of life of all Ghentians. In 2019, the City of Ghent formulated the mission: **spontaneously digital**. We included this mission in our multi-annual plan as an operational objective: **Spontaneously digital: Together, we reinforce a broad and accessible range of digital services for local residents, employees, entrepreneurs and visitors based on 4 pillars:**

1. **Data as the foundation**
2. **Collaborative innovation**
3. **IT as a link**
4. **The elimination of thresholds**

Our next step was translating this mission into a digital strategy. Together with the core departmental heads and executive councillors:

1. Inspiring digital transformation possibilities were shared;
2. The impact of the digital divide on Ghent was explored;
3. The strategic levers included in this policy note were defined.

Throughout the participation process, these levers were analysed with an external sounding board group consisting of members of the (Ghent) IT community (companies and knowledge institutions). We will continue to rely on this external sounding board group for the further development of our digitisation plans.

Our innovation policy has been outlined in the Multi-annual Plan for 2020-2025, with a focus on the societal benefits as well as on open collaboration with citizens, educational and knowledge institutions, civil society and other levels of government. We will continue to involve them in the policy's further development.

At the same time, the direction was set for data and data management, and the policy's maturity level and pillars were established. The course for achieving this objective was outlined as well.

In consultation with Flemish competent ministers Crevits (innovation), Jambon (IT) and Somers (smart cities), our policies were aligned with their ambitions regarding digitisation, data and innovation. This alignment is crucial to good cooperation with the various levels of government. On 17 July 2020, the Flemish Government issued an important communication on their ambitions for the development of Flanders as a smart region. This communication is in line with the goals described in this policy note.

It is quite challenging to draw up a policy note on innovative, data-driven and digital transformation which is accessible to any Ghentian as well as interesting for future technological or international entrepreneurs. As far as possible, we avoid technical jargon, but we do provide some technical terms between brackets so as to avoid semantic confusion and explain difficult terms in the footnotes. In addition, we communicate about our 'smart-city ambitions' for Ghent by means of a new webpage on stad.gent.

2. More than a smart city

Policy contents determined by our overall municipal mission and the sustainable development objectives

Ghent is a proud city where people like living, working and relaxing.

A city that breathes and allows people to breathe.

Everyone is equally different and equally a Ghent resident.

Children are given room to grow.

People get the opportunity to develop their talents.

*Ghent is a city of entrepreneurship and experimentation,
that is open to the world.*

Together we create a city

where future generations can lead a happy life as well.

(Mission of the City of Ghent as described in the Multi-annual Plan for 2020-2025)



The City of Ghent's mission and the 17 sustainable development goals determine the kind of city and society we aspire to be. The mission indicates why we exist as an organisation and what our focus is. With the sustainable development objectives, we commit to working together with numerous other actors in Ghent on a sustainable and future-proof society. This policy note's central message is that data, innovation and digitisation play an important part in achieving these objectives.

Addressing urban challenges digitally

The challenges we are facing are complex and occur on multiple levels in quick succession. Here are a few examples from the Multi-annual Plan for 2020-2025:

1. How do we ensure the liveability and accessibility of our neighbourhoods?
2. How do we move towards a more sustainable economy and society?
3. How do we integrate new groups of residents?
4. How do we deliver an energy transition?
5. How do we increase the number of affordable housing units?

On the basis of the Multi-annual Plan and in consultation with urban partners, we make choices in the prioritisation of urban challenges and questions via digital solutions. In this context, we focus on three broad areas: **health, education and climate**. The digital transformation and technology in Ghent could play an important role in these priority topics. We have not selected these topics randomly as Ghent has strongly positioned itself in the areas of health, education and climate.

Health

Health concerns all of us. The tasks of Executive Councillor Rudy Coddens include strengthening the health skills of Ghentians and increasing the accessibility of healthcare. Furthermore, Ghent boasts four major hospitals that are internationally renowned in different medical disciplines. In terms of prevention, we make efforts to actively involve citizens in preventive health actions. Ghent provides a wide range of healthcare services, which are constantly evolving and undergo modernisation and digital transformation. Ghent has a specific ecosystem centred around Health-Tech and Life Sciences which is still too little known, although it has been a pioneer in this field. These sectors have proven their usefulness during the coronavirus pandemic and are globally renowned for their innovative knowhow. These innovations are the result of in-depth knowledge and creativity combined with enterprise and a willingness to experiment, evaluate and adjust. We wish to keep on tapping into this potential.

Education

Executive Councillor Elke Decruynaere aims to maximise the development opportunities of every child in Ghent, and high-quality education is an absolute precondition to achieve this goal. However, the coronavirus pandemic has presented the world of education with a major challenge. Distance learning has been introduced and reinforced, and digital tools have become indispensable. This changeover has not been easy for every child or every teacher. That's why we want to support Ghent's educational sector and vulnerable children in making the transition. During the coronavirus pandemic, we have developed a series of recovery measures for this purpose such as providing hardware (laptops, tablets) to children with limited resources. We have also provided additional assistance with the use of this digital equipment so as to reinforce digital inclusion. The City of Ghent wishes to help the world of education innovate and modernise. Within this scope, we host the School Education Transformation Technology (SETT) event. We adopt education transformation technology in an inclusive manner, paying attention to the needs of every child in Ghent.

Climate

The climate transition is currently recognised as one of the principal challenges facing our planet. In Ghent, Executive Councillor Tine Heyse supervised the preparation of an extensive climate plan with a 40% reduction in CO₂ emissions by 2030 as a concrete target. There is still a lot of progress to be made in the area of sustainable food and the circular economy. Not only do we raise awareness about global warming and try to change the behaviour of citizens and entrepreneurs, we also adopt innovative energy technologies that contribute to a more sustainable economy. An excellent example of such an initiative is Ghent Cleantech Regional Cluster, which brings together entrepreneurs and knowledge institutions collaborating on a more sustainable and healthy future. In Ghent, there is considerable potential for residual heat, renewable energy and alternative fuels and there are numerous opportunities for new technologies such as the capture, storage and reuse of CO₂, thus optimising the use of raw materials and energy.

We wish to work together with local residents, companies and other external partners to address priority urban challenges and investigate which technologies can help us do so. Within this context, we make use of available consultative structures and sparingly create new consultative structures only if absolutely necessary and always with clear objectives. The urban challenges and growing expectations of citizens as well as several new technological opportunities and budgetary limitations

compel all of us to be innovative and creative. In this context, we want to reach out to higher levels of government and other cities to collaborate on these (often) shared challenges.

We are more than a smart city ...

We are on the cusp of a new era. The growing importance of technology and digitisation force us to reflect on the kind of city we aspire to be. We wish to leverage technology and digitisation to address urban challenges in cooperation with companies, local residents and knowledge institutions active and/or based in Ghent. We are convinced that by using new technologies, we can accelerate and enhance the process of finding solutions to societal problems. However, technological progress is not made automatically. Technology needs to be designed and implemented in the city and urban life, thus impacting the streetscape and urban design. And it raises new questions. For example, who will be the owner of this crucial infrastructure and under what conditions? How do we involve all Ghentians in this digital (r)evolution? An important element for us is the constant prioritisation of the privacy and security of source data (see chapter 4).

As a smart city, it is therefore our ambition to proactively take the lead and bring people together in a world of major societal transformations. **We aspire to be a smart city by sensibly considering the structural use of technology in public space in our wider policy.**

And we position ourselves as a technology capital

Ghent has expressed the ambition to become a European technology capital on a scale feasible for Ghent and based on our current strengths in the areas that have been identified. We set the pace and dare to be ahead of the curve as a city.

We therefore position ourselves as an attractive city for companies and knowledge institutions engaged in digital transformation, digitisation and technology in general under the hashtag #technologiehoofdstad. We are developing this visibility on the basis of a broader brand policy for the City of Ghent and an international perspective.

Spontaneously digital

In this policy note, we outline the building blocks for turning these ambitions and principles into a reality. **Strengthening a wide and accessible range of digital services** We work in a spontaneously digital manner. We organise information sessions, the provision of services, decision-making and communication in digital format. Users continue on the digital path thanks to positive experiences. In the policy note on Public Affairs, you can read that we attach importance to a user-friendly and inclusive offer eliminating the thresholds for users. Together with external partners (citizens and staff, the IT sector, other levels of government and the academic world) we dare to innovate and look for digital solutions to the challenges we are faced with. Data make up the foundation of the data-driven policy we pursue. And IT is the link that connects all elements: we guarantee a stable, reliable and safe digital working environment with IT projects that help implement the strategy on the basis of an aligned IT architecture.

Since innovation and data transcend the digital realm or IT, we will develop 4 tracks further in this policy note. Ghent will develop into more than just a smart city along the following interconnected tracks:

1. **Together we dare to innovate.** We will explain how a smart city is also an innovative city, as well as how our mission-driven innovation policy creates added value for society and promotes innovation through open collaboration with citizens, educational and knowledge institutions, civil society and other government agencies.

