



DIGITAL STRATEGY

FOR HAMBURG



Hamburg



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Photo: Senatskanzlei, Roland Magunia

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For a growing metropolis such as Hamburg, innovative technologies are of paramount importance, especially when it comes to finding answers to important questions regarding the future and remaining competitive as a city with a high quality of life. Digital transformation involves establishing new forms of cooperation and strengthening interdisciplinary and interdepartmental cooperation.

This is a cultural change that affects our previous living and working environments to a significant extent. Consequently, our strategic thinking on digitalisation applies to all aspects of the community. Digital applications should be used where they are beneficial and bring about improvements. We aim to identify and exploit the opportunities offered by digitalisation – for climate-friendly mobility, for citizen-friendly administration, for comprehensive participation of all social groups and for Hamburg as a strong business location. We aim to shape the digital society together.



The Digital City

The Free and Hanseatic City of Hamburg sees itself as a modern European metropolis that has always been able to use technical progress to maintain and enhance its own attractiveness as a location. The foresighted and wise use of new achievements has already had a positive impact on the quality of life and economic prosperity of Hamburg in the past. In these times of rapid technological development and increasingly shorter innovation cycles, it is more important than ever to grasp the opportunities this offers for structuring the Digital City of tomorrow.

Over the space of just a few decades, digital change has heralded a new era that is affecting the entire economic and social realm and posing new challenges for government and administration. There is much more at stake here than the use of new technology or the

electronic representation of formerly analogue business models and administrative processes. Digitalisation affects everyone – in all social and societal contexts. It paves the way for determining whether and how people can access quality housing and living conditions, how environmentally-friendly, fast, cheap or comfortable they can move around, how they can study, work and run businesses, or how they can organise their leisure time and pursue their self-realisation. This depends already now and even more so in the future on how well the transformational potential of digitalisation is meaningfully exploited in terms of the best possible quality of life and comprehensive participation in society.

Public administration plays an important role in all these tasks. It sets the general framework for almost every

aspect of society, enables participation in social life as well as political and economic activity. The Digital Strategy for Hamburg therefore focuses on all aspects of life, all Digital Spaces (see 1.2, Digital Spaces) and opens up perspectives for all parts of urban society: for citizens and civil society, companies, employees in and outside the administration, science and educational institutions and guests of the city. Starting from a large number of already established measures and projects and the areas of strategic development (digital infrastructures and platforms, data, digital administration, transformation and cultural change as well as innovation, see 2 Strategies and Perspectives), the strategy outlines overall urban development and thus impacts all parts of urban society. The strategy is based on the following programmatic guidelines:

Digitalisation is a Task for the Whole City

It is essential to shape digitalisation in the interests of Hamburg, its citizens, civil society, companies, scientific and educational institutions and employees of the city. Such cooperation among city and public authorities, which extends beyond traditional responsibilities, not only provides the best and quickest possible synergies and maximum benefits, but also ensures that public resources are used in a more targeted and efficient manner. After all, digitalisation does not stop at city or national borders, which is why national and international networking is also an important component.

Administration is Not an End in Itself

Digital administration benefits all members of urban society. Right from the start, their digital services are consistently being developed from the users' point of view and aligned with their everyday realities and specific requirements. The products and services should not reflect the internal complexity of the administration nor be restricted to the unquestioned transfer of previous

Digital First, but Not Digital Only

In a world in which more and more everyday things are controlled digitally, digital participation is becoming a prerequisite for social participation. Society must ensure that everyone is able to fully participate in what is being offered and that no one is excluded from social and societal processes. It needs to actively contribute to

Enabling Innovation

Interoperable and flexible infrastructures as well as a climate friendly to investment and innovation are the indispensable basis for successful positioning in the global competition for innovation. State-of-the-art technology, urban platforms that support data usage and service development, heterogeneous networks and "ecosystems" that provide direct access to the latest solutions from different disciplines and sectors,

Share, Use and Protect Data

Data used and shared intelligently are becoming part of digital services of general interest, are a driver of innovation and are of increasing importance for a city's ability to be managed and to adapt. Hamburg and its urban society must actively position themselves in order to remain effective in times of global data economies. The opportunities here must be taken into account along with questions of self-determined data usage, the required data privacy and information security.

Digitalisation is Not an End in Itself

The main focus is on people – as citizens, business people or administrative customers – and on social, economic and societal progress. For a growing city like Hamburg, digitalisation is an important instrument for tackling the pressing issues of the future in many areas and for ensuring that it remains liveable, competitive and able to act in the future. Digital City services must demonstrate tangible usefulness and benefits, such as relieving the burden on people or solving concrete problems and, in particular, answering those questions that the digital change itself has produced.

processes into digital form. In fact, business processes are being completely rethought from scratch and digital technologies and digital administration services are being used to simplify life a little for all those involved in the process – whether they are administration employees or administration customers.

the removal of any barriers or concerns and to provide a positive experience for the opportunities offered by digitalisation. For those unable or unwilling to use digital solutions, adequate access and appropriate support must be provided to make administrative services easily accessible to all.

and strong digital literacy are key factors here. Robust innovation strategies are thus not only aimed at the utilisation of modern technology, but also at the adaptation of business processes and new business models, the strengthening of network relationships, the continued development of organisational structures, and the qualification of human resources.

Hamburg-wide data governance puts security of data on side and its best possible usage on the other side in a responsibly minded balancing act. In the digital age, citizens must be able to rely on their data being safe and used for their own benefit in the administration. Politics and administration in Hamburg must continue to ensure that this justified trust of the citizens is strengthened in the future. This is a basis for the administration's ability to act in the digital age.

Programmatic Guidelines

Digitalisation Means Change

Digitalisation leads to far-reaching upheavals in the city and in the administration – far beyond technology alone. It encompasses much more than what is sometimes understood by "administrative digitalisation" employing e-government and related IT strategies. This affects institutional, organisational, procedural and socio-cultural aspects; in other words, also the question of how the Hamburg administration and its employees deal with this transformation. These challenges of the digital transformation and the cultural change outlined above are becoming the focus of Hamburg's digital strategies.

Design Requires Responsibility and Commitment

Designing administration and city management in the context of new opportunities also involves aligning responsibilities and functions in the city and administration – even beyond the still significant traditional line organisation – to these conditions. This includes the definition of clear roles and responsibilities with corresponding scope for action and decision-making powers together with a high degree of commitment. This also includes adapting the organisational and personnel legislation framework so as to be able to act and digitise in a flexible and rapid manner. This is the basis for not only maintaining the city's management capability, but also for expanding this capability in an appropriate way for the future.

Dialogue-oriented Citizen Participation Strengthens Urban Society

Transparency and openness in administrative action and the involvement of citizens in issues affecting them and their city increase the understanding for and suitability of decisions and encourage their acceptance. The development of dialogue-oriented participatory formats makes government action more transparent and more widely communicated, fostering social cohesion in the city.

Digitalisation Can Only Succeed with a Modern Legal Framework

The numerous possibilities offered by the digital transformation are usually counterbalanced by legal regulations. They can be a driver or inhibitor for innovation. For change to succeed, the regulatory framework must be viewed in a differentiated manner and updated wherever necessary.

Strategies Create Orientation

In times of change, orientation is necessary. This is why strategies provide directional objectives and maxims for action. Within this framework, it is possible to develop strategies on a regular basis and also align their implementation. Hamburg's digital strategies follow this flexible approach and thus remaining resilient even in a complex and rapidly changing environment.

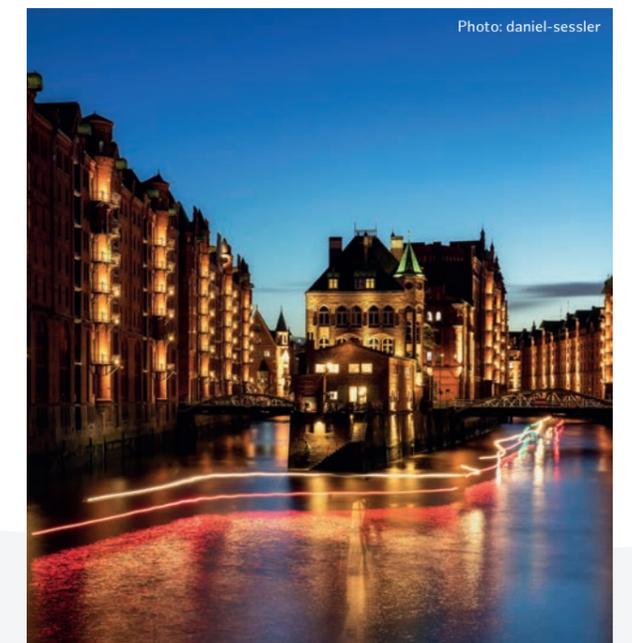


Photo: daniel-sessler

Where we are Today

The Hamburg Senate has already laid the essential foundations for the far-reaching digitalisation of the Hanseatic city with the resolution on the “Digital City Strategy – Opportunities for Economic Power, Communication and Public Services” in January 2015. Over the past five years, Digital City Hamburg has been developing significantly. This involves individual issues (such as mobility, culture, urban development, harbour, logistics, digital administration) together with the creation of strengthened structures to promote digitalisation throughout the city.

The establishment of the Department of IT and Digitalisation (ITD) in the Senate Chancellery at the beginning of 2018, headed by a Chief Digital Officer (CDO), was another decisive milestone. This was accompanied by the public signal that the Senate acknowledges the importance of digitalisation as an essential cross-cutting strategic issue and assumes responsibilities for further development at the highest level. As a central unit, ITD controls, designs, organises and accompanies the digitalisation process directly from the Senate Chancellery. In this way, the design of the digital transformation was made a “management issue” in strategic and operational terms. This will be continued accordingly. More than anything else, however, Digital City Hamburg thrives on the decentralised development and implementation of specific projects in all ministries and departments—even when interacting with partners outside the administration. The multiplicity of these projects and measures is reflected in the digital strategies of the ministries and districts involved and in the Digital Spaces.

In early 2019, all State Secretaries formulated a common understanding on digitalisation and emphasised its significance as an urban transformation project. The participants also agreed that all Hamburg ministries should develop a Digital Strategy for their business areas. The Department of IT and Digitalisation closely accompanied this process and provided methodological and personnel support. All official digital strategies were completed by the agreed date at the end of September 2019. They are constantly being developed and adapted. In September 2019, the district administrations also agreed on such a basic understanding and the development of a comprehensive joint district Digital Strategy.

Digital strategies are derived from subject-specific policy objectives and describe the extent to which digitalisation and the measures derived contribute to

achieving the subject-specific policy goals. Additionally, comprehensive digital strategies along with technical subjects explicitly include organisational, personnel-related and cultural aspects that are important in the context of digital transformation (see 2.4, Transformation and Cultural Change).

Digital strategies thus do not replace previous IT strategies. IT strategies are still necessary, are much more technically oriented and are in turn derived from digital strategies. Digital strategies provide the broader perspective, which is more strongly influenced by specialist and transformation topics, from which the requirements for the IT landscape can be derived. To guarantee a consistent approach, a citywide IT strategy is being developed on the basis of existing standards and specifications (such as basic infrastructures, workstation equipment) and supplemented by more future-oriented topics. More generally, central control at the urban level is expected to focus on digitalisation and IT management in the future. The CDO Board (see 2.4.6) is involved in this process.

The measures developed in the digital strategies together with existing digital and IT projects will be transferred into a Digital Strategy portfolio. The Digital Strategic Portfolio concept was developed centrally by ITD in collaboration with the ministries and the district administration (district offices and the ministry responsible for supervision) and implemented by extending an IT application for controlling IT finances. Existing information systems are connected via interfaces if necessary. Generally speaking, a user-oriented control system is established, which enables the connection of subordinate organisations. The Digital Strategic Portfolio provides the ministries and the district administration with a view of their respective digital projects in the context of the city’s other projects and enables ITD to have a central perspective on all city digitalisation projects. This provides an opportunity to present the projects in all their complexity, their allocation of content to the Digital Spaces and strategic development areas, and their contribution to the programme. Additionally, potentials for synergies can be more easily identified and an exchange can be promoted.

As part of this approach, it is also possible to establish links to broader systems of objectives, such as the UN Sustainable Development Goals (see also 2.5.3, CityScienceLab/UNTIL).

1.1



Data Privacy

The basic prerequisite for all digital processes of digital administration is data privacy. Citizens have the right and are entitled to have their data processed with the utmost care and in compliance with data privacy regulations, to have their data kept safe from unauthorised access and, if necessary, be made available in a suitable form and to an appropriate extent. To achieve this goal, ITD supports all public authorities in implementing the current data

privacy guidelines and in adapting potential additional provisions even before the processing activity becomes operational and, if necessary, in initiating the process of creating a revised legal basis. Employees are sensitised and trained for the requirements of data privacy law in campaigns on information security or through qualification measures, so that appropriate processing of personal data is ensured.

Information Security

Information security is indispensable, especially for the digitalisation of administrative services, but also generally for the proper and reliable operation of IT in the Hamburg administration. Hamburg designs its digital citizen and business services in such a way that newly created means of access do not create new points of attack and risks. Together with Dataport, the IT service provider for public administration, ITD continues developing the existing security procedures and organisational rules on a long-term basis in a way that is appropriate to the current threat situation. Hamburg uses a computer centre at Dataport certified by the Federal Office for Information Technology

Security (BSI) to process data used for the operation of Hamburg administrative services. This is how Hamburg ensures the security of the information against loss and unauthorised access. In addition, regular penetration tests are performed (such as simulation of unauthorised access via the internet) to check the effectiveness of existing security measures. Hamburg’s information security management is able to efficiently and rapidly undertake effective measures for recovery and damage mitigation in the event of malware infection or large-scale infrastructure failure, ensuring continuity of the tasks necessary for the business.

Implementation of the Online Access Act (OZG)

The implementation of the “Law for the Improvement of Online Access to Administrative Services” (in short: Online Access Act, OZG) represents a very central challenge and an essential strategic perspective for digital administration (see 2.3, Digital Administration). This, too, must be managed jointly by the ministries, district administration and Senate departments. The Online Access Act requires the federal government, the federal states, municipalities and administration-related institutions such as chambers of commerce

to offer all administrative services online in a user-friendly and easily findable form by the end of 2022. The implementation of the law is based on a division of labour between the federal states and the federal government. The administrative services were divided into 14 subject areas, which will be implemented by the respective subject area leader. These online services will then be used by all others. Hamburg, together with the Federal Ministry of Economics, has taken the lead in one of the largest subject areas, “Business Management and Development”.