2. **Data as the foundation** and fuel for increasingly rapid changes, creating value for citizens as well as making a data-driven policy and an agile organisation possible
3. **Technology as a smart link** to collectively design the digital and open environment of the future with a modern workplace and smarter service provision. This link facilitates acceleration as well as safe and reliable connections.
4. **User-friendly service provision** and an experience without thresholds for local residents, entrepreneurs, staff and visitors by placing the user and ease of use at the heart of our policy. We expand our digital offer and provide recognisable services as well as support to those who need it.

It is important that we follow the above-mentioned tracks together to make this (digital) transformation possible. To facilitate a connection in a coherent digital strategy, we implement 7 levers:

1. **We use technology as a lever for a smart city with reinforcement of sustainable progress**
 - More than a smart city:** By means of technology, we develop fundamental solutions with the aim of (re)designing our core functions in an innovative manner
 - Sustainability:** we assess technological solutions on the basis of their contribution to sustainability. We always strive for a balance between People, Planet and Prosperity.
 - Inclusiveness:** We assess solutions on the basis of their impact on inclusion, equal opportunities and the liveability of the city in order to improve them.
2. **We position ourselves as an attractive city for digital transformation**
 - Conscious vision:** With a strong and enticing ambition as a “European technology capital” we improve the city’s liveability and operation. We are a city that is open to everyone and actively invest in our spearheads Healthtech, Cleantech and digital economy.
 - Authentic and credible:** we use our assets (education, economy, hospitality, culture, etc.) and Ghent’s unique character to activate and attract (technologically) relevant talent.
 - A strong story, focus on “talking the walk”:** we involve our stakeholders in our progress via consistent communication about our vision, ambition and achievements. As a city, we lead by example. We adopt the most advanced technology and are an attractive employer for our employees.
3. **We evolve towards an open network model and promote progress in our ecosystems**
 - Locally:** We facilitate and participate in Ghent ecosystems (education, (tech) companies, research centres, citizens, etc.) in order to address societal and organisational challenges collectively by means of technology.
 - Nationally:** We work together with other government agencies and municipalities to define challenges, exchange solutions and technology as well as provide feedback to our local ecosystem. We participate in digital initiatives taken by other government agencies and intend to be a best-in-class early adopter.
 - Internationally:** We proactively approach technology players that can add value to the realisation of our visions and ambitions. We provide feedback to our local ecosystem and thus remain in control.
4. **We manage the city’s roles that change through technology**
 - Anticipatory policy:** We develop policies and frameworks on the basis of structural forward studies and systematic use of data, so as to anticipate technological developments and demands.

Organisation and follow-up: As solutions can be provided by anyone, the importance of adequate organisation, a clear framework and follow-up is increasing. The City of Ghent's core task continues to be ensuring quality, security, integrity and ethics.

Information and transparency: We strive for maximum transparency and are a reliable source of information for all our stakeholders. We use good online and offline communication channels to reach all those concerned.

5. We put the user first

Optimal user experience: We invest in the necessary methodology, data and knowledge to meet the rising expectations in the digital user experience.

Open solutions: By means of interfaces and open linked data, we encourage all interested parties to develop solutions in close contract with the users as a complement to our systems.

Participatory approach: We increase everyone's involvement in formulating and implementing our policy by making use of participatory technology. We also see to it that all layers of the Ghent population are reached.

6. We build an innovation culture with a balance between enterprise and stability

Speed and agility: We create a safe environment for experimentation (swift action, upscaling and cessation) where failure is accepted. If required, we consciously opt for a stable and traditional approach.

Openness: We encourage internal and external transversal partnerships. With an open mind, we look beyond the city limits to find creative insights or solutions, and dare to let go.

Resilience and autonomy: We increase the public support for technology and ensure that it is accessible for everyone. We create a framework in which autonomy and a sense of responsibility are stimulated.

7. We integrate flexible organisation forms into our organisational structure

Fleet model: We build a bimodal fleet model: a stable 'mother ship' and manoeuvrable 'speed boats' move in the same direction at different speeds.

Internal cooperation: We have designed an organisational model which structurally aligns business and IT and which promotes transversal cooperation. This model is supported by our financial toolbox.

External cooperation: We integrate a structural framework for partnerships into our organisation. We define clear choices (e.g. in what areas), objectives, roles, success criteria, degrees of freedom and shared financing models.

In this policy note, we further develop each one of our 4 "Spontaneously Digital" tracks in separate chapters with outlines. Each chapter is concluded with concrete initiatives which are categorised on the basis of the 7 levers and which we intend to implement by 2025 at the latest.

3. Collaborative innovation

3.1. A smart city is an innovative city

The challenges we face today are complex and diverse. Here are a few examples from the Multi-annual Plan for 2020-2025:

1. How do we ensure the liveability of our neighbourhoods?
2. How do we deal with diversity and the further digitisation of education?
3. How do we cope with climate change?
4. How do we build the economy of the future and ensure employment?
5. How do we make sure that Ghent remains accessible for everyone?

These challenges, linked to the growing expectations of citizens, technological opportunities and budgetary limitations, compel us to be innovative and creative. We know that it is no longer sufficient to do things 'a bit differently' or to do 'a bit more'; we must be daring.

As a smart city, we seek innovative solutions to the urban challenges we face. Smart technology and open data¹ contribute to these solutions, but a **smart city is more than that**. Open collaboration is crucial to innovation. Solving urban challenges requires the mutual reinforcement of the energy, knowledge and resources of local residents, companies, government agencies and knowledge institutions. The city is therefore looking outward for innovation.

We are not starting from scratch.

The City of Ghent has been a pioneer in various policy areas such as health, education and climate change. The innovations in these areas are the result of in-depth knowledge and creativity combined with enterprise and a willingness to experiment, evaluate and adjust. We want to keep on tapping into this potential, because a good innovation climate can be compared to a fertile soil: it has a higher yield of new ideas.

We do not go it alone as a city, but join forces with other government agencies. This means that we participate fully in the **Smart Flanders programme**, where we can set the innovation agenda and achieve better results together with other municipalities and with the support of Flanders. On a European level, we are looking for partnerships to reinforce our efforts through inspiration, contacts and additional resources.

¹ *Ghent opts resolutely for open data. By sharing the information and knowledge at our disposal, we wish to promote innovation and kindle enthusiasm in a transparent manner.*

3.2. A mission-driven innovation policy creates added value for society

Innovation for a better future

It is important to be clear about what we mean by innovation. To us, innovation means finding a solution (means) to an urban challenge, resulting in a method, operation, product or service with added value for society (purpose).

In short: **innovation is something new that impacts or solves a problem for the current, complex and digital world which could not be solved by previous solutions.**

Innovation can mean:

1. 'doing better', or working more efficiently, rapidly, cost-effectively, etc.
2. 'something new to us', or carrying out a new activity
3. 'something new to the world', or conducting an experiment.

In Ghent, we aim for innovations that create added value for society. They may involve a fundamental improvement or playing a pioneering role in the world, and are often inspired by other cities or sectors. After all, innovation often involves copying existing ideas or concepts, and there is nothing wrong with that. Since different types of innovation exist, there is more than one way to be innovative: an innovative service or product, an innovative organisation or a new experience.

We need to embed our innovation policy internally in our organisation and externally in cooperation with partners so as to look for new solutions that benefit local residents or users.

3.3. Added value of open innovation

Cooperation creates new opportunities for innovation

The challenges we are facing compel us to cooperate. The cross-pollination between different partners and sectors enables us to create new opportunities for innovation.

We wish to adopt an open innovation strategy and an open network model to facilitate progress in our ecosystems. In so doing, we recognise that innovative knowledge is widespread in our society and therefore make use of the knowledge that is present outside our organisation. Our role as a government agency has shifted to that of a **solution seeker**. Rather than address problems ourselves with our own solutions and internal resources, we look for a solution by making use of innovative knowledge that is available internally and externally. We thus share our challenges with various parties involved to achieve better solutions for Ghent.

Whom do we collaborate with?

Examples include educational and knowledge institutions, citizens, companies and other government agencies. On the basis of their individual character, they can all make a meaningful contribution to finding innovative solutions.

Educational and knowledge institutions

Educational and knowledge institutions wish to focus strongly on research and training that is relevant to society from a broad perspective, in dialogue with the parties concerned. Playing their role of social service providers, they create 'living labs' or experiments in cooperation with regard to complex issues. They are an important partner in the development of knowledge and methods. In addition, we can actively involve 70,000 students in addressing Ghent's challenges. Since they also provide the talent and new knowledge of tomorrow, consultations with higher education

institutions constitute an important bridge between Groep Gent and Ghent's educational and knowledge institutions. The resulting interaction generates considerable added value for all parties involved. Within the scope of consultations with the higher education institutions, Executive Councillor Elke Decruynaere will install a study group to submit urban challenges to students, researchers and teachers in order to integrate these challenges into educational and research activities.

Citizens

The involvement of **citizens** as users or critical voices is an essential aspect of this approach. Since citizens are the end users of the solutions to societal problems, it is essential to address their needs from the bottom up. However, citizens are also the providers of services and are able to come up with innovative solutions themselves. In this context, we refer to the creative examples from the citizen budgets. Or how can we do more with citizen science in the future? It creates a lot of opportunities to increase the involvement of citizens in the operations and policies in their city. All sorts of objectives and consequences such as reinforcement of local democracy, increased social cohesion and community building as well as smoother planning processes are on the horizon. Ghent also boasts many **civil society organisations** which are a privileged partner for the municipal administration. The Policy Participation department serves as a bridge with various citizen initiatives, while other departments are closer to Ghent's civil society.

Companies

Since **companies** are an important partner in driving innovation, we need to keep on promoting and utilising their innovative capacity. We involve both start-ups and large enterprises.

Existing as well as new platforms and initiatives with entrepreneurs may play an important role in this process, as stated in the policy note on economy: the Ghent Economic Board, platforms linked to the spearheads (Cleantech Cluster Gent, MedTeG, AI4Ghent), Gentrepreneur, etc.

We develop pilot projects concerning innovative contracting, for instance by participating in the Flemish Innovative Public Procurement Programme (PIO) (<http://innovatieveoverheidsopdrachten.be/>).

We wish to involve companies in providing and facilitating the solutions to the societal challenges of tomorrow (in terms of health, education and climate) in order to develop ground-breaking technologies and products. The policy note on economy states that we make use of the opportunities provided by a "**Start-up in Residence**" programme, following the example of other cities such as Utrecht and Amsterdam. The supply and demand side still need to be further aligned.

Government agencies

Finally, we involve all relevant government agencies. In this context, Flanders is our first partner via the Smart Flanders programme as well as the cooperation and financing opportunities provided by VLAIO. We also need to strengthen our innovative thinking within the municipal organisation culture. We allow room for ideas and talents and continue to promote innovative thinking and actions. We find it important to take the policies of **other governments agencies** into consideration.

Ghent keeps its finger on the pulse of what's going on in other cities via the Eurocities network. As an active member of the digitisation forum, we are able to put our principles, concerns and ambitions regarding this topic on the political agenda. We are looking for opportunities to cooperate on this topic on a European level and to support our municipal organisation which is in a digital transition process as well as our strategic partners such as knowledge institutions, companies and citizens.

We activate the subsidies from higher levels of government as a form of leverage funding for projects that make the difference in terms of innovation, technology and digital transformation, preferably within the scope of the priority policy areas of health, education and climate. Such subsidy projects provide the city with further opportunities for increased experimentation and innovation.

3.4. Mobilisation and increased visibility of Ghent's innovative capacity

We must continue to inventory, mobilise, facilitate and interconnect Ghent's innovative capacity. As a municipal administration, we wish to alter the preconditions so as to obtain more innovations. This requires time to grow and courage to let go and allow room for greater involvement and experimentation.

To do so, we will follow **three tracks** which have proven their success in other areas:

1. mobilising innovative capacity
2. launch innovation projects with regard to specific challenges
3. provide targeted support

We choose to pursue our open innovation policy in a broad and strategic manner. This requires us to play a facilitating role as a government authority. We build an **innovation culture with a balance between enterprise and stability**. Speed and agility can be achieved by creating a safe environment for experimentation (swift action, upscaling and cessation) where failure is accepted. We aim to increase resilience and involvement thanks to a framework in which we promote autonomy and a sense of responsibility. In addition, we allow room for experiments to be conducted freely in the public domain by creating zones with few regulations where innovation is made possible.

We make innovation visible

We communicate both internally and externally about existing and new innovations while establishing a clear link with the added value for society.

Various organisations have already opted for Ghent as the location for organising an event concerning data, technology or digitisation. Examples of such events are The Big Score, Trefdag Digitaal Vlaanderen, the School Education Transformation Technology (SETT) event, Apps for Ghent and Open Knowledge Belgium. Organisations are also interested in staging events with regard to innovation and design thinking.

We wish to continue building on existing initiatives. A multi-day innovation festival with international resonance can be useful for Ghent's international influence and for bringing innovation and technology closer to the citizen. Local residents, companies, educational and knowledge institutions as well as government authorities should be able to showcase their innovations in optimum conditions. We examine what events should be scheduled in the same week and what events should be distributed throughout the year.

Ghent thus connects, coordinates and clusters various existing initiatives and events organised by leading Ghentian and Flemish companies, knowledge institutions and networks. For the further development of these events, we draw inspiration from the Ghent Festivities and with a nostalgic reference to the former 10 Days Off festival, we will launch **10 Days of Tech**. We will upscale this event that brings people from diverse backgrounds together to an **internationally relevant**

innovation festival that is connecting, groundbreaking and authentic. We will continue to support relevant initiatives and ensure better coordination under the umbrella of this overarching innovation festival. As a City, we do more than organising, but also ensure alignment to tell a single story to highlight our assets as a technology capital as much as possible. This festival is centred around innovation, and enables us to establish a link with technology, digitisation, open data and other topics.

3.5. Support of innovation

We need to develop the support provided to innovation further in order to maximise the chances of generating and implementing the ideas required to effectively address the problems of tomorrow.

Within Groep Gent, we are developing an innovation network as a driving force and supporter of our city-wide innovation policy. The Strategic Coordinator keeps an overview of the network, which is composed on a multidisciplinary basis and complemented with external expertise, if required. Innovation projects receive the necessary support from this innovation network in all stages from conceptualisation to roll-out. This support is provided in the form of an appropriate training programme concerning innovation or legal support, by disclosing open data or by looking for subsidies for the innovation project.

In consultation with Executive Councillor Filip Watteeuw, we investigate the possibilities of experimentation with zones where few regulations apply. Such zones are important to supporting experiments and innovation, but their purpose is not to allow conducting research in an uncontrolled manner. On the contrary, they constitute a safe and temporary regulatory framework in which researchers can put a specific theory into practice for the first time. Another possibility is to create zones in which different partners undertake to innovate together.

Wintercircus will become the new meeting place in the city centre in 2022. It will include a hub for technology companies, start-ups and scale-ups. In other words, it will be a centre with international resonance which will accommodate innovative players and will be visible to the general public. Innovation “for everyone” means that the City of Ghent works together with partners, and in this particular case with the internal community organisation of Wintercircus, to launch innovative co-creation projects. Wintercircus can also be used as an exhibition space where innovative solutions are presented to the public at large.

3.6. Initiatives

We use technology as a lever for a smart city with reinforcement of sustainable progress

1. We promote innovative solutions to societal challenges within the topics of health, education and climate with the aim of developing groundbreaking technologies and products that create added value in the everyday lives of Ghentians. To do so, we create living labs that bring together academics, companies, government agencies and citizens. This is in line with previous living labs that dealt with the issue of social isolation: Hello Jenny (2018) and with learning difficulties: Inclusie in 4D (2020).

We position ourselves as an attractive city for digital transformation

2. We communicate both internally and externally about existing and new innovations while establishing a clear link with the added value for society. Together with partners, we organise the innovation festival '10 days of Tech' to highlight innovations developed by citizens, companies, educational and knowledge institutions as well as government agencies.
3. We organise an innovation contest to look for innovative solutions to societal challenges. This contest will bring people from diverse backgrounds together, just like the KUS contest focusing on administrative simplification. The innovation contest is aimed at presenting innovations and acknowledging innovators for their commitment.
4. In 2022, we will open Wintercircuit as a centre with international resonance where technology, culture (music) and architecture go hand in hand. It will be a showroom for innovation in partnership with public and private players.

We evolve towards an open network model and promote progress in our ecosystems

5. We involve Ghent entrepreneurs in the quest for innovative solutions via a Startup in Residence programme, following the example of other cities such as Utrecht and Amsterdam.
6. We develop pilot projects concerning innovative contracting by working together with the Flemish Innovative Public Procurement Programme (PIO). We embed this knowledge in our organisation.
7. We actively invest in knowledge sharing within Groep Gent and with other innovative cities. On a European level, we look for external cooperation in the digital transition process together with our strategic partners, including knowledge institutions, companies and citizens.
8. In consultation with the higher education institutions, we will install a study group to submit urban challenges to students, researchers and teachers. This way, we interact with and support the existing living labs and multidisciplinary research centres.

We manage the city's roles that change through technology

9. It is important for innovation that experiments are launched. We provide maximum support to such pilot experiments within the existing regulatory framework and for each innovation project, we investigate the possible legal derogations so that experimentation is given every chance. To boost innovation, we make use of our own new regulations as well as of the opportunities on a Flemish level which make it possible to launch a project in a zone with few regulations, e.g. Buurzame Stroom in the Dampoortwijk neighbourhood.

We integrate flexible organisation forms into our organisational structure

10. Within Groep Gent, an innovation network is developed to drive and support our city-wide innovation policy. It will be coordinated by the Strategic Coordinator and will be composed on a multidisciplinary basis and complemented with external expertise, if required.

4. Data as the foundation

4.1. Introduction

Policies cannot be made up on the spot.

Data are often considered as the new gold. If we want to become (more than just) a smart city, we should not delay in making maximum use of the considerable value of the abundantly available data and information to address urban societal challenges, make well-founded policy decisions and improve the city's internal operations.

To truly embed data as the foundation, we will take our maturity as a data-driven municipal organisation to a higher level within the scope of a project of which policy, architecture, data management, infrastructure and data-driven decisions are the building blocks.