Photo: Pressestelle des Senats

Photo: krzysztof-kowalik

Life in the Digital City: Digital Spaces

The concept of Digital Spaces reflects the changes in the various areas of life and society associated with digitalisation. Digital Spaces are a response to the everyday lives of all Hamburg residents, who experience every day how digital technologies are already penetrating urban society and shaping the way people organise their everyday life and leisure, how they work, move around the city, shop, enjoy culture, live and reside. This sometimes happens quite openly, for example through new mobility services accessible via apps, or the online police station, where criminal charges can be filed electronically. In other cases, penetration is rather imperceptible, such as the acquisition of real-time traffic data at major intersections, which will improve traffic control in the future, or laser scanning by plane, which Hamburg is using for its virtual 3D model of the city.

Digital change also involves networking previously separate topics and actors. Digitalisation enables new business models, optimised business processes and value chains and leads to a fundamental structural change in which interaction and collaboration become not only possible but necessary. Digital Spaces are a response to this upheaval and make it clear that their design only partially corresponds to official responsibilities and that instead a wide range of actors inside and outside Hamburg must interact with each other (such as public authorities, city institutions, companies, science, civil society, etc.) in order to create contemporary user-oriented solutions or to be economically successful. And for the administration, digitalisation is becoming a compulsory task in all its technical ramifications if it wishes to fulfil its task in the Digital City and its Digital Spaces.

The sum of Digital Spaces reflects the digital environment experienced in Hamburg. The specific design of this concept is anchored in the digital strategies of the ministries and the districts or is updated in these strategies. In this way, they are making a significant contribution to shaping Digital City Hamburg. The concept of Digital Spaces also takes into account the strategic approach that digitalisation and the realisation of its projects are often connected with thinking and acting beyond established responsibilities and institutional boundaries. In this context, the possibilities, freedoms and limits of the actors (e.g. administration, companies, science) to act remain basically the same.



This applies in all Digital Spaces: Hamburg should be just and social, promote social participation and cohesion. People identify with their city and their district; they want to have social, cultural and sports facilities as well as educational, local supply structures, crafts and other services there. Greater access to education for everyone is the key to equal opportunity. Innovative mobility services and a well-developed public transport system as well as the expansion of bicycle traffic in the sense of an Active City are just as much a contribution to climate protection as the increased energy efficiency of buildings, energy concepts for commercial and residential quarters and the economical use of resources.

In principle, many challenges that must be overcome together also affect all Digital Spaces: The city's steady population growth, the effects of demographic change and individualisation – sometimes only made possible by digitalisation. With regard to technical developments, previously heterogeneous IT landscapes must be harmonised and standardised in order to avoid media discontinuities and facilitate citywide cooperation. An important focus of the actors and at the same time the elementary basis for successful digitalisation across all Digital Spaces is to ensure stability of the infrastructure and to guarantee data security and availability.

Extensive networking with other areas (institutions, states) leads to an efficient use of resources and uniform solutions. Digitalisation opens up opportunities to get closer to the world in which citizens live by making application procedures and public services available online, making them easier to access, regardless of time and place. This shortens distances and makes exchanges with people and organisations more direct. In this context, the implementation of the Online Access Act (see 1.1, Where We Are Today) sets an important course for the administration.

Digitalisation is increasingly bringing about the replacement of analogue processes with digital media and digital tools. They not only replace them, but also open up new perspectives in all social, economic and scientific areas. Personal development, professional success and participation in society today depend largely on digital skills. Similarly, economic and social development of the community depends to a not inconsiderable extent on how the opportunities offered by digitalisation are used.

Urban Life

Urban living spaces are places of innovation and integration and are significantly influenced by technological innovations. Machine learning for the evaluation of knowledge and experience, the use of sensor data to control processes and the simultaneous representation of reality and generated content, but also intelligent logistics and delivery systems as well as social developments such as the sharing economy (e.g. as a counter-design to individual transport), new work with agile forms of work and mobile workplaces and the increasing importance of local structures for supply (re-localisation) are formative trends for the Digital Space of urban life. The current transformation is not only changing consumer behaviour and people's lifestyles – entire markets and industrial sectors are changing and with them previously established structures in the economy, culture and society. This has an impact on land use and ultimately indirectly on the appearance of the city.

Building culture, infrastructure and structural qualities provide stimulus as structural policy instruments of urban development. Urban planning oriented towards the goals of sustainability is a joint task of the public sector (administration including state agencies), civil society (social agencies, associations and initiatives, cultural institutions) and the economy (above all housing companies, craftsmen's enterprises and architects' offices, but also commercial enterprises and founders). As topics of particular relevance to the Digital Space of urban life, the focus is on integration and education, social participation and cohesion, demographic change, needs-based housing, social infrastructure, climate and environmental protection, land (re-)use, work, production and storage spaces (e.g. co-working spaces, commercial and craftsman's yards) and transparency. With regard to climate and environmental protection, the Senate, in updating the Hamburg Climate Plan, has set the climate policy goal of being climate-neutral by 2050 and specifies comprehensive measures for many sectors and fields of action with which CO2 reduction will be achieved. This also includes the "efficient use of energy" in digitalisation and IT projects. The agreements of the Leipzig Charter on Sustainable European Cities and the National Urban Development Policy Initiative are also important guidelines.

In future, Hamburg will rely more and more on digital tools to optimise processes between actors inside and outside the public sector. The development and expansion

of assistance systems (cockpits and dashboards, see 2.2.4, Data-based Tools for Good Administrative Behaviour) contributes to the further automation of processes, the optimisation of resource management (between district administration and ministries, inter alia within the Integrated Urban District Development (RISE) framework programme) and the improvement of decisions in spatial planning.

Platforms on which urban data can be displayed geographically, evaluated and made easily accessible (e.g. the Rainwater Drainage Information System (NEwIS) based on the Urban Data Platform) enable all actors to monitor spatial developments and form the basis for comprehensive process optimisation. Image data (including satellite data, laser scanning, aerial photographs) and their systematic evaluation (Big Data analytics), e.g. for monitoring soil sealing, help to identify changes in the urban space. Sensors for measuring and displaying conditions (e.g. the fill level of waste containers) as well as crowd-sourcing approaches for smart control of urban processes are also increasingly used.

By means of networked life-cycle management of the technical infrastructure (in the long term in the form of a Digital Twin of the city), construction measures will be optimised in a resource-conserving manner, impairments reduced and asset management will be successively dovetailed in terms of process organisation.

In future, methods of Virtual Reality (VR) or Augmented Reality (AR) will be used in building and urban planning and urban development for the visualisation of planned objects in multidimensional space. The standardisation of data and process interfaces (XBau, XPlanung, XBauleitplanung) and Building Information Modelling (BIM) facilitate cooperation with a large number of heterogeneous actors. Knowledge and work platforms (e.g. the AI-supported knowledge database DiPlanung) support the cooperation of multiple actors within and outside the administration.

The maintenance management systems of the urban infrastructure create the prerequisites for systematically visualising and reducing the backlog of renovation and maintenance of the infrastructure of green spaces, playgrounds, river banks and water management facilities as well as flood protection facilities, and for ensuring the long-term maintenance



1.2.1

of the infrastructure more effectively than before and linking it with the infrastructure of municipal utilities.

The heat cadastre is a digital tool for municipal heat planning, which provides a central and accessible information base for everyone regarding heat demand, heat generation and distribution. The goal is, among other things, to identify energy- and cost-efficient measures in a spatial unit and to coordinate infrastructure measures by closely interlinking urban development and urban land use planning. This enables the development of efficient heat supply solutions.

In addition, the participation of all groups of society in planning projects, e.g. for housing construction and other important decisions in urban life and neighbourhood

development, is continuously improved by the further development of online participation (e.g. DIPAS) (see 2.4.1, Participation and Involvement in the Digital City). Artificial intelligence or self-learning machines, in turn, could in future help to perform the analysis of a large number of suggestions and complaints from citizens more effectively or to carry out planning simulations. Innovation Labs and putting on hackathons to use the potential of third parties are a useful addition to all these projects and lead to the development of new ideas and prototypes. The modelling of the various business and application levels as well as the technology and information architecture help to make the interrelationships and dependencies transparent, reduce data silos and develop suitable cloud strategies.

Projects from the Digital Space of Urban Life Include:

Digital Building Application 2.0

The Digital Building Application 2.0 project provides a streamlined application procedure whose efficiency has been confirmed in user tests. By implementing the Digital Building Application online service in the Online Service Infrastructure

(OSI), citizens and companies will be able to submit their building applications paper-free. The development of the online service in the OSI allows Dataport owner states to reuse the Digital Building Application.

Process Automation for Letters to the Public

The "Process Automation for Letters to the Public" preliminary project is intended to help reply to letters from the public. It is funded by the EU. In particular, artificial intelligence will be used to analyse the topics contained in letters from the public and to assign them to the responsible unit as well as propose potential response texts to the processing department. This is intended

to optimise response times and reduce the workload on the processing department. Ideally, the approach can be extended to other ministries or the results can be transferred to other use cases after the pilot phase with the Ministry of Environment and Energy (BUE) and the Ministry of Urban Development and Housing (BSW).

Maintenance Management Systems of Green Spaces, River Banks and Water Management Facilities as well as Flood Protection (EMG, EMU and EMHW):

The preservation of urban greenery, river banks, water management and flood protection facilities will be consistently supported digitally in the future. By the end of 2022, the Ministry of Environment and Energy (BUE), together with the district administration, the Ministry of Economy, Transport and Innovation (BWVI), the State Agency for Real Estate Management

and Land Assets (LIG), the State Agency for Roads, Bridges and Waterways (LSBG), the Hamburg Port Authority (HPA) and other comprehensive IT solutions, will realise all steps of maintenance management from condition assessment to the processing and balancing of maintenance measures, also from an accounting perspective, and provide strategic key figures.

Monitoring Soil Sealing in Hamburg

The project will use cyclically updated image data (including satellite data, aerial photographs) and their systematic evaluation (Big Data analytics) in a digital workflow to identify changes in soil sealing in urban areas. Implementation will

take place in close cooperation with the State Agency for Geoinformation and Surveying (LGV), university institutions and specialist companies.

DigiTAIL

The DigiTAIL project connects, digitises and structures different applications and processes from the "Road construction in Hamburg" topic area. With the sub-project "Cockpit Solution", DigiTAIL creates for the first time the possibility of displaying information on construction projects of various companies

and public authorities at a glance fully automatically and to point out optimisation and coordination needs. The central communication and information channel thus contributes to better traffic flow and simplifies construction planning.

Mobility & Energy

Mobility services and energy supply are the basis of urban life and economic activity. Networks for energy, transport and telecommunications are the pulsating arteries of the city. The requirements for resource efficiency and freedom from emissions are increasing. Hamburg's goal is to provide low-emission, climate-neutral mobility and energy in order to achieve the CO2 reduction targets set out in the first update to the Hamburg Climate Plan. "Renewable energies" must be proactively supported: Energy sources such as solar thermal, geothermal and photovoltaic energy as well as the use of waste heat, biogas and power-to-gas must replace conventional fossil fuels in the shortest possible time. Mobility services will be further electrified, and the use of hydrogen will also be given greater consideration.

However, the climate-neutral energy sources that have been available up to now are not available to the extent required, so that a reduction in energy consumption is essential. Sustainable consumption, avoidance of long transport distances and higher shares of local public transport (ÖPNV), cycling and walking, new car and ride sharing offers are an important component in reducing energy consumption despite constant growth. The backbone will continue to be public transport, whose services will be improved and increased.

Hamburg public authorities, municipal and private companies operate networks and provide vehicles and services. Some of them operate in markets that are highly regulated by the EU, federal and state laws (e.g. the Road Traffic Act, the Passenger Transport Act, the Road Haulage Act, the Energy Feed-In Ordinance, the Renewable Energies Act, the Energy Conservation Ordinance). Passenger transport and energy supply are dominated by a few large companies, while freight transport is liberalised and more fragmented. Hamburg's citizens move around the city on foot, by bike or car or can be transported in buses, taxis, ships, underground and suburban trains, regional trains or planes. New forms of mobility are also emerging in the airspace above the city.

Hamburg ensures that transport and energy networks are maintained, modernised, converted and expanded, operated and further developed on the basis of digital technology. In order to cushion the partial volatility of renewable energy sources, it is necessary to enable both companies and private individuals to act in a grid-compatible manner by means of intelligent and flexible load management. Within the framework of major regional projects, Hamburg is working together

with northern German partners on digital platforms to coordinate energy supply and demand. At the same time, pilot projects are testing the redirection of certain types of energy consumption in private households during periods of high energy supply. Efficiency improvements are particularly necessary in motorised passenger and commercial transport. Networks and their technical equipment, e.g. signalling systems, are increasingly being equipped with sensors and communication units. In future, they will provide automated information on status, capacity utilisation or disruptions and record traffic volumes or power consumption. Modern control technology in rail networks enables a shorter time between trains. Technological modernisation must take account of different cycles of innovation and renewal of infrastructure, vehicles and communication technologies. Strategies must be developed and priorities set. The increasing electrification of transport means that in future transport and energy networks will have to be designed and operated in a more closely interlinked manner. In the future, simulation techniques oriented to reality will offer new and better coordination possibilities (based, among other things, on quantum computer-like computational power).

With its strategy for Intelligent Transport Systems (ITS), Hamburg is pursuing the digitalisation of the city's transport systems and mobility services. The planning and implementation of more than 70 projects has resulted in cooperation with many relevant national and international partners. The German ITS World Congress 2021 in Hamburg, which is in preparation, offers the opportunity to show the world public innovative applications and to present Hamburg as a model city with new mobility concepts. Together, technological developments in vehicle drives, components and concepts as well as the increasing automation of driving functions, up to and including automated driving and on-demand mobility, are tested and implemented. In the courier, express and parcel services sector, the focus is on intelligent, digital solutions to reduce emissions and improve traffic flow. Hamburg can position itself as a pioneer of new mobility solutions and integrate real laboratories into everyday urban life. Hamburg also contributes many projects to the federal "National Platform Future of Mobility" initiative. The goal of this platform is the development of inter-modal and interlinking paths for a largely greenhouse gas neutral and environmentally-friendly transport system that guarantees efficient, high-quality, flexible, available, safe, resilient and affordable mobility for both passengers and freight.