We also promote the data culture and support and encourage (digital) players to make use of data. Together, we look for methods to utilise data for economic growth, competitiveness, innovation and social development. **Data thus become a lever for cooperation, co-creation and a participatory policy.**

The city develops structural operations centred around data and information management to create added value.

1. For **citizens**, who enjoy better **(proactive) services and a more transparent municipality**, as stated in the policy note on Public Affairs.
2. For municipal policymakers, who can obtain better insights more quickly thanks to data analyses and research, and can subsequently **make fact-based decisions** that make it possible to tailor policies to the needs to all Ghentians.
3. For the organisation's internal operations, which can achieve **operational efficiency gains** as a result of increased quality and reusability of data.
4. For compliance with regulations and legal obligations, in particular privacy and data protection, as well as for progress towards the **ethical use of data**.
5. **For companies which, within the scope of specific arrangements and with respect for privacy, can develop applications on the basis of these open data.**

The following basic principles are at the centre of Ghent's **data policy**:

1. Data are public property and therefore open and available to everyone.
2. Data are secure and protected, taking into account the data protection of all parties involved.
3. Data are consumable and therefore defined, documented and retrievable.
4. Data are structured and integrated into the internal and external data landscape.
5. The use of data is traceable.
6. Data are managed as closely to the information source as possible.
7. Data and metadata are managed throughout their entire life cycle.
8. The data quality should be sufficient.
9. Employees make maximum use of data themselves.
10. Data are used in a respectful and ethical manner.

4.2. Value for citizens, entrepreneurs and researchers

Relevant, Attractive and Comprehensible

Data are only relevant if they can be converted into useful information and insights. Whether they concern complicated studies about the environment and policy follow-up, reporting for operational management or environmental indicators, efforts should always be made to clarify data and make them accessible. An attractive and usable range of data (which we already make available through the 'Gent in Cijfers' (Ghent in figures) dashboard, neighbourhood profiles in hoeveelin.stad.gent or the relocation study) is the basis for sharing conventional insights with citizens and civil society.

Clear and accessible data strengthen the communication and dialogue concerning policy topics, which is a condition for providing data-driven support to involvement and participation. Taking it one step further, we facilitate co-creation by including data from citizens and researchers in the development of the data dialogue as well as providing data to researchers in a relevant format, thus encouraging more research for Ghent.

Open, available and reusable data

Open data offer many opportunities for Ghentians and Ghent companies. The data made available by Ghent are utilised for both commercial and societal purposes. Companies are provided with the opportunity to develop new services or enhance existing ones thanks to the data put at their disposal by the government. Open data can also serve as a basis for market research and give companies a boost in finalising a business case. This requires sufficient dialogue so that we can learn about the ambitions, wishes, expectations and possibilities of companies and assist them if required.

Open data not only give insight into and control over the functioning of the government, but local residents and visitors to our city also benefit from the open data made available by the city. Developers build apps and provide services that create added value for society. Take, for instance, the Ghent Festivities app which was developed by a third party on the basis of open data.

In addition, open data are the final piece in the puzzle of the basic principle regarding openness and reuse in the city. For many colleagues, the open data portal is a source they use to support their work with available data.

We will continue to apply this principle. ' **Open by default**' ² is our starting point to make as much data as possible available in the correct manner. The '**Open Data Charter**'³, which the City of Ghent helped develop within the scope of Smart Flanders, will be operationalised further.

However, we do not just focus on the publication of more data. We continue to monitor and pioneer best practices to make data available in line with other Flemish (OSLO⁴) and European initiatives in order to increase their usability.

² Open data is the standard and normal practice; derogations are only allowed in case there are good reasons for not making data publicly available.

³ The open data charter is a collection of principles and guiding principles to maximise the openness and sharing of data, written out in specifications by the Flemish centre cities <https://smart.flanders.be/open-data-charter/>

⁴ OSLO stands for Open Standards for Linked Organisations (OSLO), an initiative launched by the Flemish IT organisation (V-ICT-OR) in 2012. This formed the basis for an open semantic information standard.

The technical accessibility of data enhances their usability. We also convert the pioneering role we play on a European level in publishing Linked Open Data⁵ in good practice cases developed in European and other subsidised projects.

We wish to help facilitate the maximum reuse of data in Ghent, including for data which we do not own, but which can generate solutions of public importance. We want to be a partner for Flanders in the research into how a sustainable compatible infrastructure for data storage and accessibility can be developed. We wish to involve Ghent's innovative companies in this process. The data broker⁶ piloted within the VLAIO project in Ghent may be an interesting tool to achieve this. It serves as a platform that collects data, makes them readable for the end user and makes linking data possible. This is a lever for **data citizen science**, so that data collected by individuals are put at the disposal of everyone.

More efficient, once-only and proactive services

We reuse as much data as possible that citizens have already provided to us before. By applying the **once-only principle**⁷, we make our services more customer-friendly.

People who are entitled to a discount or a subsidy currently have to apply for it themselves. Moreover, citizens have to provide additional data so that the city can make a correct decision. We can do better. We want to take the initiative to inform the citizens about the subsidies they are entitled to and award them automatically, on the basis of different data sources, including relevant sources that are not under our control. Therefore, we want to make data available across systems and link them to each other. We cooperate with other authorities or companies that have the necessary data at their disposal, for data exchange. All of this happens within the GDPR framework that ensures personal data protection. We investigate to which services and subsidies we can apply this, as well as which information is available where. That is an example of how **citizens can benefit from data flow**.

This is a very complicated matter, both in technical terms and in terms of content. That's why we focus on initiatives by the Flemish and Federal government (Flemish Information Agency, FPS Policy and Support, Association of Flemish Cities and Towns and Knowledge Centre for Flemish Cities).

4.3. Data-driven policy

Good policy is underpinned by data. Data should be made available to citizens and companies as well as policymakers. If there are still gaps in data availability, we should try and close them.

We uphold the tradition of regularly organising studies such as the city monitor, environmental analysis and demographic trend research, which form a solid statistical basis for thorough analyses, across policy areas.

⁵ *Linked Open Data is a technique to link data from several resources, so that you can conduct 'smart' searches across several resources, or let a software do it for you.*

⁶ *A databroker is a collection of software components that grant access to share databases if you meet certain conditions or if certain threshold values have been met.*

⁷ *The once-only principle ensures that you have to identify yourself or provide data to a public authority only once. This way, citizens and enterprises do not have to enter the same identification data, which have already been transferred to another administration, several times.*

The city becomes more complex, the challenges identified are intertwined and more data is generated.

In order to shape a data-driven policy, we need to align these factors well and know when we have relevant data that tell us something about a certain topic.

We will make these data available as much as possible for operational, management and policy decisions, through dashboards, self-service portals and reports. In this context, we provide good data visualisation to make the data tangible.

We will specifically develop a geographic platform with environmental indicators at a detailed level. At the same time, we are developing the capacities of the departments to analyse data. Smooth cooperation between data analysts and domain experts should guarantee the relevance of analysis results and increase the utility for decisions. We are also working on a **data culture** and public support to increase trust in the analysis methods.

Apps for Ghent has been a success for 10 years. It is an initiative that makes maximum use of the potential of **open data** in Ghent via projects, events and co-creation, and familiarises as many people as possible with the possibilities. Apps for Ghent stimulates cooperation, knowledge sharing and transparency. However, the value of data is not only in having data. The real value comes from the way data are used. That is why we invest in innovation and exchange of knowledge on data analysis and innovative application possibilities of data. Our goal is a data-driven municipal organisation. At the same time, we encourage citizens, organisations, companies and educational institutions to use proven and new techniques to explore challenges together. We initiate a series of thematic cooperations in which we bring together expertise, projects and events to explore the use of data further, with Apps For Ghent as the central factor.

Growing towards a shared Digital Twin

In a physical city, we cannot always experiment with possible solutions to a complex problem in public space. However, more and more ways are developed to realise substantiated predictions and simulations.

We will combine different techniques to prepare our policy digitally where possible, bring data together and simulate scenarios. This will take place in a 'City Dashboard', where we apply data from different (internal or external) sources as much as possible and provide an overview of data in order to make the right choices on a policy and organisational level.

The existing, statistically underpinned time series will be used to develop validated models, which will be supplemented with real-time data, where possible.

We use these models to gain a better idea of what is going on and to make policy choices, but also to help staff make faster and better-founded choices when performing their tasks.

All of this forms the basis for a **digital Twin**, a virtual version of our city. We are developing a vision and model of what this digital twin should look like, so that external parties can also cooperate on it and adjust the model if required. We focus primarily on concrete user cases within specific areas, such as water scarcity, air pollution and other climate-related topics as well as 'the hustle and bustle in the city' and 'city logistics'.

The 3D data that we already have at our disposal today form the basis for this ambitious project.

The development of trends, scenarios and predictions in this respect will lead to useful algorithms. Cooperation with companies, other authorities and researchers is essential to maximise utility and relevance.

Cooperation with others

Useful data can also come from external sources beyond our control such as other authorities, companies and citizens. We need to include these sources into the data landscape that the administration and policymakers can use for decisions, services and policy preparation work. We will investigate how we can increase the level of cooperation with citizens and companies. A wonderful example of that is the TMAAS⁸ project.