1.2.2

Digitalisation and AI are also important to enable networking, efficiency and automation. Examples include location-based real-time information on the availability of electric charging stations, the signal status of traffic lights or the punctuality of buses, bus priority switching at traffic lights, mobility platforms and apps, cashless payment functions in the Hamburg Transport Association (HVV), control and safety technology in rail traffic, driver assistance functions and data exchange between infrastructures, vehicles and management centres. Technological developments coupled with real-time communication and control enable the (automated) provision, management and payment of mobility and energy in line with demand or other parameters.

Within the framework of parliamentary procedures and in specialist committees, the goal is to help shape the updating of the relevant laws and standardisation in this sense, so that increasing digitalisation contributes to efficient, low-emission and safe urban mobility and energy supply. This also includes the creation of experimental spaces that make it possible to accommodate the speed of digital change, so that new developments can be tested quickly and easily under safe conditions.

Projects from the Digital Space Mobility & Energy Include:

Intelligent Transport Systems (ITS) – Strategic Digital Programme

Digitalisation in the mobility sector plays a significant role in increasing the attractiveness and optimisation of traffic flows. With an integrated and cross-mode ITS strategy since 2016 and the successful bid for a German ITS World Congress in Hamburg in 2021, Hamburg will play a pioneering role

in the use of innovative technologies in the mobility sector. Currently, more than 70 ITS projects are being implemented in Hamburg with the goal of making mobility more efficient, environmentally-friendly and comfortable.

Collecting and Using Mobility Data in Real Time

In future, the city of Hamburg will use over 2,000 thermal imaging cameras to collect anonymous traffic data in real time at around 420 locations throughout the city, to improve current traffic management and long-term traffic planning. The data will be made available on the city's "Urban Data Platform Hamburg" of the State Agency for Geoinformation and Surveying (LGV), so that citizens, public authorities and businesses as well as private companies can access the data

for a variety of applications. The same technology will also be used in the "Hamburg Cycle Counting Network" project to permanently record cycle traffic with thermal imaging cameras mounted on street lamps at around 30 locations in the city. The result is an overall picture of the situation over the year, which precisely records individual transport and also reliably records fluctuations in bicycle traffic.

Heat Cadastre

The heat cadastre shows the spatial distribution of heat demand and heat supply structures in the city (e.g. energy production plants, areas supplied with district heating, heating networks, development plans with energy specifications, hypothetical heating network, type of heating) and is an information and planning basis for energy and urban development actors and is intended to encourage projects for CO2 reduction in the heating sector.

Environmental Partner Map

The interactive map shows the locations of the approximately 800 active Environmental Partners who regularly provide voluntary environmental services. Environmental Partnership Hamburg is a business network for voluntary corporate environmental protection. The sponsors are the Senate as well as chambers of commerce and associations. Citizens can search by the name of a company, by an address or industrial sector, or display individual economic sectors.

Exchange of Driving Licences

Due to EU legal requirements, from 19 January 2022 until 2033, all driving licence holders must have a time-limited driving licence in card format. In order to provide the several hundred thousand affected persons in Hamburg with the new documents without having to go to the public authority in person, a media-consistent online service for applying for and issuing licences. One of the cooperation partners is the Federal Printing Office.

Internet-based Vehicle Registration (stage 4)

With internet-based vehicle registration level 3 (i-Kfz 3), certain registration procedures can be handled completely on the internet, but only for natural persons. Stage 4 of i-Kfz has set itself the goal of developing a prototype for a procedure for legal entities. For this purpose, a portal infrastructure must be designed by the State Agency for Transport (LBV) together with the Federal Ministry of Transport (BMVI) or the Federal Motor Transport Authority (KBA). The goals are increased efficiency, a reduction of errors and better data quality.



Economy & Working Worlds

A strong economy is the basis for employment, prosperity and quality of life. Hamburg has a differentiated economic structure, an industrial core and a highly developed service sector. Hamburg's aim is to promote the digital transformation of the economy and the world of work in a successful and socially acceptable manner. The city is creating the right conditions for this.

and further developed. Co-working spaces, digital hubs, incubators and accelerators, competence centres and fabrication labs bring together founders, experts and freelancers, but also employees of large companies who want to immerse themselves in a particularly creative atmosphere. One example of this is Digital Hub Logistics, in which more than 40 start-ups work on process, product and service innovations along the logistics value chain together with established companies and other partners from science and research on three warehouse floors in HafenCity.

The basis for this is an efficient digital infrastructure that grows along with requirements and technological development. A particular focus is on nationwide coverage of fibre-optic connections and the new 5G mobile communications standard, which represents the backbone of the digital transformation.

Furthermore, Hamburg must not let up in the competition for the best ideas and talent. Hamburg already has the highest proportion of IT specialists among all employees subject to social insurance contributions in Germany. These professionals are needed for the development and introduction of new, digital technologies. Soft factors, such as an attractive living and working environment and affordable housing, play an increasingly important role in attracting and retaining skilled workers.

Hamburg will in future continue to be one of the most modern and competitive port and logistics locations in the world. The port of Hamburg is a pioneer in the field of digitalisation and will continue to build on this position. Hamburg is relying on a holistic concept for sustainable and intelligent urban logistics as part of overall urban mobility and will test innovative ideas in the form of real-life laboratories.

Both demographic change and the sometimes massive changes in the world of work pose major challenges for companies and state actors in achieving their goals. On the one hand, the digital transformation leads to jobs being changed, outsourced or disappearing altogether. On the other hand, additional needs arise because new fields of work and jobs are created. Hamburg is committed to good working conditions and active participation opportunities for everyone along this transformation path.

Hamburg's ability to innovate depends largely on excellent science, research and education. In dialogue with industry and the main innovation actors, the city promotes the development of digital technologies and innovations in important urban future fields and their dissemination. It creates excellent conditions for the digital transformation of Hamburg's economy and urban infrastructure. These include a strong innovation ecosystem, a tailor-made support system, skilled workers and comprehensive educational opportunities as well as a high level of appeal to digital start-ups, innovators and investors.

Employment histories are often no longer linear. This requires courage and the joy of experimentation from each individual. Hamburg provides excellent education and training opportunities and enables the acquisition of digital competences across the entire education chain and employment history (see below, 1.2.5 Knowledge & Education). The necessary further development of the social security systems as well as of company co-determination is actively supported.

With selected lighthouse projects, Hamburg will make the digital change in the city tangible. For the design of the digital projects, suitable work processes, dialogue structures, cross-clusters and future networks will be set up and new formats will be tested with which these goals can be achieved. Open and experimental spaces invite people to try out new ideas, technologies and forms of work. Knowledge and methods from the digital, creative, media and IT industries are taken up

The Senate promotes initiatives and projects that specifically address young women and inspire them with enthusiasm for mathematics, computer science,

natural sciences and technology. In addition, further employment potential will be raised through targeted promotion and the use of modern technologies.

The focus is on people who are not yet able to participate fully in working life but would like to do so. According to

the Hamburg Act on Equal Opportunities for Women and Men in the Public Sector (HmbGleiG), women should be given appropriate consideration when filling positions in the STEM sector (science, technology, engineering, and mathematics), which has been dominated by men up to now.

Projects from Digital Space Economy & Working Environments Include:

Uniform Contact (EAP) According to the Professional Qualifications Directive (BQ-RL)

This project enables people from Europe and third countries to have their application for recognition of their professional qualification as equivalent to a German regulated profession examined. This service will be expanded to the non-regulated professions. Together with the new central office for foreign

nationals, the offices responsible for the right of recognition will in future serve applicants from abroad within two instead of three months. The central office for foreign nationals will receive the applications and electronically transfer the documents concerning an extension of the EAP to the responsible ministries.

Development of a Digital Welcome Service Website

Hamburg needs qualified immigration from abroad to meet the demand for skilled workers. Digital welcome services for employers and immigrants will be designed based on customers and their needs and navigation behaviour. An important

aspect is inter-culturally competent communication. Services developed in other contexts in accordance with the Online Access Act (OZG) will be integrated for this target group and prepared in (foreign) languages.

Network Digital Learning in the Aviation Industry of the Hamburg Metropolitan Region (DigiNet.Air)

The DigiNet.Air team works together with small and medium-sized companies to develop holistic solutions that enable them to organise the digital transformation in a concrete way. The content and methods developed are also used for

implementation in educational modules. DigiNet.Air is funded by the European Social Fund (ESF) of the European Union and the Federal Ministry of Education and Research (BMBWF).

Start-up and Innovation Support

The interactive, digital platform "beyourpilot – Start-up Port Hamburg" is intended to increase the number and quality of knowledge-intensive start-ups in Hamburg and the region, integrating the specific offers of participating universities and research institutions. By opening up urban infrastructures, innovation in the media, digital and creative industries will also be specifically promoted: The "Cross Innovation Lab" of Hamburg Kreativ Gesellschaft transfers significant creative know-how into traditional industrial sectors. NextMedia.

Hamburg is establishing a "Prototyping Lab" with the University of Hamburg, the University of Applied Sciences (HAW), the Hamburg Media School and the University of Applied Sciences Wedel, where companies can experiment with new technologies using prototypes. As part of the national De:Hub initiative, more than 40 start-ups are also working together with established companies and other partners from science and research in Digital Hub Logistics on process, product and service innovations in logistics.

Joint Digital Clearance of Goods Imports

In future, imports of goods into the EU economic area that are subject to veterinary requirements will be processed jointly with customs and the veterinary and import office (BOSS-IT project). For this purpose, the currently separate control centres will be physically merged and local process control

will be digitally supported. This includes both the delivery of the goods to the individual control points and the complete electronic exchange of data between the EU veterinary ministry and customs in accordance with the planned new EU control legislation (CERTEx).

Digital Networking in Occupational Health and Safety

Digital notifications, announcements and applications in the field of occupational health and safety (e.g. asbestos removal, Working Hours Act, maternity protection notifications, child and youth work) are developed for companies in Hamburg and

provided to the public authorities of other federal states for implementation of the Online Access Act. The medium-term goal is completely digital processing of all applications and notifications in the field of occupational health and safety.

Security & Justice

The Digital Space Security & Justice includes the digital aspects of the complex of issues relating to the protection of public safety and order. This means the protection of the legal system, the state and the individual legal interests of citizens. Despite digitalisation, the essential core of services in this area is still experienced "analogue" by people or provided by people in this area. However, digitalisation creates many new opportunities for communication and for the collection, provision and use of data. Networked digital technologies therefore offer numerous opportunities for the organs of the judiciary and the public authorities and organisations with security tasks to provide technological support and make them more efficient in their tasks of upholding the rule of law and protecting the public against threats.

One of the most important actors in digitalisation in this Digital Space is the legislature, who, through data privacy and formal regulations, decisively determines whether and, if so, which data may be digitally processed by whom and how. Drivers for further state digitalisation in this area include laws on electronic legal transactions and the Online Access Act. Especially in the field of law enforcement agencies, the Office for the Protection of the Constitution and the judiciary, development alliances with the federal government or other states also determine the technological progress for better networking in Hamburg.

Citizens expect that the administration is also accessible digitally and that services are available round the clock. "Online" is increasingly replacing "offline". Social networks are used to share information and publish opinions within seconds. On the one hand, this leads to a picture of an increasingly strong differentiation on certain political issues in society. On the other hand, these social media also create space for hatred, disinformation ("alternative facts") and the creation of filter bubbles in the search for information. Therefore, in times of digital change, care must be taken to preserve the rule of law and, if possible, to ensure that nobody is "left behind".

With the continuous growth of Hamburg and an increasing number of visitors to the city, the number of police and fire brigade deployments is also increasing. The increasing number of cases makes digital support of the work necessary. In order to successfully meet the challenges of the digital change in the Digital Space Security & Justice, a highly secure IT operation is required for the collection, storage and processing of

data. In addition, the fire brigade and police in particular will use live data, data platforms, such as the Urban Data Platform, and mobile data connections in future to get to the scene of an emergency more quickly, check what is going on and save lives. The fire brigade is already using the mobile recording of patient data in rescue vehicles and a media-consistent data transfer to the central emergency room of the hospital they are on the way to. Telemedicine in emergency services will be further developed. This includes the high-performance and economic networking of tele-emergency doctors in the rescue control centre, automated advance notification of hospitals, triage in the event of mass casualties (prioritisation of medical assistance) and capacity proofs such as the fire brigade's nationwide fire bed proof. In the MobiPol project, the police are working on improving the data connection of emergency vehicles on the scene. Enabling secure, fast data exchange between emergency control centres and the forces on site via mobile data systems is the challenge and basis for the digital support and organisation of future operations.

In order to promote further standardisation and avoid media discontinuities, the "Police 2020" programme, for example, promotes modernisation of the information architecture of the police, and the "Electronic Legal Transactions" programme promotes (largely binding) electronic communication and electronic file management in the justice system. In addition, there is extensive standardisation and unification of specialist procedures in the judiciary and police. These projects pursue a cross-state IT governance and are part of the digital strategies of the public authorities.

Agile and goal-oriented cooperation in the Digital Space is promoted and administrative and judicial services are systematically made accessible online. To this end, for example, electronic legal transactions are offered via a citizen-friendly online service, the "Online Police Station" of the police will be improved and the electronic residence permit of the Central Residents' Office of the Ministry of the Interior and Sports as well as the office for foreign nationals in the district administration will be integrated into the DigitalFirst programme (see 2.3.1) as Digital Space services.

Hamburg is taking advantage of the opportunities offered by technological progress on a professional level, which is made possible by a large number of individual project plans, which are intended, for example, to ensure improved performance of tasks by the police and fire brigade or the courts. For example, the fire

brigade is planning to test the use of drones initially in the clearance of explosive ordnance and to support fire-fighting boats in order to transmit and analyse video and sensor data in real time to command and emergency services. This testing may lead to further application possibilities in major disaster situations. The traffic accident service of the police and the water police will use drones to document accident sites from the air, for example. Likewise, the police forensics department will use this technique for better crime scene documentation. Among other things, the judiciary is striving for the use of artificial intelligence, for example in the text analysis of the electronic file. The goal of a digital transformation is also to promote the initiative, motivation and further training of employees and young professionals through comprehensive digital competence. In this context,

it is important to promote mobile working in public offices in the field of security and justice, for example by developing creative and innovative solutions in workshops, setting up digital learning platforms for the fire brigade or the IT-supported writing of the first and second state examinations.

In a comprehensive process of change and modernisation, information and its processing from IT systems of the various parties involved will be networked or automated in order to provide users of the Digital Space with barrier-free and usable online services on the one hand and to support employees in the fulfilment of their tasks with technologically modern and ergonomic work equipment on the other.

Projects from the Digital Space Security & Justice Include:

ERV Overall Strategy/ERVEA

The nationwide introduction of electronic legal transactions and the electronic procedural file includes (largely binding) external communication between professional parties to proceedings (e.g. lawyers), courts and investigating authorities as well as electronic file inspection for parties to proceedings in the judiciary (projects ERV overall strategy and ERVEA). In particular, the introduction of the electronic file in criminal matters from the programme for the modernisation of information and communication structures "Police 2020" ties in with this.

Online Police Station

The police will continue to expand their online services to keep the bureaucratic and administrative burden for the city's citizens as low as possible. The usability of the "Online Police Station" is further simplified, for example, by reducing the input effort. The information and service offerings and application procedures available there will be developed further in the direction of automation wherever legally possible and economically reasonable.

Legal Examination Offices

The project includes the administration of exam candidates and trainee lawyers from initial registration to graduation and the IT-supported writing of examinations for the legal examination

Doctor in the Rescue Control Centre and Tele-emergency Doctor System in the Fire Brigade Rescue Service

Multimedia technology should enable callers, paramedics, emergency doctors and central emergency rooms to treat emergency patients as links in the rescue chain. The goal is to provide medical advice and guidance to the caller and to involve

Project Pearl

The goal of the renewal of the fire brigade and police control centres is to improve the management of operations, i.e. the initiation and control of operations, especially after emergency calls to 110 and 112, and the acceptance of emergency calls. For this purpose, a common, modern, efficient and sustainable emergency control system for fire brigades and police, consisting of an operations control, communication and geoinformation system, will be procured and implemented.

Automated Shipping Register

In the cooperation project between the local court, the Ministry of Justice and the Ministry of Economy, Transport and Innovation, the currently physically managed shipping register, which documents ownership and other legal relationships with regard to the registered ships or ship constructions, will be replaced by an electronically managed register and made publicly accessible electronically.

offices. Within this framework, administrative services for students and trainees should also be made electronically accessible.

a specialised emergency department before the caller arrives at the hospital. In this way, follow-up costs and trips by emergency doctors can be reduced.

Knowledge & Education

The Digital Space Knowledge & Education is of particular importance for the future of the metropolis of Hamburg. Especially against the backdrop of demographic and social change, the challenge of the digital transformation process will cover all areas of society.

Education refers to the lifelong development process of a person, which leads to individual, institutional and social knowledge as well as to personality development and the strengthening of talents. Education and knowledge form an important basis for social cohesion and for equal participation in social life in the Digital City.

In the sense of lifelong learning, this Digital Space can be structured from early childhood to adulthood, and the transitions can be fluid:

- ➔ **Early childhood education**
(day care, pre-school or all-day education and care)
- ➔ **School education** (schools of general education)
- ➔ **Vocational education**
(vocational schools, especially the dual system)
- ➔ **Academic education**
(universities and research institutions)
- ➔ **In-house education, further education and training, human resources development**
(both in the ministries, departments and state agencies of the city as well as in companies, institutions etc.)
- ➔ **Non-school education**
(e.g. library halls, cultural institutions, youth welfare institutions, adult education centre, youth music school)

Research into education and digitalisation issues is an essential part of this Digital Space. It contributes directly to the further development of this Digital Space through new findings, e.g. in fields such as data science or artificial intelligence. In all disciplines, it is necessary for teaching content to always be based on the latest findings. Teaching and research in particular are therefore subject to the changed conditions of the Digital Space and are two closely connected elements that cannot be considered separately.

Digital media are increasingly becoming an integral part of everyday life from an early age and are therefore becoming more and more important in the field of early childhood education – this applies both to the training and further training of specialist pedagogical staff and their role in advising parents, as well as to the implementation of concrete measures directly with the children in daycare institutions and other

local youth welfare institutions. Early media education can help children to perceive the world in its diversity and differentiation, to orientate themselves in it, to understand it and to participate in social life. The importance of the media for the general educational and upbringing mandate of daycare facilities and other youth welfare institutions has been included in the current revision of the "Common Framework of the States for Early Education in Daycare Institutions for Children" at the federal level and will be taken into account in Hamburg in the further development of the "Hamburg Educational Recommendations".

The tasks across educational institutions can be structured into the fields of action named in the strategy of the Standing Conference of Education Ministers (KMK) "Education in the Digital World" (see printed matter 21/19308 – Digitalisation in Hamburg Schools). This means, on the one hand, expanding and the rollout and application of the more technical-legal infrastructures (e.g. WLAN, communication and learning platforms, user management and intermediary services, timetable programmes, equipment maintenance and support), which are subject to similar requirements in all fields of action. The same is true for educational processes and inter-institutional exchange on new forms of teaching and learning (e.g. webinars, interactive learning programmes, virtual-reality learning, and open online courses). With regard to universities and research institutions, it is also important to ensure and promote the transfer of their findings so that all areas of society can benefit from the latest research findings and actively shape the digital transformation. To this end, research should complement basic research and, conversely, also be application-oriented and needs-based. Education and research institutions have always been driving forces for innovation and transformation by transferring their knowledge and ideas to the economy and wider society.

For the education system, digitalisation is both an opportunity and a challenge. The special potential of learning in digital change is to promote the potential of students individually, to respond to the needs of the individual student and to redesign teaching and learning processes. This means that digitalisation is also a challenge for the education system, because it requires that the teaching and learning methods, the structure of learning environments and the educational goals that have been customary up to now be reviewed, changed and expanded.

With this in mind, the digitalisation of Hamburg's schools will further develop the concept of teaching. The "DigitalPakt Schule" will make the exemplary IT infrastructure in all of Hamburg's schools even more powerful and reliable (see Senate printed matter 21/19308). Hamburg is striving to use digital media in every subject as naturally as workbooks and textbooks. To this end, internet access is available in every classroom via a high-performance 1 Gbit/s wireless network and, in the future, access to a Hamburg-wide learning management system will also be possible. All pupils will reliably acquire skills for living in the Digital World. All educational plans are reviewed and supplemented for the necessary further development of specialist teaching. Teachers are already being trained in further educational measures. These will be expanded in the future and extended to include innovative formats.

In all phases of life and learning, it will increasingly be a question not only of learning how to use digital tools, but also of recognising and critically reflecting on possible risks as well as potential. The state's educational mandate includes the education on and development of media and information literacy, media ethics and critical reasoning. In order to ensure smooth and seamless transitions, it is important that all educational institutions make a reliable contribution to the field of digitalisation, on which subsequent institutions can build.

In all fields of action of the planned digitalisation projects, the importance of easily accessible and analogue intermediary services and meeting formats (bookshops, libraries, exhibitions, performances) will have to be taken into account and, if necessary, redefined so that digitalisation does not lead to exclusivity and uniformity.

In order to make new offers and services accessible to citizens without barriers, access to digitalised services should be standardised and thus simplified (uniform user ID or a central service portal for all relevant services). This also includes promoting the user-oriented exchange of data between institutions in line with the citywide Digital Strategy (e.g. automated transfer of university entrance qualifications in the application process for university). An example of a concrete action is the automated transmission of information on possible reductions for recipients of social benefits for pupil/trainees or students. In this context, inter-agency and cross-ministerial digitalisation in such a field of action requires a critical examination of the current institution-specific processes and definitions (e.g. standardisation of reduction criteria). In this respect, a corresponding comprehensive view, through process optimisation instead of just process digitalisation, will also initiate processes of organisational development in the direction of standardisation and centralisation, which in themselves can already lead to a reduction in bureaucracy.

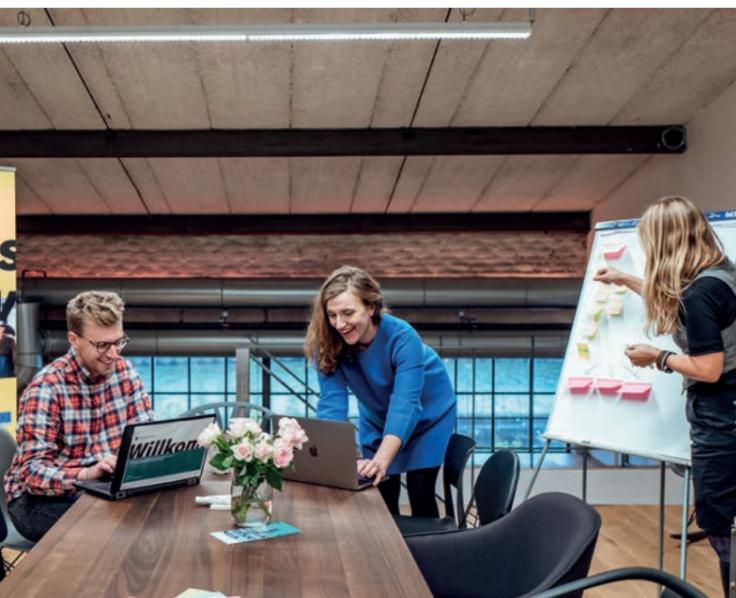


Photo: www.mediaserver.hamburg.de/
Geheimtipp Hamburg



Photo: www.mediaserver.hamburg.de/
Sven Schwarze



Photo: www.mediaserver.hamburg.de/
Geheimtipp Hamburg

Projects from the Digital Space Knowledge & Education Include:

Optimisation of Daycare Centre Utilisation – Extension of the Approval Period for Five-hour Daily Childcare

The goal of this project of the Ministry of Labour, Social, Family Affairs and Integration in cooperation with the district offices is to extend the approval period for applications for five-hour daycare

centre supervision from the current twelve months until school entry. Families now only submit one application. However, this requires new electronic testing and control procedures.

Digital Link "Daycare Online Application Procedure with ProCAB Specialist Daycare Procedure"

The goal of this project of the Ministry of Labour, Social, Family Affairs and Integration in cooperation with the district offices is to ensure that applications submitted online are transmitted

electronically to the ProCAB specialist daycare centre procedure with media-consistency and – as far as possible – fully automated authorisation.

Online Registration and Re-registration for Youth Music School and All-day School

Parents should be able to book the offers of the youth music school and school all-day offers online; the bookings will be electronically

linked to the specialist procedures. The pilot application will be the youth music school, followed by all-day offerings.

Discounts Online

The information available to the public authorities that entitles them to benefits and discounts will be automatically compared between the specialist procedures in a way that is faultless in terms of data privacy. For example, discounts on services such as monthly tickets, lunch, use of all-day school offers in marginal and holiday periods or visits to the theatre can be taken advantage of at low cost.

DigitalPakt Schule

Over a five-year period, the schools will be equipped with modern digital infrastructure: Fast WLAN in every classroom, which can also be accessed from private devices, plus a sufficient number of presentation media and mobile devices. Parallel to this, a further training offensive and the revision of the education plans in accordance with the strategy of the Conference of Education Ministers "Education in the Digital World" are taking place.



Photo: www.mediaserver.hamburg.de/
Escape Filmproduktion

Photo: www.mediaserver.hamburg.de/
Claudia Hoehne

1.2.6

Culture, Sport & Leisure

Hamburg is an important cultural metropolis, which is reflected in the richness of the range and quality of the art and cultural offerings in the care of municipal and private cultural institutions. The still young start-up scene in the creative sector complements the classic profile of Hamburg's established media landscape and, for its part, is driving forward digital change. The examination of new media technologies also has a direct and immediate influence on contemporary forms of expression by artists and creative people, supported by a lively district culture, a wide variety of associations and initiatives, and public libraries. By realising practical digital examples, Hamburg wants to seize the opportunity to make the emerging social transformation more perceptible and tangible in digital form for the common good as a whole – both in the cultural sector and in the field of sports and leisure activities. In doing so, the diverse requirements of the most diverse target groups must be considered more closely, for whom differentiated approaches and participation must be realised in each case by digital means. The main focus is on access to information and thus, for example, municipal services in the field of cultural assets and monument protection, accessibility to official information on the basis of the Hamburg Transparency and Archives Act, and application and grant procedures in the field of public cultural and sports funding.

The development of stable, secure and modern infrastructures for Hamburg's cultural institutions is in full swing. The State Archives and many cultural institutions are making great efforts to review their core processes

and are testing the introduction of comprehensive and inter-relational digitalisation processes. The museums are increasingly making the Hamburg collections accessible digitally and are developing attractive digital offerings based on this. The heterogeneity of the cultural landscape and its actors and the dynamics of technological development require flexible approaches, especially in the merging and networking of digital internet-based third-party service offerings. Also due to the diversity of specialist procedures in the various specialist areas, increased efforts are required for the consistent development of interoperable interfaces from urban specialist applications. The goal here is to access and integrate the infrastructure services of other networking networks from the systems of the Hamburg institutions, e.g. in the library, museum and archive sector as well as in the field of monument preservation.

The demographic development and increasing individualisation – in many cases only made possible by digitalisation – also determine the areas of culture, sport and leisure. In addition, there is a change in leisure behaviour, which is expressed by decreasing ties to traditional structures in associations and institutions. On the other hand, there is great interest in participation in a diverse leisure, sports and cultural life with changing themes.

Cultural institutions are faced with the challenge of making digital cultural assets accessible as part of public cultural life. Against this backdrop, the development of a cloud solution that can also be transferred to other municipal departments is being driven forward.

The communication and networking of digital cultural and knowledge offerings in a wide variety of forms and formats will become increasingly important in future, especially against the backdrop of social developments towards lifelong learning (see 1.2.5, Knowledge & Education). This offers the opportunity to offer new formats in a service-oriented manner and to exploit potential in presentation, mediation and marketing in cooperation with traditional cultural institutions, in order to address

new target groups (outreach strategies) or to provide supplementary offers for those interested in content via digital information platforms (e.g. the outreach platform for digital culture). Through a targeted promotion of barrier-free offers, signals are being set for inclusion. Standardisation in the preparation of information is being driven forward. Digitalisation also offers the opportunity for increased cooperation between the various actors in the Digital Space Culture, Sport & Leisure.

Projects from the Digital Space Culture, Sport & Leisure Include:

Active City Map

Here, the district sports facilities and sports framework agreement areas, (school) sports halls, swimming pools, water sports facilities, exercise centres and numerous club facilities and sports centres are visualised in a digital map. The Active City Map provides a wealth of information on the different facility types. Users have the option of filtering institutions by facility type, facility component, district, city district and sponsor group in order to find out, for example, sports facilities close to their homes.

Active City App

Under the motto "Inform, Motivate and Involve", the new Active City app offers easy and direct access to the Hamburg sports world for trying out, participating and sharing. The App presents the city's wide range of sports and sporting events. News and stories from the Active City World are available in a news feed. With their own sports activities, citizens can collect pulse points for their chosen district and thus raise the "pulse of the city".