We need to support that cooperation with the right technology. We also have to investigate the feasibility of an '**Urban Data Platform**'⁹ as a central point for data collection and a platform to launch applications. This way, the city can provide the platform and infrastructure that allow different parties to exchange data, both with the city and with others (cf. Databroker).

Big data & data science techniques offer new possibilities

The city will have more data at its disposal. We investigate how administrators, officials, citizens and companies can use the same data. We will build models to use these data in a virtual simulation. If we realise that, it can help us as a government to determine which expertise is relevant and useful for our purposes. Techniques such as Artificial Intelligence or Machine Learning¹⁰ could lead to predictive models that make faster interventions and a future-proof policy possible. The multitude of sensors that we can expect in the coming years will generate gigantic amounts of data. Some of these data will be used in real time by means of machine learning techniques to actively and immediately adjust services. We can, for example, close off a square during the Light Festival if it is too crowded, and make it accessible again when it is less crowded.

To that end, we need to make careful choices:

11. Which data sources are reliable?
12. Which models do we use as a basis for algorithms and decisions?
13. Which methodology and technology do we prefer?

As a government, we are working together with companies, researchers and citizens to increase data literacy as well as skills inside and outside the administration in order to find a useful purpose for data and get value from it.

This way, we can easily detect urgent problems such as crowds in the city by means of crowd counting systems. Together with all our partners, we can thus gain an insight into a good, solid and sustainable approach.

4.4. Data management for an agile organisation

We continue to develop a fully fledged data and information strategy in order to realise our digital transformation and innovation. It is the city's ambition to become a data-driven organisation. With

⁸ The Ghent Mobility Company developed 'Traffic Management as a Service' (TMaaS.eu), an initiative that includes a fully digital and virtual platform which automatically processes the data of all transport modalities (bicycle, bus, car, tram, train, on foot) and provides real-time information to the citizens of Ghent. All data are processed and sent automatically, so no operators have to stare at screens all day.

⁹ Urban Data Platform is a collection of technical infrastructure that compiles the data of the city and other providers, enabling several actors to provide additional services in accordance with certain rules.

¹⁰ Machine Learning: a part or form of Artificial Intelligence according to which machines can adjust to new situations as well as discover and use algorithms and patterns.

high-quality and efficient data and information management, agile and scalable infrastructure, organisation as well as data and information skills, we create the agility and effectiveness to respond to the rapidly changing challenges facing the city.

We embed information management into the structure and operation of the whole organisation. We will launch an **enterprise architecture** operation, in which data and information are important factors for high-quality IT systems and efficient organisational processes.

Cooperation is important within the municipal organisation as well. It is not just one service, we are developing a structure and organisation for data governance, with an important responsibility for urban departments that create content. This way, the content experts throughout the municipal organisation are brought together to coordinate data and information management, assisted by central data experts. This results in ownership for the services of the data they manage for the city. The development of such a decentralised network of experts within the organisation facilitates the building and sharing of knowledge on data and information.

The foundations for data management

Foundations allow us to focus on good data and information management, in order to make high-quality data available in the right form and the right place. To increase the maturity of our data management, we make clear, future-oriented agreements on the following topics:

14. Recognition of authoritative reference and master data sources.
15. Measurement and improvement of data quality.
16. Data management throughout their life cycle.
17. Internal and external access to our data (open data).
18. Data security and personal data protection (GDPR¹¹).

As we want to cooperate at every level, we will use the relevant procedures set up by the Flemish administrations as well to increase the data quality and utility. By means of standards established in OSLO and the possibility to share data as Linked Open Data, we will pioneer and implement these procedures as much as possible.

4.5. Fair, Protected and Ethical

Citizens and staff trust Ghent to handle their data correctly. We aim for a higher level of maturity in terms of the safe and correct handling of (personal) data to keep earning that trust. Of course, collecting and processing personal data takes place pursuant to the applicable legislation, such as the General Data Protection Regulation (GDPR).

In practice, we apply a system of data classification that enables us to better judge which data we should protect and how. This way, we make sure all our data are sufficiently protected to guarantee their confidentiality, integrity and availability. We will publish the data processing register with all the purposes for which we process personal data to increase the transparency for citizens.

¹¹ **GDPR:** the General Data Protection Regulation (GDPR) is a European regulation that standardises the rules on the processing of personal data by companies and government agencies in the whole European Union. The regulation is an essential step to guarantee the protection of personal data within the European Union and to ensure the free flow of data in the European single market.

We also guarantee safe internal access and reuse of personal data, of course only for legitimate purposes and pursuant to the GDPR. Openness and reuse thus go hand in hand with data protection.

We closely monitor emerging personal data management techniques (e.g. Solid) with a view to possible implementation in Ghent. According to this concept, users can determine where their data are stored and who can make use of them.

Together with several partners at home and abroad, we will look for the right insights and tools to integrate ethics into data governance and new technologies such as AI¹² in particular.

We will cooperate with Executive Councillor Heyse to closely monitor the purchase of fair and circular IT hardware. Over the past years, we have taken the first steps towards the purchase of fair IT materials for Ghent. The City of Ghent, together with District09 and other stakeholders, will investigate how we can make IT purchases as fair and circular as possible. It goes without saying that this analysis continues to focus on reliability, affordability and performance. We will specifically explore the possibilities in specific specifications in order to know what the potential is.

¹² Artificial intelligence (AI) is the umbrella term for technologies that provide machines with some form of human intelligence.

4.6. Actions & Initiatives

We use technology as a lever for a smart city with reinforcement of sustainable progress

11. We are gradually developing a useful 'Digital Twin'. We focus primarily on user cases within specific areas such as 'the hustle and bustle in the city' and 'city logistics'.
12. We develop thematic collaborations on data with citizens, companies, other authorities and researchers.
13. All data initiatives are judged on their impact on and contribution to a responsible, transparent and ethical use of data.

We position ourselves as an attractive city for digital transformation

14. We invest in Apps For Ghent to discover innovation, expertise and added value. We will broaden the scope and not only focus on apps but also on data insights.
15. We pioneer and reuse relevant standards established on a Flemish and European level as much as possible.

We evolve towards an open network model and promote progress in our ecosystems

16. We will further develop our renewed open data portal as the final piece of our 'open by default'¹³ approach.
17. We develop infrastructure for data availability and integration. We want to be a partner of Flanders in the research into the development of a sustainable, compatible infrastructure for high-performance data storage and access.
18. The Open Data Charter¹⁴ will be further specified to give researchers, companies and citizens access to even more data.
19. In order to manage the variation in resources and partners uniformly, we set up several initiatives:
 1. to make these data usable for internal and external applications via an 'Urban Data Platform'.
 2. to bring the relevant insights together in a City Dashboard, where you can consult not only data, but trends and visualisations as well. That will be the stepping stone for a Digital Twin of Ghent.

We manage the city's roles that change through technology

20. We use the 'Gent in Cijfers' (Ghent in figures) studies as a statistically sound basis for a data-driven policy, completed with an approach to embed 'self-service' analysis in the services as much as possible.
21. We provide a data strategy & policy with clearly formulated data principles that are implemented in reality.
22. We manage and monitor the data quality (for priority domains) with clear KPIs.

We put the user first

¹³ Open By Default is the principle that all data are available to the public, unless there is a sufficient justification to explain that greater public interest (privacy, security, etc.) may be at stake. In other words, you have to explain why you are not publishing something. This leads to more published open data.

¹⁴ <https://smart.flanders.be/open-data-charter/>

23. We will develop the 'Gent in Cijfers' (Ghent in Figures) platform and dashboard to publish more neighbourhood information.

We build an innovation culture with a balance between enterprise and stability

24. We are setting up a project to make data science usable as expertise within the organisation, possibly by means of Artificial Intelligence.

We integrate flexible organisation forms into our organisational structure

25. We establish data governance in the organisation with roles and responsibilities.

5. Technology as a smart link

5.1. Introduction

Information and communication technology is the basic link in a stable, reliable and safe digital environment.

We strive for an evolving digital environment in which technological trends are turned into new possibilities and solutions by:

19. Designing the digital open environment of the future together in an agile way.
20. Developing an attractive and modern workplace as a municipal organisation.
21. Setting the course for the provision of smarter services.
22. Making the digital road accessible with sensors and connectivity.
23. Offering and supporting a stable, reliable and safe environment.

We let the IT services evolve with the digital environment and guarantee permanent and safe cooperation between processes, data, applications, services and infrastructure thanks to an integrated architecture.

The concepts and components we use and develop for this purpose are open to and reusable by all partners.

IT is not only an essential link to make the digital transformation possible, we also want to step up a gear.

5.2. Together we design the digital environment of the future

Digipolis Ghent becomes District09. We have designed an organisational model which structurally aligns business and IT, and which promotes transversal cooperation. This model is supported by our financial toolbox. We are disconnecting Digipolis Antwerp and Ghent, and will launch District 09 at the beginning of 2021 as an Autonomous Municipal Company (AGB), connected to the Ghent municipal activities. We will further develop the client and cooperation model for IT and data.