Electronic Online Application and Grant Management

In a cross-state cooperation with Mecklenburg-Western Pomerania, Online Access Act (OZG) processes for monument approvals and tax assessments are being implemented as models for other federal states. The OZG process of public funding of historical monuments is being coordinated across

all offices by the Ministry of Culture and Media and integrated into the development of special online services for the funding of cultural activities, in order to interlink various internal processes and digital systems of grant management.

Building Secure and Efficient Basic Infrastructures for Cultural Institutions Large and Small

Museums are not only busy with the important task of digitally recording and creating an inventory of their collections, but have also set out to digitise all of their internal business processes. This task includes all areas of the museums (visitor guidance, exhibition design, press and public relations, marketing etc.) as well as the working conditions of all employees. In a complex

process, Hamburg's museums are therefore being equipped with a standardised "cultural workplace" that is individually adapted to the institution. In addition to appropriate IT equipment, this includes IT telephony, support contracts, mobile work devices, maximum data storage capacities, cold storage, applications to enhance IT security and appropriate software packages.

Archiving of Digital Recordings

In order to implement the subject-specific guidelines of the Conference of the Heads of Federal and State Archive Administrations (KLA) in accordance with the digitisation strategy of the State Archives, the required digital indexing

as well as the digital networking of specialist information and, in some cases, digitised material is done via the website. This is done in exchange with national (such as the German Digital Library) and international portals (Europeana).

Hybrid Cloud Technologies for Cultural Institutions

In order to secure digital collection data and digitised records from private and public cultural institutions in the long term and to make them accessible, individual storage concepts will be developed by networking various cloud services (infrastructure and platform services in cooperation

with external universities and the Fraunhofer Institute for Applied Information Technology) as well as targeted offers to Hamburg's digital economy for the creation of innovative web applications for cultural content using open interfaces.

Health & Social Issues

1.2.7

The design of issues such as social security, good healthcare, support for young people and families, integration of citizens with a migration background and participation of senior citizens or people with disabilities are decisive for good living together, good quality of life and for participation opportunities for all groups of society. Digitalisation processes help to make the city more citizen-friendly, they reduce the number of trips people have to make and facilitate administrative procedures, they can make contacts barrier-free and location-independent. In addition to citizens and the administration, the digital infrastructure also networks companies and institutions, sponsors, associations and welfare organisations. In the healthcare sector, hospitals and health insurance companies, research institutions and medical practices are the key actors.

Digitalisation is already a fundamental component of social security and medical care. Under the heading "Data save lives", promising digital solutions are being developed, for example, in medical care but also in social fields of work such as daycare centres. Databases such as KURSNET support

the finding of suitable integration and language courses for people with a migration background and network the relevant sponsors.

Technical trends associated with digitalisation, such as the Internet of Things (IOT), laboratory systems, artificial intelligence and robotics, and assistance systems, as well as legal requirements and demographic change, have a direct and indirect impact on health and social services. Hamburg would like to take a pioneering role in actively organising changes in the use of apps, mobile devices or online consulting, new work as new models of working and participation through accessibility. The targeted promotion of digital infrastructure and networking of service providers will significantly support many care and social policy goals. This concerns, for example, increasing the quality of medical treatment through rapid information processing, easier diagnosis and therapy recommendation, improved information access for citizens to social and health services, and a reduction in the workload of employees in the health and social services fields.

Projects from the Digital Space of Health & Social Issues Include:

Accounting with Service Providers

Certain healthcare benefits are paid centrally via the CareCostManager specialist procedure. Health insurance funds, health insurance (dental) medical associations, fire brigade and pharmacy accounting centres send their invoices

by post, on CD or via a web server. The provision of all invoices on servers or transmission via the electronic mailbox of the service portal is planned.

Education and Participation

Children, adolescents and young adults are, under certain prerequisites, granted benefits for education and participation in social and cultural life in addition to the standard social assistance requirements. These include, for example, the use of learning support, participation in excursions and school

trips or the financing of membership fees in associations. In order to receive benefits, parents must go to the services and present documents for applications and accounts. Applications and processing should be done digitally for customers without the need for an appointment.

H³ – Health Harbour Hamburg

The goal is the joint creation of the structural prerequisites for digital networking of Hamburg's healthcare players. This is an iterative process in which existing solutions (e.g. telematics infrastructure) will be integrated and parallel structures avoided. In addition to representatives of hospitals as well as health insurance funds, the Association of Statutory Health Insurance Physicians Hamburg and the Hamburg Medical Association are also involved.

Digital Health Hub Hamburg

In the Digital Health Hub Hamburg of Gesundheitswirtschaft Hamburg GmbH, established and young companies in the healthcare, digital and creative industries work together with universities to develop ideas for digital innovations for the healthcare system, e.g. using virtual reality, augmented reality or artificial intelligence. These are developed to project maturity or discarded again. Funding applications have been submitted for three project ideas.

Online Appointment Service Vaccination Centre Hamburg

The Hamburg Vaccination Centre of the Institute for Hygiene and Environment offers an open vaccination consultation hour for citizens, among other things for preventive travel medicine.

In order to offer the best possible service and keep waiting times as short as possible, an online appointment system will be implemented for this service in the future.

Digital Information Platforms for Citizens and Industry in the Neighbourhood

Hamburg residents, companies and experts will be informed, networked and activated via local digital platforms. Together with local actors, the platforms will be established and expanded step by step – from intergenerational neighbourhood

projects to prevention, youth and senior citizens' services, health promotion options and consumer advice to local company partnerships for health promotion.

1.2.7

The design of the Digital Space Health & Social Affairs requires the cooperation of many actors: In addition to the ministries and the district offices of the city, there are volunteers, clubs, associations, sponsors, service providers and other parts of the public administration. Through joint efforts for targeted networking and the secure exchange of information, added value is created for people working in the healthcare system and in the social sector and for citizens who use health and social services.

Challenges arise in social, organisational, legal and technical respects, which must be mastered with suitable solutions and projects. In addition to ensuring the technical availability of the systems and data privacy, it is particularly important to promote user acceptance, provide the resources necessary for implementing measures and actively promote networking. In addition, appropriate qualification measures and modern business process organisation and management also play a role.

Thematically, the focus is on the implementation of the Online Access Act (OZG), the consideration of data privacy, the development of resilient neighbourhoods, qualification, the eAkte and the networking of participants. At the same time, the opportunities offered by digitalisation are used to counteract social segregation by promoting participation.

The actors in the Digital Space Health & Social Affairs will define clear internal responsibilities and resource allocations, appoint specific contact persons and ensure the flow of information and digital networking in order to implement the many different projects. In addition, comprehensive digital communication is being established in the social sector; particularly against the backdrop of media discontinuities that must be avoided, the first step will be to network the relevant specialist procedures, such as JusIT and ProSoz, in order to exploit the initial potential there. In addition to good technical and staffing facilities, questions of data privacy and its further development must also be addressed. Interfaces for data exchange using the eAkte must be created and developed.

In connection with the implementation of the OZG, early and proactive networking with the states responsible for the various "life situations" is sought in order to develop the necessary processes in comparison and together and to implement suitable procedures in Hamburg.

The H³ (Health Harbour Hamburg) project is already well under way. The goal is to create the structural prerequisites for digitally networking health actors, especially in areas that are not likely to be covered by the telematics infrastructure. This is an iterative process in which existing solutions will be integrated and parallel structures avoided. In addition to representatives of hospitals and health insurance companies, the Association of Statutory Health Insurance Physicians Hamburg and the Hamburg Medical Association are also involved. The initial focus is on solutions for online appointment booking, the design of care transitions, the creation of a teleradiological network for Hamburg and the connection to health insurance company apps and electronic patient files of the health insurance funds. The intention is to create appropriate structural prerequisites for digital networking that are also suitable for other social fields of work and their actors.



Photo: www.mediaserver.hamburg.de/GeheimtippHamburg



2. Strategies and Perspectives – Making the Digital City Possible

Hamburg's digital living environments can be experienced in the Digital Spaces, opening up development paths there and, in their sum, representing important future areas of the Digital City. For example, the ministries have formulated objectives along the ITD framework (see 1.1, Where We Are Today) in their digital strategies drawn up in 2019 and, on this basis, have identified a wide range of approaches and projects to organise these digital living environments (see 2, Digital Spaces). The district administration is currently developing its strategy. The projects already outlined (see 1.2) show how closely ministries and district offices need to be networked.

At the same time, the Digital Strategy for Hamburg promotes topics which, due to their cross-sectional character, promote development in all or several Digital Spaces and thus support the expansion of digital projects on a broad basis. Strategic development areas of Digital City Hamburg are digital infrastructures and platforms, data, digital administration, transformation and cultural change as well as innovation.

On the one hand, they thus form their own focal points in the future development line of the Digital City. On the other hand, they essentially reveal their effect by being used in the Digital Spaces and by being shaped through specific projects. Cultural change and transformation must be realised everywhere, so it is beneficial to focus on them as central themes (see 2.4, Transformation and Cultural Change). Without broadband coverage, digitalisation will not take place (see 2.1.1, The "Digital Backbone"). The Urban Data Platform already technically enables interdisciplinary data usage (see 2.1.2,

The Urban Data Platform). The data on the basis of which specific applications are developed and added value is generated come from very different areas such as urban planning and development, culture or mobility, and must be integrated and managed in a uniformed manner (see 2.2.3, Data Governance).

The strategic development areas thus act as drivers in Hamburg's Digital Spaces. They will therefore be elaborated and detailed in the following sections in individual fields of action and measures. Here, too, an inter-agency and cross-ministerial approach is often required, which is itself an essential component of the Digital Strategy for Hamburg (see 2.4.3, Transformation Agenda).

Photo: www.mediaserver.hamburg.de/
E. Recke



In addition to the strategic development areas, which are already more strongly contoured and underpinned by measures, it is part of the overall strategic perspective to keep an eye on other prominent technological trends and (possibly supposed) future topics and to continuously examine them with regard to their possible contribution to the strategic objectives. These future fields are discussed in the last section of this chapter (see 2.6, Other Future Fields).

Digital Infrastructures and Platforms

Efficient and sustainable infrastructures form the basis for successful development. Digital platforms have long since established themselves in the commercial world as the core of many successful business models, and (data) platforms are also playing an increasingly important role for the sustainable functioning and competitiveness of cities and for the provision of digital services.

Wired and wireless data networks thus form the basis and backbone of the Digital City: The Senate will therefore vigorously promote their expansion, also with a view to future standards such as the fifth generation of mobile communications (5G). In addition, Hamburg will expand existing platform solutions and, if necessary, develop further ones in order to enable the development of powerful, scalable, and standardised solutions.

The “Digital Backbone” – the Technical Basis for the City’s Digital Solutions

Broadband/fibre optics, mobile telephony/5G and Wi-Fi are currently the central technologies to enable digital communication. Data speed and volume require further development, as do changing social requirements.



Photo: sander-weeteling

Broadband coverage in Hamburg is good in comparison with other states. According to the German government, 97 percent of all Hamburg households have access to connections of at least 50 Mbit/s, 94 percent even have access to 100 Mbit/s. Only one to two percent of the connections have bandwidth below 30 Mbit/s. These gaps are being closed in an ongoing funding process. For the last few isolated addresses in Hamburg that do not have a broadband connection, a perspective to provide it will be developed in 2020. Despite these good prerequisites, it is clear that a metropolis such as Hamburg will have to rely on the provision of fibre-optics in future in order to meet the increasing requirements for the transmission of data volumes. The goal is for Hamburg to have citywide fibre-optic coverage in future. All citizens and companies will be given access to a fibre-optic network.

Hamburg has good and almost complete mobile phone coverage with the current LTE technology standard and was also involved in 5G technology development

in the area of industrial applications from 2017 to 2019 with the “5G test field” in the port of Hamburg through the Hamburg Port Authority (HPA). The project is one of a total of two application test fields promoted by the EU Commission throughout Europe. Hamburg will do its utmost to support the expected rollout of 5G by companies from 2020 onwards, including the identification and implementation of sites for additional antennas. During implementation, multi-layered interests have to be taken into account – the concerns of house owners, citizens, monument protection and urban development. In cooperation between the Ministry of Economy, Transport and Innovation, Hamburg receives funding within the framework of the 5G innovation competition of the Federal Ministry of Transport and Digital Infrastructure. Within the framework of the funding programme, 5G-based pilot applications are being tested in order to further expand the new mobile communications standard for industrial use.

Hamburg is also one of the leading metropolises in Europe in the expansion of open and free Wi-Fi. Public lighting masts and parking guidance systems can be used as installation points free of charge. Taking advantage of this opportunity, the high-performance, free public “Moby-Klick” Wi-Fi service has already been expanded by private companies in parts of the city centre such as Jungfernstieg, Rathausmarkt and Gänsemarkt. Furthermore, the Speicherstadt and the Reeperbahn have already been equipped accordingly. All 32 public libraries also offer Wi-Fi access via “Moby-Klick”, and this service is also available in all 92 U-Bahn stations, all S-Bahn stations and in over 1,000 buses. The goal is to offer a Wi-Fi service that is open to users and free of charge throughout the city, at tourist hotspots and in the district centres. The result is a fast growing open accessible Wi-Fi network, which is unique in Germany in this dimension. The voluntary, civil society initiative Freifunk-Hamburg, which builds donation-based open Wi-Fi networks in public places where typically

no commercial services are created, also makes an important contribution in this context. This is why the initiative has been supported by the Free and Hanseatic City of Hamburg.

In addition to the expansion of the new 5G mobile communications standard by private providers, which is characterised by high data rates and very low latency, a cooperative project on the use of Lo-RaWAN technology (Long Range Wide Area Network) together with the

A Platform for Urban Data: The Urban Data Platform

Data is a strategic topic of the Digital City and to pursue this, Hamburg is relying on a platform solution: The Urban Data Platform Hamburg (UDP_HH).

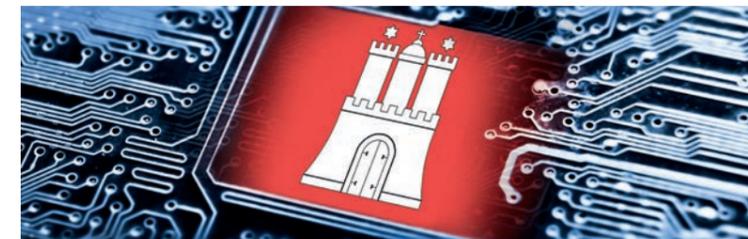
The Hamburg administration has an efficient spatial data infrastructure as well as a wide range of other data, which were collected and stored in various subject-related IT procedures. In the context of the rapidly growing Internet of Things (IoT), urban sensor data are also becoming increasingly important. However, these data are often available in technical silos and can rarely be systematically networked.

Hamburg has been expanding the UDP_HH since 2017 on the basis of the established spatial data infrastructure of the State Agency for Geoinformation and Surveying (LGV) in cooperation with Dataport. As an urban data platform for the entire city, it is the technological “data hub” of the city. It explicitly follows a decentralised approach: The goal is not a uniform central data resource, but the standardised technical linking of the city’s many decentralised systems and databases (“System of Systems”). The UDP_HH therefore does not only address the public administration and its associated institutions (e.g. state agencies, municipal companies) but also civil society, science and economy. A variety of practical applications (e.g. availability of e-charging points in real time) are already running on the basis of the already diverse data from all areas of urban society. The operator of the technical infrastructure of the UDP_HH as well as the central specialist contact point for urban data is the Urban Data Hub, which was also established in 2017 (see 2.2.1, Urban Data Hub).

Hamburg utilities is addressing the issue of data transfer with the characteristics of low bandwidth and long range. This is an open available radio technology that enables the transmission of measurements. The rapid exchange of information will make services available more quickly and comprehensively, which will lead to a considerable enhancement in efficiency in various operational processes (including the reading of parking sensors and level measurement for waste containers).

In an increasingly digital and networked city, the Senate will further open the data silos (see 2.2, Data) and intelligently merge data via the UDP_HH. As an application and service-oriented platform, it is an important prerequisite for data-driven innovations.

The platform forms the basis for the development of new, digital services and business models and also supports the efficient provision of services in the city. For example, in the implementation and development of online services, the ministries will closely link the UDP_HH to the city’s Online Service Infrastructure (see 2.1.3, Online Service Infrastructure). Since data analysis will become increasingly important in the future, Hamburg will also examine the integration of new technologies such as machine learning and artificial intelligence to solve specific tasks and problems within the framework of the UDP_HH. Recently, the UDP_HH has also included a new infrastructure for recording and using sensor data in the context of the rapidly growing Internet of Things (see 2.6, Other Future Fields). In order to ensure common



standards in matters of interoperability and data quality beyond the state border, Hamburg is striving for closer cooperation both in the metropolitan region and at the national and international level.

Central Service Platform: The Online Service Infrastructure

2.1.3

Through the Online Service Infrastructure (OSI), Hamburg's citizens and companies have central access to all online services of the Hamburg administration and, in future, to online services of the federal government and other states. This makes it an essential technical basis for the implementation of all online administrative services under the Online Access Act and also for the DigitalFirst programme (see 2.3.1, User-friendly services for the city). Technically, the OSI platform provides a secure connection between users and the online service as well as the specialist procedures in the network of the Hamburg administration.

The development of the OSI platform being advanced by Hamburg has been open for joint use with other states from the very beginning. So far, Bremen, Schleswig-Holstein, Saxony-Anhalt, Lower Saxony and Berlin have also decided to use this platform. By jointly operating and further developing the platform, the states benefit from the experience of others, lower development costs and the reliable exchange of data between the systems. OSI also supports the reuse of online services developed by others.



The Strategic Development Area
"Digital Infrastructures and Platforms"
Includes the Following Topics and Projects:

DIGITAL INFRASTRUCTURES AND PLATFORMS

Expansion of the "Digital Backbone"

Data networks (e.g. broadband, fibre optics, mobile/5G, Wi-Fi, LoRaWAN) form the technical basis for the city's digital solutions. At the same time, they are part of a modern basic service for the public and will therefore be expanded further.

A Platform for Urban Data

In order to make data increasingly available in and for the city, powerful platform solutions are needed. Hamburg is pursuing this approach with the Urban Data Platform. Its expansion will further improve the technical basis for functionally connecting the many different decentralised systems and databases, thus breaking down "data silos" – including for real-time data.

Central Platform for Online Administrative Services

Through the Online Service Infrastructure (OSI), Hamburg's citizens and companies have central access to all online services of the Hamburg administration and, in future, to online services of the federal government and other states. With OSI, Hamburg is relying on a "modular character" so that new technical requirements can be implemented more quickly and online services can be created more easily, quickly and cost-effectively.

With the platform, Hamburg is breaking new ground and thus creating the prerequisites for developing online administrative services more quickly in future and making them more accessible to citizens. For example, due to its "modular character", new technical requirements can be implemented more quickly on the OSI platform. It uses "developmental patterns" and central functions (e.g. basic modules, service account, mailbox, etc.) to create online services more easily, quickly and cost-effectively. To help users quickly find their way around, the user interface is intuitive and uniformly designed.

The new OSI-based service portal of the Free and Hanseatic City of Hamburg already provides essential functions for the majority of online services: Service accounts for citizens and companies and service account mailboxes for secure communication are just as much a part of this as ePayment and developer tools. The online services from the existing service portal (HamburgGateway) are currently being migrated to the new service portal (OSI).

2.2

Data

Hamburg is already using the potential of available data for the sustainable further development and control of the Digital City, following the maxim "share, use and protect data". Important prerequisites for the design of the Digital City and its digital spaces are the existence, provision, exchange and networking of digital data that are interoperable and contain information about the digital spaces and their various fields of action via transparent and secure access routes.

Such quality data with uniform standards and process interfaces (such as XBau, XPlanung, XBauleitplanung) enable needs-based, sustainable decisions and tailor-made services. The Urban Data Platform (UDP_HH) forms the technological basis and is the enabling element for the strategic development area of data. In addition to this technological basis, Hamburg is pursuing the following projects in particular to develop this strategic area.

Contact Point for Urban Data Usage: The Urban Data Hub

2.2.1

With the establishment of the Urban Data Hub (UD-HUB) in 2017, the Senate laid the foundation for a centrally coordinated handling of urban data. The UD-HUB is a cooperative project between the State Agency of Geoinformation and Surveying and the CityScienceLab of HafenCity University (see 2.5.3, CityScienceLab). It is the technical organisational unit that is responsible for the strategic management of the common municipal data infrastructure in close coordination with the ITD Office and the public authorities.

administration and thus enable ever broader cross-office and interdisciplinary data usage. The amount of available urban data will be continuously increased by expanding the data portfolio in line with target groups and needs. To this end, the UD-HUB determines data requirements within and outside the administration, advises on questions of ability to connect IT processes to the municipal data network and is the contact for all public and private actors in Hamburg who are implementing or planning data-based digitalisation projects.

One of the main tasks of the UD-HUB is the operation and further development of Hamburg's central technical data platform (see 2.1.2, The Urban Data Platform). The UD-HUB organises and standardises technical data and process interfaces (such as XBau and XPlanung) and enables the integration of data from procedures of the urban actors to the UDP_HH. In addition to the technical aspects, the focus is on initiatives and formats to break apart the data silos within and outside the

On this basis, new services and applications for the urban society and a vibrant data ecosystem can emerge within and outside the administration. In connection with sensor data, the UD-HUB is also working on the introduction of new technologies from the subject areas of the Internet of Things, Linked Data and intelligent three-dimensional city models (see 2.6, Other Future Fields).

2.2.2

Transparency for Citizens: Open Data

In addition to its commitment to the systematic provision and use of urban data, Hamburg is also committed to the openness of administrative data (open data). The Free and Hanseatic City of Hamburg is therefore already playing a pioneering role in the field of open data throughout Germany. One important reason for this is the Hamburg Transparency Act, which in a very progressive and comprehensive way provides the framework for practising open data in Hamburg. With the Transparency Act and its implementation in the form of the Transparency Portal, Hamburg is making an ongoing contribution to ensuring

that the relationship between citizens and the state is characterised by trust and a lived culture of openness. The transparency portal is also already integrated into the UDP_HH (see 2.1.2, The Urban Data Platform) and thus the citywide data infrastructure, so that the openly available administrative data (e.g. official statistics and activity reports, land use and landscape plans) are also available to a large number of target groups. The open data location Hamburg is also distinguished by the fact that the German GovData open data portal, which was initiated jointly by the federal and state governments, is operated here.

Uniform Handling of Urban Data: Data Governance

Data-driven projects and applications need uniform guidelines, standards and processes for the systematic use, networking and processing of urban data resources both in the UDP_HH and in other systems. Already today there is a rule-based and lived professional practice in urban data management in Hamburg. It is based on the strict and unalterable requirements of data privacy, information security and best practice approaches of the participants in the data ecosystem.

Together with its urban partners within and outside the administration, Hamburg will gradually formulate the contents of its data governance and establish binding guidelines and standards in the city. Such a holistic approach includes not only a high level of data privacy and freedom of information but also quality standards for data and binding rules for data access and exchange.

Data-supported Tools for Good Administrative Behaviour

Hamburg will continue to promote the development of control instruments, tools and assistance systems (so-called cockpits and dashboards, which present complex data in a simple way) for process- and data-based

For example, data models must be (further) developed, meta-data must be made reliably available and maintenance concepts must be agreed upon in order to ensure data quality in the long term. It must be clear and comprehensible to all actors in the data ecosystem who is responsible for the quality and timeliness of the data, who is authorised to use the data and in which technical formats an exchange takes place.

In close coordination with Hamburg's national and regional partners, Hamburg's data governance will be designed in such a way that it harmonises with national data ecosystems as well as international standards and interfaces. Hamburg is thus helping to ensure that Germany and Europe develop into a uniform and compatible data environment.

government and administrative action. Such instruments help in particular to carry out interdepartmental projects of a cross-cutting nature in the city efficiently and reliably on a common data basis.

2.2.3



Photo: www.mediaserver.hamburg.de/
Michael Zapf

Cockpits and Dashboards for Urban Infrastructure and Planning

Cockpits and dashboards are presentation and analysis instruments that depict technical processes and data in a clearly understandable and condensed form or represent the process control of complex legislative procedures. They thus facilitate the evaluation and implementation of complex projects and situations. Hamburg is piloting these instruments in the form of the cockpit for digital urban land use planning (DiPlanung) and the cockpit for urban infrastructure (CoSI).

DiPlanung is a system for the procedural control of complex legislative procedures and planning processes and integrates the digital tools for urban land use planning, which were previously operated separately, in a central web interface. This merges these tools in a single system, thus enabling networked viewing of the previously separate areas. For the first time, the cockpit thus provides various functionalities for the overall process control of development plan procedures. These include a web interface as an information overview for all ongoing processes, partially automated reporting functions and detailed task lists for process planning and control. In addition, the integrated time planning tool enables planners to forecast the course of the procedure at the beginning of the process, which often takes several years, and makes the process controllable and verifiable at an early stage. As a result, the cockpit, as an access and user interface for digital tools and assistance systems, enables the development plan processing department to have the necessary modules

and data automatically available for every step of the process, to carry out individual tasks semi-automatically and thus to process planning procedures more quickly as a result and to transfer them more quickly to the next process unit, the digital building application procedure, in the cycle of the digital process chain.

CoSI is map-based planning and visualisation software for sustainable neighbourhood development and brings together participants from district offices, public authorities and neighbourhoods at an electronic planning table. By networking those involved more closely and preparing the data basis, it supports the analysis and planning of, for example, daycare centres, public spaces, family support, senior citizens' assistance, maintenance of green spaces, health prevention, safe routes to school, mobility or inclusion. CoSI is used in this function within the framework of the urban neighbourhood initiative Urbanes Leben (QuL). The objective of the QuL is a holistic, interdepartmental strategy to strengthen social cohesion.

In the QuL, flanking housing construction, the goal is to strengthen urban infrastructures and to give a socio-spatial orientation with stronger integration of assistance systems. CoSI provides the necessary digital basis for this and can be connected to other important tools such as the digital participation system (see 2.4.1, Participation and Involvement in the Digital City).

Building Information Modelling (BIM)

The Senate will introduce the digital working methodology Building Information Modelling (BIM) in all public organisations involved in construction in Hamburg in order to bring together all relevant building data in an intelligent building information model ("Digital Twin") over the entire life cycle of a building (design, construction and operation). Digital Twins are digital replicas of material objects (such as buildings, streets, bodies of water) or immaterial process chains (such as administrative procedures, citizen participation, and traffic control). They are made up of data and algorithms and can be connected to the real world via sensors. Experience in the international environment shows a very high potential with respect to cost savings and transparency as well as schedule reliability in project implementation.

The goal of the six Hamburg BIM control centres established in 2019, is, among other things, to introduce uniform and citywide BIM standards/BIM technologies and to expand the range of training programs for Hamburg's public authorities and implementation agencies. A central programme management unit at the Hamburg Port Authority (HPA) coordinates the projects and pools the results. With its BIM activities, Hamburg has already taken on a pioneering role throughout Germany. Hamburg is currently successfully piloting BIM across all modes of transport in 25 projects. Further projects, also in building construction, are in preparation.

Photo: Hamburg Port Authority



Digital Urban Twin

In addition to the intelligent building information models described above, Hamburg plans to build a Digital Twin of the entire city, the Digital Urban Twin (DUT). One technical basis for this is, among others, the Urban Data Platform, which is already networking, integrating and making urban data available (see 2.1.2, Urban Data Platform). With a view to a further increasing the number of data sources, the DUT will help in the overall urban planning process to make decisions and lower costs, as future challenges can be simulated and mapped. Through perspective networked life-cycle management of the technical infrastructure in the DUT,

more than just construction measures can be optimised. At the same time, potential interactions of urban life (traffic, construction sites, weather conditions, events) could be simulated and taken into account in the DUT through the integration with other data sources (e.g. DigITALL). The case-by-case development of prototypes and simulation models would become obsolete.

As a dynamic, virtual, interactive 3D city model and collaborative city data platform, the DUT will be used by experts and citizens alike.

The Strategic Development Area "Data" Includes the Following Topics and Projects:

DATA

The Contact Point for Urban Data Usage

The Urban Data Hub is the organisational unit through which the Urban Data Platform is brought to life. The hub operates the data platform, develops it further, organises and standardises the technical data and process interfaces and enables the connection of the procedures of urban actors. It also further develops the data ecosystem within and outside the administration.

Data Governance & Open Data

Data-driven projects and applications need uniform guidelines, standards and processes for the systematic use, networking and processing of urban data resources both in the Urban Data Platform and in other systems. Within the framework of data governance, Hamburg, together with its urban partners within and outside the administration, will gradually be formulating this and establishing binding guidelines and standards.