Speed and agility. A 'one-size-fits-all' approach for projects and services is not sufficient to meet the different demands and defend the interests of the City of Ghent and its partners. We create a safe environment for experimentation (swift action, upscaling and cessation) where failure is accepted. If required, we consciously opt for a traditional approach.

To organise the digitisation, we are working on a bi-modal 'fleet model':

24. The familiar organisation as a robust tanker that can meet stable and predictable demands best;
25. Small speedboats that can meet other demands quickly and cost-efficiently.

Agility is an essential part of the IT project and portfolio activities.

Our policy is based on needs and strategic value. After an initial investigation, we agree on priorities several times a year and we continue to develop our smart city. **Our priority strategic focus is on applications that are of direct practical use to citizens, companies, students and associations within the areas of health, education and climate.**

We prefer project methodologies with short-term software development (sprints), repeated developments (iterations) and a higher user engagement to achieve high-quality results faster.

We use technology as a lever for a smart city that facilitates sustainable progress. Thanks to technology, we can develop fundamental solutions to innovatively (re)design our core tasks as a city, within the above-mentioned areas of life (health, education and climate). Of course, we will keep on using technology to optimise and digitise the current organisational processes.

To this end, we need standardisation and openness: a digital infrastructure that puts accountability, open standards, open services and data first. **We consider using open source software applications.** By means of interfaces and open data, we encourage third parties to develop solutions in close contact with the users as a complement to our systems. Another possibility is to cooperate with software suppliers who work with open standards which avoid vendor lock-in, but are not necessarily open sources.

We use reference architectures as a model. It is a tool for working according to Enterprise Architecture¹⁵ on the basis of principles, standards, building blocks, business capabilities, etc. That results in the use of internationally accepted methodologies and the application of best practices in terms of applications and integrations. We also benchmark our own architecture against reference architectures.

We want to rise to the challenge of actively involving actors on the smart cities market. We will especially concentrate on unleashing the potential of the 'GovTech Market' (government-orientated technologies that help municipalities raise their internal efficiency) by removing thresholds for suppliers and simplifying procedures. We bring in expertise of companies from other industries and help them apply their knowledge to our context. Our external sounding board group helps us reflect on this exercise.

The time of one comprehensive, monolithic system that is not compatible with other software or services is far behind us. Smart city solutions are flexible and consist of several interconnected parts, which has 3 important advantages:

26. One function (service) can be used several times in several applications.
27. If required, we can choose to improve part of a solution, without touching the other parts.
28. We are no longer tied to one supplier, but are free to decide that several parts of one solution are developed by several market players.

We can 'glue' those parts together by using Application Programming Interfaces (APIs)¹⁶. This way, we create open and modular solutions.

An additional advantage is that these APIs support the analysis of collected data, help make anonymous data available and support the further development of smart products, services and processes in the wider ecosystem of companies and research centres in and around our city. These ecosystems are important for us to achieve our ambitions.

In order to work efficiently, but also to make local solutions available elsewhere, we also invest in the guidelines developed by Flanders in the Flemish Open City Architecture (VLOCA).

¹⁵ Enterprise architecture: a young field of study between business administration, information science and computer science, with the goal to enable an organisation to develop in the desired direction in all its sections.

¹⁶ Application Programming Interface (API): an API enables communication and exchange of information between different (software) systems.

We will, for example, develop a generic module for electronic payments that can be used by all our services. This way, if we encounter a market evolution in this field, we can integrate it into our generic module so that any software using it can work with the payment platform.

5.3. A modern workplace

Meetings with colleagues from home or different locations, while sharing your screen to discuss a calculation, and your schedule that automatically indicates whether you are available via chat or that you have to leave early for a meeting because of traffic, all of this is part of modern workplaces. Together with Bram Van Braeckevelt, Executive Councillor for Human Resources, and Annelies Storms, Executive Councillor for Facility Management, we will invest even more in modern workplaces within our organisation.

The COVID-19 crisis accelerated virtual cooperation from one day to the next. The municipal council and other committees now meet virtually. Virtual cooperation has become standard practice, easy, efficient and has been adopted en masse by our inventive staff to keep providing services. However, we have noticed that support and guidance of staff, training on digital workplaces and assistance with its use are also required. District09 and the Human Resources department will take care of this.

Furthermore, there is a demand for even more virtual functionality, online applications, integration, etc. The workplace of the future all of a sudden became the workplace of today, which raised the expectations about the workplace of the future.

The virtual workplace of the future still poses serious technological and organisational challenges, of course. Despite the acceleration, no solution already meets all the personal expectations of the different generations while being completely open, reliable, affordable and safe. As the work will never be finished, we need to keep adding new elements to the digital workplace, taking into account our budget.

The supporting infrastructure is also important:

- 29. Flexibility is needed for swift action;
- 30. A more traditional, stable and predictable approach is needed.

In our hybrid infrastructure, the **Cloud**¹⁷ and the newly built data centres are in harmony, which enables us to combine the best of both worlds.

We choose between the Cloud and local infrastructure on the basis of objective and transparent criteria. Thanks to this hybrid infrastructure, we provide a high-performance, quickly scalable infrastructure at the most efficient cost. When applications work independently of time and place, we also need to take into consideration the physical workplace:

- 31. A physical workplace may still create added value, but how are we going to shape it in the future?
- 32. How can we make that workplace more intelligent to simplify cooperation on concrete tasks?

¹⁷ *Cloud: The cloud is a gigantic network of systems around the world that are linked together and function as one ecosystem. The systems have been designed to save and manage data, run applications or provide services. Instead of retrieving files and data from a local computer or PC, you open them online on each device with an internet connection.*

We want to maximally use the possibilities of smart buildings by **developing Smart Spaces**. Smart spaces offer users realtime services like automatically signing in and signing out, automatic access control, locker reservation, etc., and are integrated into the direct environment as well as other urban infrastructure. Smart spaces can be adjusted to different user needs and make it possible to share the available, comfortable and easily accessible places with others in a flexible way.

Executive Councillor Van Braeckvelt will develop a new telework policy that meets the needs of the staff and organisation.

5.4. Towards smarter services

Easier for staff ...

We automate repetitive work by making use of Robotic Process Automation and Hyperautomation.

This is how Robotic Process Automation (RPA) works: A programme observes how staff members perform tasks. The robot can analyse the different steps of clearly defined tasks. For instance, the programme can independently detect and retrieve relevant data. In the next phase, the robot takes over these steps and automates the tasks by imitating the steps, retrieving emails and registering data in a system.

This way, our staff can concentrate on their core task: support the end users optimally and in a customer-oriented way.

For the development of our IT infrastructure, we are thus investing in automation and are developing scripts to perform as many tasks as possible. These scripts are centrally managed and documented,

which facilitates more standardisation in the development and maintenance of our systems, as there is one script and no deviation between the working methods of the staff members. Given that these scripts are centrally managed and exchanged between staff, we thus provide better documentation and a more transparent insight into the workings of our systems. Moreover, this modus operandi also drastically reduces the risk of human error.

... more accessible to citizens, entrepreneurs, visitors or staff

Google has taught us that you no longer need to find your way in a hierarchical document structure, but that you can just enter a search term, which leads you to the right information in less than a second. Bol.com has taught us that you can consult a chatbot day and night to solve an annoying problem with your order.

The municipal staff and the Ghent users have also noticed this evolution and have adapted their expectations. The easier provision of services involves concepts such as Big Data, Artificial Intelligence (Machine Learning, smart algorithms, Natural Language Processing - 'NLP', etc.) and many other advanced technologies that are emerging and becoming available.

These are not Ghent's first steps in automation and digitisation. We are further developing the important steps we have already taken, with speech input and the improvement of speech understanding. We make decision-making more transparent and our services more accessible by using bots, such as chatbots or voicebots. **Ghentians receive answers to their questions also outside the standard opening hours, thanks to the virtual information point Ghentinfo.** We are focusing on semantic searches, both on our websites and on other publication platforms. Those search engines

33. Are easier to use;
34. Can handle synonyms and writing errors;
35. (Semi-)automatically look for the meaning of search terms and published words and connect them.

Finally, we try to provide more insight and value by using sentiment and semantic analysis. To do so, we cooperate with experts, students and interested parties.

... and a challenging new role for the government

As solutions can be provided by anyone, the importance of adequate organisation, a clear framework and follow-up is increasing. The City of Ghent's core task continues to be ensuring quality, security, integrity and ethics.

That standard role will be challenged. Decentralisation is a challenge that we need to take up as an organisation, to determine our place and role within an open network of other authorities, organisations and citizens. Special attention should go to our role in the field of identity, life course and the corresponding initiatives currently underway. We need to keep connecting to other systems that allow people, for example, to use and prove their identities, both online and offline.

We also investigate the application possibilities of "Distributed Ledger"¹⁸ technology and specific blockchain¹⁹ for efficient service provision and safe data storage, Internet of Things²⁰-related or otherwise. We will keep our finger on the pulse of good use cases of the various blockchain possibilities, such as the Royal Federation of Belgian Notaries.

5.5. A connecting and accelerating link

The plans for the coming term in Ghent immediately show that smart sensors and connectivity will play an important role in the city.

Connectivity (the ability to connect) and a well-functioning network are essential to connect sensors with smart devices. We need a 5G network that enables us to forward data quickly, with low response times and high coverage. We make sure the necessary measures will be taken to respect the prudent avoidance principle. To that end, we also apply European, Federal and Flemish regulations. We continue to develop and improve the fibre optic network in combination with a high-performance wi-fi network. The further development of the fibre optic network results in faster and more stable connectivity in the city.

¹⁸ A "distributed ledger" is a database that does not save transactions in one central location, but distributes them over a network of many computers. Usually, all members of the network have access to the data, and can add information, if they are entitled to.

¹⁹ "Blockchain" is the most common type of a "distributed ledger". The name is derived from the fact that transactions are combined in "blocks", which are connected in chronological order, thus forming a "chain". The whole chain is protected by complex mathematical algorithms that ensure the integrity and safety of the data. This chain forms the complete registration of all transactions included in the database. The same technology can be used for digital currencies.

²⁰ Internet Of Things (IOT): several everyday, intelligent appliances are connected with each other through the World Wide Web. Smart devices such as the intelligent thermostat, refrigerator or lighting share all kinds of useful information.

Thanks to 5G and cloud computing, we will discover new ways of collaboration. The ecosystems of large and small enterprises around us will use this technology to develop new services.

The evolution of this wireless network and the continued progress of the battery technology, for example, will cause a revolution in the flexibility with which we can deploy smart applications in priority domains such as health, education, mobility, economy and climate.

Smart sensor devices will exchange data at an unprecedented speed in several locations. However, we do not want sensors to appear everywhere in the city. That is why we wish to immediately provide basic infrastructure in urban development projects, together with Executive Councillors Watteuw and Souguir. This way, smart connectivity and sensor possibilities can be easily applied to new urban developments that are still in the preparatory phase (Overpoort project, the Loop, Afrikalaan, etc.).

5.6. Safe and reliable

As a government, we stay focused on the safety and reliability of digital solutions. Therefore, we need a framework or data architecture that describes how data are processed, stored and delivered (open data). We also consider the legal and ethical challenges that come with the technological challenges.

We check every access to our network

Digipolis/District09 manages approximately 400 places with IT and network services provided to roughly 13,000 unique users. These places are open to the public, visitors, suppliers, partners, staff, etc. and provide access to our network, our critical applications and our confidential data.

The increasing number of mobile users, sensors, Internet of Things (IOT) devices and Cloud applications are factors that make control of the access to our network increasingly complex. The old belief that the internal network can be trusted is no longer true. Our internal City of Ghent network should evolve into a zero trust network, if we want to ensure that only users or devices we want to give access to, actually get access. A zero trust network never trusts anyone automatically, but always verifies their identities. For each user and device, the network verifies whether they are who they claim to be and whether they are allowed access (authentication and authorisation) before they actually get access to the network, systems or data.

As a city, we ask citizens and specialists to report any weakness of our systems, so that we can take appropriate measures immediately. That is why we opt for a Responsible Disclosure Policy, so that you can inform us whenever you discover a weakness. In the near future, we want to go even further and allow ethical hacking, which enables experts to try and hack our systems, detect security leaks in our systems and networks, and report them to the City of Ghent.

Cybersecurity: prevention, detection and response

A golden rule in terms of cybersecurity is “prevention is ideal, but detection is a must, and detection without response has little value”. 100% security does not exist. We try to protect our organisation as much as possible against cybersecurity threats, but preventive measures are not enough. We always have to monitor our technological solutions as well as detect and manage suspicious actions.

In order to do so, Digipolis/District09 expands its current detection and response activities, and establishes a Security Operations Centre (SOC). The SOC watches over our technological solutions and reacts immediately to threats to the availability, integrity or reliability of our systems and data.

5.7. Actions & Initiatives

We use technology as a lever for a smart city with reinforcement of sustainable progress

26. We provide good infrastructure: our safe, reliable and scalable environments are the basis of a more than smart Ghent. Thanks to that infrastructure, we can create our “Digital Twin” (a virtual version of the city) that focuses on climate themes (such as water, less pavement and city logistics) or the hustle and bustle in the city, with a federated approach. We connect the data available on certain topics to each other and eventually to the “Digital Twin”. In the long term, the “Digital Twin” itself will be a part of the infrastructure.

We position ourselves as an attractive city for digital transformation

27. We develop one or more additional Smart Spaces in Ghent, in collaboration with the research world. Together with partners, we are acquiring knowledge and experience through a pilot implementation as the basis for wider development.

We evolve towards an open network model and promote progress in our ecosystems

28. We contribute to the development of a local API economy via open services and open data. We consider using open services and making partners available. We will also add partners’ services to our own service processes and optimise this expanded range of services. In this context, we can use acquired knowledge (on challenges for the market, guidelines, API standards, etc.), experience and infrastructure. We are building on the guidelines developed by Flanders in the Flemish Open City Architecture (VLOCA).

29. We connect the increasing number of smart devices and sensors via 5G connections and connectivity.

30. We are specialising in new technological possibilities for data analysis and machine learning.

31. We investigate and utilise the possibilities of Robotic Process Automation for clearly defined, repetitive tasks in processes in the supporting departments.

We manage the city’s roles that change through technology

32. We explore and utilise the possibilities of Blockchain or Distributed Ledger by means of efficient transactions and safe data storage to improve the services we provide.

33. We pay a great deal of attention to legal and ethical challenges associated with new technologies.

We put the user first

34. We use the possibilities of artificial intelligence to improve services, to make decision-making more transparent and to encourage participation.

We integrate flexible organisation forms into our organisational structure

35. We work with portfolios for IT projects within the city with a primary focus on health, education and climate.

36. We develop a new client model within the digital agenda and embed District09 in the city as an autonomous municipal company.

6. Services and Ghent experience without thresholds

6.1. Introduction

Different and higher expectations about the digital user experience have been created by those working on new technologies. We put the user first and ensure an optimal user experience. The users expect all kinds of everyday services to be fast, direct, digital, easy and user-friendly, **without any thresholds**. Only this way, users will **spontaneously opt for the digital way**.

We want working digitally to be a natural reflex for the end users and our own staff. Ghent users experience added value in digital services which they spontaneously look for or which are offered to them proactively if possible and desired. **They use the digital way because they want to, not because they have to**. A “Ghent user” is anyone who uses services provided by the City of Ghent, including people, companies, associations and authorities from Ghent or outside Ghent. The digital services fit their needs and are experienced as added value.

The following principles are followed for services without thresholds (see policy note on Public Affairs):

36. User-friendliness is the starting point / optimal user experience and ease of use;
37. Support and inclusion;
38. Larger digital offer.

6.2. User-friendliness as a starting point

We aim for a very user-friendly digital offer that creates added value for the end users, so that they will prefer the digital option for other interactions as well. We are stimulating that with the best user experience and user-friendliness possible. We develop our solutions locally and together with the users.

We invest in the necessary methodology, data and knowledge. We focus on user experience with User Design. We get to know our different Ghent users quite well and involve them in the development process. We want to meet the rising expectations in the digital user experience.

In addition, we make things easier for the applicants:

- By filling in their data beforehand on the basis of the once-only principle, if possible and allowed.
- We consider how to inform the citizens about the services relevant to them, which saves them a search through our service range. This method is also called **automatic rights exploration**.
- Where possible and allowed, we want to take steps towards **proactive service provision** or automatic allocation of rights. If we notice, on the basis of available and consultable data, that someone is entitled to certain services, we can provide those automatically, so that application is not necessary.
- We use the impact of the solutions on inclusion, equal opportunities and the liveability of the city as a benchmark.

We start with **E-inclusion by design**:

39. The focus in the design of a new application or service is on the end user;
40. Different profiles of digital literacy among Ghentians are taken into account;
41. Actions for e-inclusions will be launched as required.

6.3. Support for people who need it

We will help and support people who encounter problems when applying digitally so as to familiarise them with the digital channel and enable them to use this channel next time. In addition, physical service provision always remains a possibility for those who wish it.

Digitaal.Talent@Gent is a pioneer in Flanders and helps Ghentians find their way in the digital world. Together with partner organisations and departments, we increase digital literacy so that people can benefit from the opportunities created by digitisation instead of being excluded from the digital world. We grant citizens access and increase their individual digital basic skills by supporting them as well as offering them digital practice opportunities. This way, we eliminate thresholds and guide Ghentians towards a 'spontaneously digital' approach.

For years, Ghentians have had the opportunity to use a computer with Internet connection free of charge in our **digital community hubs**. We are optimising this network and invest in high-quality assistance. We also ask colleagues from the decentralised locations to help us with the performance of this task. Furthermore, volunteers are already offering support at some of the locations.