In addition to a high level of data protection and freedom of information, Hamburg also promotes the openness of administrative data (open data) and, in particular through the Hamburg Transparency Act and its implementation in the form of the transparency portal, continuously contributes to ensuring that the relationship between citizens and the state is characterised by trust and a lived culture of openness.

Cockpit for Digital Urban Land Use Planning (DiPlanung)

DiPlanung integrates the previously separately operated digital tools for urban land use planning in a central web interface. This merges these tools in a single system, enabling networked viewing of the previously separate areas. DiPlanung is developed in the Ministry of Urban Development and Housing in cooperation with the State Agency for Geoinformation and Surveying.

Cockpit for Urban Infrastructure (CoSI)

CoSI is map-based planning and visualisation software for sustainable neighbourhood development. It brings together participants from district offices, public authorities and neighbourhoods at an electronic planning table, in order to provide support in the analysis and planning of daycare centres, maintaining green spaces or family support. CoSI is being developed by the State Agency for Geoinformation and Surveying in cooperation with the CityScienceLab of HafenCity University on behalf of the Hamburg-Nord district office.

Digital Urban Twin and Building Information Modelling

Hamburg plans to gradually create a digital model of the entire city: A "digital twin", the Digital Urban Twin (DUT). As a dynamic, virtual, interactive 3D city model and collaborative city data platform, the DUT will be used by experts and citizens alike. Through simulation and modelling, the digital model can help to prepare decisions, make better informed decisions and perspective save costs.

An important component of the DUT is the digital working methodology Building Information Modelling (BIM), which the Senate will introduce in all public organisations involved in construction in Hamburg. Through BIM, all relevant building data over the entire life cycle of a building (design, construction and operation) are combined in an intelligent building information model. To this end, six BIM control centres with specific BIM focal points have been set up at the Hamburg Port Authority, the State Agency for Roads, Bridges and Waterways, the Ministry of Urban Development and Housing, the State Agency for Geoinformation and Surveying, HOCHBAHN and HafenCity University.



Digital Administration

Citizens and other actors in urban society will initially encounter the Digital City where they are directly involved with the administration. If they wish to submit applications, request documents or make use of other administrative services. This digital administration is an important figurehead when it comes to the user- or citizen-oriented design of digitalisation and naturally also represents the internal working methods in ministries and departments. For this reason, the structure and task portfolio of the Department of IT and Digitalisation (ITD) has placed a special focus on the contemporary and future-oriented digitalisation of Hamburg's administration: For example with the DigitalFirst program, its clear commitment to consistent user orientation and the establishment of a modern technical basis for the development and mapping of online administrative services for citizens and companies. To ensure that digitalisation does

not get stalled at the citizen's interface, the public authorities and district offices are also adapting and further developing internal administrative processes and IT procedures.

In addition, further focal points are the always necessary legal support for digital projects as well as the associated cooperation between the federal and state governments, especially in the IT Planning Council. ITD's task programme also includes the further development and supply of employees with digital work equipment (e.g. electronic files, work flows and committee folders or workstation equipment with notebooks). In addition, ITD supports the public authorities via the "project pool" with personnel resources for digital and IT projects, administers the city's central IT budget and is responsible for another important future field in the form of urban data management.

User-friendly Services for the City

Citizens' and companies' expectations of the Hamburg administration have changed. Customers expect the administration to also use digital technologies for its range of services, as is taken for granted in many other areas of daily life.

With the DigitalFirst program, Hamburg is pursuing the goal of rethinking processes in user administration from the ground up, and in full: From a comprehensible user interface to the administrative processes behind it, the entire process is being digitally redesigned (end-to-end digitalisation). This is done along four guidelines:

- ➔ Communication with the administration is primarily digital.
- ➔ Proactive administrative action should enable services to be provided without the need for an application or other form of participation.
- ➔ Extensive automation should also relieve the burden on employees and enhance the efficiency of the administration.
- ➔ Once-only principle/reduction of data input.

By reducing the amount of data having to be entered, customers of the administration should not have to re-enter information that they have already provided in a contact with public authorities in a further procedure (once-only principle). Access to the data is logged without exception and users can see at any time who accessed their data, for what purpose and at what time. Currently, more than 30 administrative services are available online via the new service portal.

Under the Online Access Act (OZG), all administrative services will be available digitally by 2022. Hamburg is actively promoting the exchange of design and development results with other states (see 1.1, Where We Are Today). Overall, DigitalFirst and the Online Service Infrastructure (see 2.1.3, Online Service Infrastructure) as the technical basis form the central starting point for the implementation of the OZG in Hamburg.

In addition, it is important to look at municipal services beyond the core administration (e.g. of municipal companies) from a more citywide, user-friendly perspective.

Automation of Internal Administration

In addition to the potential offered by new processes, new software standards and technical innovations, especially in existing IT processes, also offer the potential for efficiency increases and process optimisation. The Hamburg administration uses about 800 IT specialist procedures to perform its tasks, including IT specialist procedures to support schools, police services, customer service in district administration and internal administrative work, such as human resources management for approx. 71,000 employees and 63,000 pension recipients. At ITD, therefore, in addition to the responsible IT units in the public authorities and state agencies, a separate area of competence is being created to support the future design of specialist procedures and joint identification of the potentials for automation.

Among the many innovations, Robotic Process Automation (RPA) and Artificial Intelligence (AI) offer the most recognisable application scenarios today. By making increased and targeted use of these technologies, Hamburg is able to automate formerly manual processes and facilitate the day-to-day work of its employees.

An example of AI is the daily handling of incoming documents that are processed by employees. With AI, automated content recognition of the documents can be performed and reply texts can be generated. Service personnel then only check the result. This saves having to perform many of the steps manually. This procedure is already being tested in several projects in the Hamburg administration.

Digital Budget Control (ERP 4.0)

EnterpriseResourcePlanning(ERP)refers to the planning and control of resources, products and processes with regard to the purpose of an organisation.

As part of the project "Further Development of Digital Administration and Digital Budget ERP 4.0", the Ministry of Finance is adapting the entire ERP system to meet today's requirements for modern software for budget preparation, management and accounting. The operative business is organised more economically and the acquisition and processing of information is improved. The ERP 4.0 project aims to achieve the following goals:

- ➔ Extending the possibilities for results-based management and control
- ➔ Reducing manual activities in the context of document processing
- ➔ Reducing the complexity of structures in budget planning, plan execution and financial statement preparation
- ➔ Modernising the internal control system in the context of the management of budgetary resources
- ➔ Providing digital services for the customers, citizens and business partners of the Free and Hanseatic City of Hamburg,
- ➔ Open, simple, transparent, interactive and always accessible budget information and its evaluation

➔ Automation (digitalisation) and standardisation of business processes in the budget system, especially in accounting,

➔ Improved options for control by means of a standardised electronic reporting system

The existing ERP system landscape will be further developed and migrated to new hardware and software technologies in a future-proof manner in order to enable integrated overall control of the budget. Migration of the entire ERP system to the new SAP HANA database architecture should lead to significant performance improvements and more extensive evaluation options. In addition, a business system landscape will be set up that supports the preparation of the budget as well as budget management and reporting in a simple and intuitive manner and allows virtually complete electronic processing. A management information system (MIS) for resource management in the form of a reporting portal is intended to provide an efficient, fast and high-quality source of information relevant to decision-making. In the associated data warehouse, largely all decision-relevant budget data from the operative specialist procedures will be loaded automatically and in a standardised form and made available to the reporting system for systematic analysis. The interoperability of budgetary and financial data and the connectivity of the ERP system to the Urban Data Platform (see 2.1.2 – A Platform for Urban Data) will further promote the smooth and efficient exchange and linking of budgetary and operational data in the city.

The number of transactions to be processed manually in invoice receipt will also be reduced. Electronic invoices have already been processed in Hamburg for four years – in 2018 more than 100,000. In view of these very large volumes, the city is already benefiting from electronic and digital invoice processing. Part of the project is the general digitalisation of incoming mail.

The ERP 4.0 project will therefore also include the optimisation and further automation of the accounting system. In this context, DRiVe (Digital Accounting in Administration) bundles various applications in accounting to support bookkeeping. In this context, the number of transactions in invoice receipt being manually processed will be reduced and productivity in document processing increased.

Technical Operations

The basic prerequisite for digitalisation is reliable and secure operation that also meets future requirements. Here, Hamburg is relying on strategic cooperation with IT service provider Dataport. Today, 24,000 workstations are being centrally managed by Dataport. This service includes the entire life cycle of end devices as well as the provision of software, peripherals and central services such as mail, video or telephone communication. The operation of end devices by Dataport is being consistently expanded. This applies both quantitatively, by extending the services to other parts of the organisation, and qualitatively – for example, by extending them to mobile devices such as smartphones or tablets.

Furthermore, the digitalisation of receivables management, the modernisation of local payment processes (cash optimisation), the creation of a uniform system landscape and the evaluation of the law on the strategic reorientation of the budget system (SNH law) are parts of the ERP 4.0 project. They are all essential prerequisites for the creation of an integrated electronic and accounting integrated budget preparation, management and accounting procedure.

Current development priorities in cooperation are high and continuous availability (even outside traditional office hours), complete independence of location as far as possible and the continuous expansion of data and information protection. Technical solutions based on AI are used to find anomalies, identify threats by evaluating them and, as far as possible, take automated measures. In addition, it will be ensured that the IT resources for the administration are as far as possible at the level of technical development and are offered competitively in order to enable the most modern administrative action in the future.

2.3.4

The Workstation of the Future

The Hamburg administration is continuing its efforts to equip the workplaces of its employees appropriately in line with technological developments. Workplace design supports all employees in their activities and takes into account the experience they have in dealing with modern technology in their personal lives. The workplace is user-friendly, barrier-free and technologically up-to-date. It also meets the requirements of a modern communication culture and location-independent working and thus contributes to employee satisfaction. The requirements are currently being updated and gradually implemented with the broad participation of employees at various levels of the hierarchy.

The electronic file, document management systems, digital decision-making processes and a central collaboration platform (e.g. the FHH portal), which also integrates external partners, support employees in completing their tasks efficiently. In addition to providing the digital instruments, Hamburg is also focusing on improving the digital competence of employees with accompanying measures and continuous change management in order to increase usage. This aspect will be given even greater attention in the future.

In the context of the digital transformation, new cooperation structures are emerging. In order to be able to use them successfully, existing collaboration structures will be continuously developed further, e.g. the communication via chat or a modern task management system to create transparency, to share and find expert knowledge.

Even beyond “traditional” office work, far-reaching changes in processes will lead to a new range of tasks and the qualification of specialist professions in administration. Here, it is also important to ensure appropriate technological equipment to enable the most efficient completion of tasks. This includes first of all evaluating technological developments with regard to their suitability for use. For example, administrative engineers will use new technologies such as augmented reality (AR) and virtual reality (VR) and will be even more closely networked with each other, with technical infrastructure companies, engineering offices and construction companies. The transfer of large amounts of data, e.g. to and from construction sites, will require the use of 5G. In addition, the increased requirements from the environment of construction measures, such as online construction site information or planning visualisations, must be covered via new communication channels.

2.3.5

The Strategic Development Area “Digital Administration” Includes the Following Topics and Projects:

DIGITAL ADMINISTRATION

User-friendly Services for the City

By 2022, all administrative services will be digitally accessible under the Online Access Act. The DigitalFirst programme uses guidelines and standardised processes to ensure that user needs are the focus of the services being developed.

Automation of Internal Administration

New software standards and technical innovations hold the potential for increasing efficiency and optimising processes – even in existing IT processes. A competence area provides support in the future design of specialist processes and the identification of the potential for automation.

Digital Budget Control (ERP 4.0)

As part of the project “Further Development of Digital Administration and Digital Budget ERP 4.0”, the Ministry of Finance is adapting the entire enterprise resource planning system to meet today’s requirements for modern software for budget preparation, management and accounting in order to expand the possibilities for result-based management and control in the budget system.

Technical Operations

Hamburg relies on strategic cooperation with Dataport for reliable and secure technical operations. This will be further expanded. The current focus of development is on high and continuous availability as well as the continuous expansion of data and information protection.

The Workplace of the Future

Equipping the workplaces of all employees with modern technology was and remains a strategic goal. This includes all facets of everyday work – from electronic files and video telephony to the use of augmented or virtual reality in engineering activities. In order to make the best possible use of the digital instruments available, a current focus is on improving the digital competence of employees.



Photo: www.mediaserver.hamburg.de/GeheimtippHamburg

Transformation and Cultural Change

Digitalisation means change. And digitalisation is more than technology. Thus, the term digital transformation describes the comprehensive socio-cultural, organisational and institutional changes brought about by rapid and profound technological or "digital" progress.

To a considerable extent, they also affect existing living and working environments and change the network of urban actors. In order to be able to shape digitalisation in a holistic way, this transformative component must also be taken into account.

Participation and Involvement in the Digital City

The increasingly digitalised world opens up new opportunities, but also poses risks to participation and involvement. Ensuring participation includes enabling everyone to fully participate in the infrastructures and services of a society and thus to achieve an equal measure of both personal and professional opportunities. This also means not excluding anyone from social and societal processes. This requires not only the creation of suitable access to the services, but also communication appropriate to the target group and appropriate support at different levels.

For this reason, the following section focuses on institutional, organisational and personnel-related issues with which Hamburg would like to make positive use of this pressure for change in order to shape the digital transformation in the interests of the entire city, its citizens, companies, civil society and employees.

Hamburg takes this responsibility into account in many ways, for example by explicitly integrating a society/user perspective into all Digital Strategy activities and by consistently demanding and implementing policies to ensure accessibility and equality. In addition, Hamburg creates important prerequisites and conditions that make contemporary education possible in an increasingly digitalised world.

Photo: Behörde für Stadtentwicklung und Wohnen



Accessibility

Hamburg's digitalisation efforts are based on the principle of providing barrier-free access to all public online services. In particular, this also applies to the platform being created in the DigitalFirst programme, on which all online administration services will be made available. In order to ensure the accessibility of these services for all people with and without disabilities, Hamburg follows the specifications of the harmonised standard EN 301 549 and the recommendations of the W3C contained therein, the Web Content Accessibility Guidelines (WCAG 2.1).

The obligation of the public sector to make internet and intranet sites barrier-free, as formulated in the EU Directive 2016/2102, has been legally anchored in Hamburg and put into concrete terms in the "Regulation for the Creation of Barrier-free Information Technology for People with Disabilities" (Hamburg Barrier-free Information Technology Regulation, HmbBITVO).