Digital and social exclusion are inextricably linked to each other, which is why we cooperate with several partners to offer digital practice opportunities to vulnerable target groups, for example by developing **digitally inclusive neighbourhoods**. We improve the offer of our **Digital Lending Service** in order to support our partners and municipal departments better. We enhance the promotion of this service, thanks to which digital devices can be borrowed free of charge for projects. We act as a **lever for municipal departments** to work on digital inclusion in Ghent. We will continue to follow up on the successfully embedded e-inclusion in the De Krook library. The COVID-19 crisis has demonstrated the importance of our digital efforts. More than 600 laptops have been distributed by the City of Ghent to vulnerable families, who needed them for distance learning. Furthermore, personalised assistance and trainings have been made available.

With the **'Code City'** project, we introduce pupils and teachers to computational thinking during classroom coding workshops conducted by coaches from companies and higher education. In 2020 we extended Code City to secondary education. We facilitate knowledge building and promote the integration of new technological skills in classes by providing materials and organising training days for teachers. We support **IVA SOG** (Internally Autonomous Agency for Municipal Education Ghent) in the digital transformation of the education of the future. During the COVID-19 crisis, the city offered extra laptops to the pupils in Ghent and provided advice to eliminate digital thresholds in distance learning.

Together with the Employment Department and GSIW (Ghent, City in Action), we help vulnerable job-seekers to overcome digital barriers with the **'Digitaal Werkt'** project and assist employment officers at a digital level. With the Public Affairs Department, we promote **e-service** provision. We collaborate on an e-inclusive service range and organise actions to guide Ghentians towards a 'spontaneously digital' approach to interaction with the government.

We also help municipal staff find their way in the digital world. We minimise the risk of digital exclusion in the City of Ghent with the **'Allemaal Digitaal'** project, aimed at staff who do not have

their own work PCs. We develop a digital screening tool, provide infrastructure and trainings to measure, establish an informal network of digital coaches and help departments and their staff find their way in the digital world. By promoting the development of strong digital basic skills among all staff, the City of Ghent can make the most of the opportunities created by digitisation.

We increase public support for technology and make it accessible to everyone. We create a framework in which autonomy and a sense of responsibility are encouraged.

6.4. Increasing our digital offer

We are expanding our digital offer. In the past years, online service provision has been our priority. Not all services we provide already have a digital version. We are extending our digital offer to all products for which it is possible. We are actively looking for digital ways to provide products for which you still need to go to the physical office. We keep investing in more online forms and make sure that such online forms are processed completely digitally.

We furthermore organise uniform digital processing in the back office, regardless of whether the citizen opted for the digital or physical office. The efficient (digital) organisation of the back office enhances the quality of the services we provide. Citizens are given access to this digital back office so that they can consult the status of their files. To this end, we are investigating whether we can use 'Mijn Burgerprofiel' (My Citizen's Profile). For enterprises, we are considering participation in vlaanderenonderneemt.be. We are looking into using the federal eBox for sending digital documents and reading messages.

By means of such user-centred initiatives, we are cooperating with other government agencies to offer one central platform to citizens or companies. We focus our attention on a “No Wrong Door” approach.

In addition to increasing the digital offer, we want to make the offer well known and easy to find. Citizens and companies should be well informed about the offer. If someone visits the physical office, this should be a conscious choice and not the result of ignorance about the digital alternative. We can draw attention to digital products through our offline channels, but we also need to make sure that online possibilities can be easily found on the city's website. Citizens or companies looking for information about a product on the website should easily find what they need from a user logic, so that their online application can be initiated smoothly. The offer represents the recognisability and reliability of the government, thanks to a uniform, digital approach.

6.5. Initiatives

We use technology as a lever for a smart city with reinforcement of sustainable progress

37. With our e-inclusion project [Digitaal.Talent@Gent](#), we work on creating digital opportunities for every Ghentian and guide them towards a 'spontaneously digital' approach.

We position ourselves as an attractive city for digital transformation

38. We make every effort to familiarise users with our digital offer.

39. We turn all forms into web forms.

We evolve towards an open network model and promote progress in our ecosystems

40. We consider participating in initiatives such as Vlaamse Burgerprofiel (Flemish citizen profile) and Vlaanderenonderneemt.be (website for Flemish entrepreneurs) to give citizens and companies access to the status of their files.

We manage the city's roles that change through technology

41. We are gradually developing proactive service provision (automatic allocation of rights).

42. We inform users about services relevant to them (automatic rights exploration).

We put the user first

43. We invest in data use and User Experience (UX) methodologies in all projects. The client's experience with digital service provision is our main concern. We start with E-inclusion by design.

44. We are working on a uniform digital experience across products and services in order to increase their recognisability and reliability.

45. We support citizens who need help with the use of digital services.

46. We offer the user several ways to find information on the provision of services and the corresponding online form as fast as possible. In addition to a thematic classification and search terms, we provide an overview by means of a product catalogue.

We integrate flexible organisation forms into our organisational structure

47. We are digitising the complete service provision process (front and back office) and provide relevant training to our staff.

7. Annexes

7.1. Budget

For the realisation of the objectives and the activities stated in this policy note, a budget has been allocated in the Multi-annual Plan for 2020-2025 to the following operational objectives:

- 42. OD10076 – Strengthening a wide and accessible range of digital services: spontaneously digital
- 43. OD10079 – Increasing the data-driven policy preparation and implementation
- 44. OD10005 – Scaling up the economy of the future
- 45. OD10071 – An enhanced image, more space and freedom for experimentation and innovation, reinforcement of Ghent’s regional and international position and ensuring that Gent can realise its ambitions as a unifying force

These operational objectives should be supplemented with additional resources allocated from the activities portfolio and subsidies that can help us realise our spearheads.

7.2. Terminology

Artificial intelligence (AI) is the umbrella term for technologies that provide machines with some form of human intelligence.

Application Programming Interface (API): an API enables communication and exchange of information between different (software) systems.

GDPR: the General Data Protection Regulation (GDPR) is a European regulation that standardises the rules on the processing of personal data by companies and government agencies in the whole European Union. The regulation is an essential step to guarantee the protection of personal data within the European Union and to ensure the free flow of data in the European single market.

“Blockchain” is the most common type of a "distributed ledger". The name is derived from the fact that transactions are combined in “blocks”, which are connected in chronological order, thus forming a “chain”. The whole chain is protected by complex mathematical algorithms that ensure the integrity and safety of the data. This chain forms the complete registration of all transactions included in the database. The same technology can be used for digital currencies.

Chat of voice bot: an application that can automatically answer the questions of users or refer to the right information by using artificial intelligence.

Cloud: the cloud is a gigantic network of systems around the world that are linked together and function as one ecosystem. Such systems are designed to store and manage data, run applications or provide services. Instead of retrieving files and data from a local computer or PC, you open them online on each device with an Internet connection.

A **dataprovider** is a collection of software components that grant access to share databases if you meet certain conditions or if certain threshold values have been met.

Digital Twin: the virtual copy of a city. In a physical city, we cannot always experiment with possible solutions to a complex problem in public space. However, more and more ways are being developed to realise substantiated predictions and simulations in a digital world.

A “**distributed ledger**” is a database that does not save transactions in one central location, but distributes them over a network of many computers. Usually, all members of the network have access to the data, and can add information, if they are entitled to.

Enterprise architecture: a young field of study between business administration, information science and computer science, with the goal to enable an organisation to develop in the desired direction in all its sections.

Internet Of Things (IOT): several everyday, intelligent appliances are connected with each other through the World Wide Web. Smart devices such as the intelligent thermostat, refrigerator or lighting share all kinds of useful information.

Linked Open Data is a technique to link data from several sources, so that you can conduct ‘smart’ searches across several sources, or let a computer program do it for you.

Machine Learning: a part or form of Artificial Intelligence according to which machines can adjust to new situations as well as discover and use algorithms and patterns.

Natural Language Processing: a form of written or spoken text or language analysis in which computers also process and interpret the meaning of literal text or language.

Once-only Principle: principle that ensures that you have to identify yourself or provide data to a public authority only once. This way, citizens and enterprises do not have to enter the same identification data, which have already been transferred to another administration, several times.

Open Data: Gent opts resolutely for open data. By sharing the information and knowledge at our disposal, we wish to promote innovation and kindle enthusiasm in a transparent manner.

Open By Default: Open data is the standard and normal practice; derogations are only allowed in case there are good reasons for not making data publicly available.

Open Data Charter: a collection of basic guiding principles to maximise the openness and sharing of data, written out in specifications by the Flemish centre cities <https://smart.flanders.be/open-data-charter/>

OSLO stands for Open Standards for Linked Organisations (OSLO), an initiative launched by the Flemish IT organisation (V-ICT-OR) in 2012. This formed the basis for an open semantic information standard.

Robotic Process Automation (RPA): A programme or robot observes how a task is performed, analyses the different steps of a clearly defined task, and can subsequently perform the task automatically.

TMaaS: The Ghent Mobility Company developed ‘Traffic Management as a Service’ (TMaaS.eu), an initiative that includes a fully digital and virtual platform which automatically processes the data of all transport modalities (bicycle, bus, car, tram, train, on foot) and provides real-time information to the citizens of Ghent. All data are processed and sent automatically, so no operators have to stare at screens all day.

Urban Data Platform: a collection of technical infrastructure that compiles the data of the city and other providers, enabling several actors to provide additional services in accordance with certain rules.