Supported by a central "Design Toolkit", which includes guidelines on the language to be used as well as on layout and visual design issues, and a library of the components to be used (e.g. the text fields, date fields, buttons, etc.), the services are always consistently tested for accessibility, both in the conception and development phase and before going live.

The project "Hamburg's Online Contribution to Barrier-free IT" also introduces "easy language" and sign language into the online media of the Free and Hanseatic City of Hamburg. Together with people with disabilities, the specific needs are identified in order to make online media accessible to the target group.



Equality

Gender equality is an important aspect of participation and a cross-sectional, inter-agency and cross-ministerial task. The Senate's mandate in this regard can be found in the update of the Senate's Equal Opportunities Policy Framework Programme and the IT and digitalisation-related action goals contained therein are pursued by the responsible public authorities.

Exclusion mechanisms and gender hierarchies are in many cases still having an impact on the design of digitalisation. This is reflected, for example, in the fact that women are seriously under-represented in training and study courses and in areas and positions of particular importance for digital change. This means that websites and apps are still often designed from a "male" perspective. This also applies – with sometimes serious consequences because they are relevant for participation – to automated decision-making systems and services based on algorithms or artificial intelligence.

To ensure the non-discriminatory and equal participation of all genders in an increasingly digitalised world, it is necessary to ensure that gender inequalities and discrimination are not repeated or even increase. In order to counteract this, Hamburg relies on heterogeneous

design teams (i.e. increased participation of women) as well as diversity of perspectives (i.e. reflection of gender stereotypes). When filling vacancies, women should be given appropriate consideration in accordance with the HmbGleIG (see 1.2.3 Economy & Working Environments). Top priority is also given to a balanced composition of the relevant committees in the context of digitalisation efforts (see 2.4.6, Cooperation in the Digital City).

Websites and apps are designed so that all genders are equally addressed and have the same opportunities of access and usage. This concerns both the content and interactive user interfaces. The use of automated decision-making systems that evaluate persons or characteristics attributed to them are intended to ensure equal inclusion or participation without discrimination on the basis of gender. In addition to monitoring and evaluation of those automated decision-making systems in the context of which discrimination based on gender can be expected (e.g. in application procedures), this also implies the involvement of stakeholders from the field of equality. In order to process these steps in a targeted manner, an exchange between the relevant Senate departments and ministries will be included in the next iteration loop of the corresponding strategies of the ministries.

Citizen Participation

Designing a liveable Digital City also means knowing the wishes and needs of its citizens and involving them in the planning processes. With new technical possibilities, new ways of communication are constantly being created between Hamburg's citizens, political decision-makers and the administration. Used correctly, they narrow the information gap between laypersons and professionals and create space for a more intensive exchange of information among all actors, which ultimately benefits everyone. While citizens receive in-depth information, are able to discuss issues affecting them and help shape their city, those responsible for planning gain valuable insights into the requirements of each of the groups of people involved, which they can use to optimise their planning projects and to be able to implement broadly supported projects.

Current formats in the context of urban development show how effective citizen participation can be. The Digital Participation Project (DIPAS), for example, has developed a participation methodology that enables citizens to be quickly, transparently and comprehensively involved in urban planning. DIPAS combines the online participation tool of the Free and Hanseatic City of Hamburg with digital planning tables (so-called multi-touch tables) to form an integrated participation tool with no media discontinuity, which can be used jointly in informal participation processes in workshops of groups (such as in the context of municipal utility events on the development of the Grasbrook). Likewise, digital plans, maps and background information can be accessed and feedback given from home.

The system, which is designed to be open to all topics, enables information and informal participation on all

topics related to location and spatial planning of an urban, transport, environmental or social-space manner and in freely selectable areas of application, e.g. at the level of the city as a whole, or at the level of districts, city districts or building blocks.

Beyond the described fields of application in the context of classical urban development, digital forms of participation are finding their way into more and more areas worldwide. One of the tasks for the coming period will be to further develop the culture of planning and participation in Hamburg and to open up new ways of involving citizens in urban design processes.

A resilient discourse about the future of the city needs contemporary and reliable formats that give it the necessary space. In addition to the expansion of digital tools, it is particularly important to investigate which forms of participation appear suitable for specific issues and the resources and skills needed for this. Informal participation processes do not replace formal decision-making processes, but they can provide special support for them and thus promote not only the transparency and quality of individual projects but also that of government action in general.

In Hamburg, such information and participation procedures will be developed and tested with the involvement of the ministries, the district administration and the Department of IT and Digitalisation (ITD) and take existing formats into account. This will open up new opportunities for citizens to actively participate in the design of their Digital City and its administrative services, thus promoting a good and resilient culture of participation in Hamburg.

Digital Education for the Digital City

Digital Spaces can only be designed by people who have acquired the skills for living in the Digital World. In addition to the acquisition of basic application skills, this primarily involves digital skills, as described in the strategy of the Standing Conference of the Ministers of Education and Cultural Affairs of the States in the Federal Republic of Germany (KMK) "Education in the Digital World". Participation and co-determination in a Digital City are increasingly only possible for digitally competent citizens. To this end, it is important to teach in general education schools early on how students can work together with digital collaboration tools, for example, how to evaluate and organise digital sources or how to use digital tools for planning and reflection of learning processes.

Digitally competent pupils will be able to cope with the new demands placed on them in a Digital World in education, science, research and the labour market, among other areas.

In order to create the prerequisites for learning under the conditions of digitalisation in general education schools, the Ministry of School and Vocational Education (BSB) has set equipment targets for general education schools which will be achieved with the implementation of the Digital Pact for Schools. In addition to expanding the existing IT infrastructure, all classrooms will be equipped with powerful Wi-Fi and presentation technology. In addition, mobile devices will be purchased in primary schools at a ratio of device to pupils of 1:4 and in secondary schools at a ratio of 1:5. In all schools, these devices will supplement pupils' own mobile devices in the "Bring Your Own Device" (BYOD) classroom.

These technical conditions enable new pedagogical learning scenarios in which the potential for digitalisation can be used in the classroom. Here, the Ministry of School and Vocational Education (BSB) is developing

pedagogical-technical deployment concepts based on the above-mentioned equipment objectives, which will be available to all general schools. Innovative forms of spatio-temporal flexible learning are also being considered, which can be supported, for example, by using a learning management system.

School education under the conditions of digitalisation can only succeed with digitally competent teachers. At the State Institute for Teacher Training and School Development (LI), teachers are comprehensively qualified for learning with and via media in various training and further training events. Learning in the digital transformation is, for example, a fixed component in main and specialist seminars of the preparatory service, at specialist conferences, qualification series or internal school training. Established training and consulting services will be successively expanded to include innovative formats such as e-learning courses or blended learning formats.

The objective for vocational education is the acquisition of comprehensive competence to act in the context of digital work and business processes as an interdisciplinary cross-sectional task. This includes self-management, international thinking and acting and project-oriented cooperation.

Due to their proximity to the world of work, vocational schools are in the special situation that they have to strategically address the immediate requirements of digitalisation in occupational fields, the economy and the globalised world of work and develop suitable offers. Small and medium-sized companies in particular are facing major challenges in the digitalisation of the world of work, as they are unable to fully enable important training and further training content. Vocational schools also play a key role here as a place of learning in initial and continuing education and training.



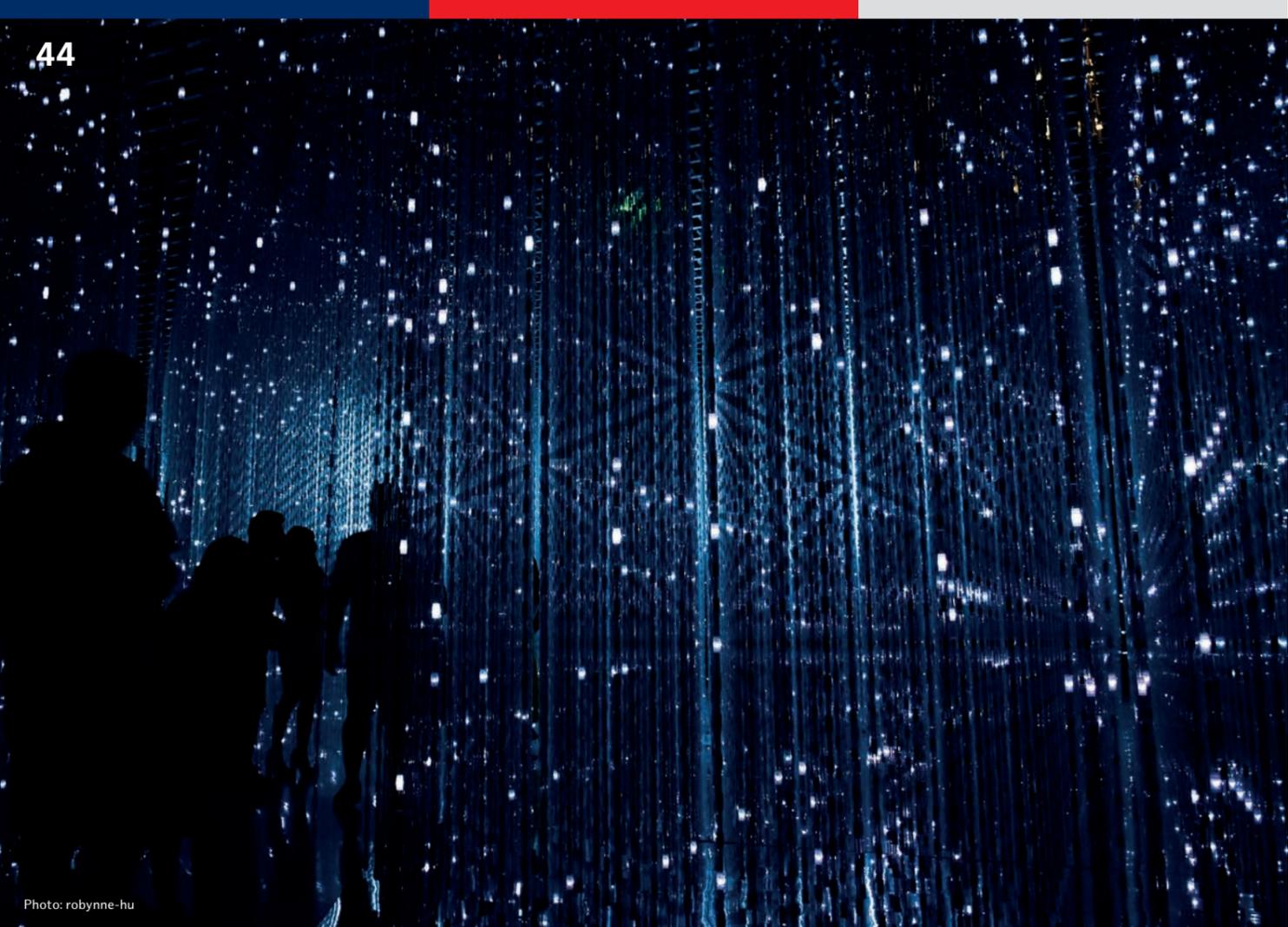


Photo: robyne-hu

House of the Digital World (Working Title)

With the “House of the Digital World”, Hamburg wants to create a novel and networked information, communication, discussion, learning and meeting place for everyone living in Hamburg. It should be low-threshold and open for new forms of learning and events – both analogue and digital. Such a central location in the city can make an important contribution to a sovereign life in the digital age and to shaping the future of society as a whole, offering a forward-looking programme and range of services supported by strong partners for all citizens of Hamburg – schoolchildren, students, researchers and teachers, founders, company owners – as well as for guests to the Hanseatic City.

It is planned that the “House of the Digital World” will be the new location of the Central Library and that one of the most modern libraries in Europe will be created here. The headquarters of the Hamburg Adult Education Centre will also be relocated there and will accommodate the comprehensive range of further education courses

offered by the adult education centres as well as courses designed specifically for digital education. Universities should also be given the opportunity to establish event formats in this building that make research transparent and enable them to experience the digital transformation. The offerings will be integrated into the programme and the “House of the Digital World” will be conceptually open to other actors and offerings.

The city’s entire urban society will thus be given a central space, which, with a public library, seminar rooms, forums, labs, lecture halls, reading rooms, co-working spaces, maker spaces, studios and other flexibly usable areas, will promote the design of digitalisation and other central social issues. The “House of the Digital World” will thus create a place that invites people to inform themselves, to browse and read, to be creative, to exchange ideas, to advance initiatives – whether analogue or digital, together with others or on their own.

Communication in the Digital City

Good accessibility to digital administrative services is a central factor for their acceptance and use, along with a high degree of user-friendliness and security of the services. The long-term goal is to be able to offer all services and information from a single source. The many and varied activities in the field of digitalisation are being presented to the public in Hamburg in a variety of ways. Authorities, public companies and other institutions present their projects or services within the scope of their professional responsibility or the fulfilment of their mission. A central, uniform representation of the urban digitalisation projects or a broad range of information for experts and interested citizens does not yet exist. In a first step, a systematic external presentation oriented to the Digital Spaces will

be created in the form of a website on the Digital City, which will offer as complete an overview as possible. With hamburg.de an established portal already exists, which will be developed further in the course of a general reorganisation so that it can comprehensively meet the requirements of a modern citizen-friendly city portal, in which all online services, service offers and information on urban matters are included and presented in a user-friendly manner. As part of a joint approach, an overarching marketing and communication strategy is being developed for the Digital City in cooperation with Hamburg Marketing GmbH, which will form the basis for an effective Hamburg presence at the national and international level.

A Transformation Agenda for the Hamburg Administration

The digital transformation in Hamburg’s administration will only succeed if it is viewed as a holistic process. Technology, organisation and personnel are equal parts of this change process. They are “thought of together” in Hamburg and comprehensive solutions are developed for them. The opportunities offered by digital technologies for the city and its employees will only be truly exploited if not only technological answers can be found, but also changes in people’s minds, culture and organisation. This process also includes accompanying it in the sense of comprehensive change management. And last but not least, it is important to actively discuss the values of the Free and Hanseatic City of Hamburg as an employer in a Digital World. This process must also succeed if the administration is to remain attractive as an employer in the future: for the employees already working here and those whom Hamburg wants to attract in the future.

The basic idea that digitalisation can only be successful in combination with organisational and personnel competence and requires new, agile formats of cross-departmental cooperation must be anchored and supported even more strongly in all departments. This is precisely where the digital transformation must be implemented and lived. This is a task for all municipal institutions, which will be supported in an appropriate manner by central bodies such as the Department of IT and Digitalisation (ITD), the Human Resources Department and the Ministry of Finance. It is a matter of

working together with the ministries and departments to ensure that a new learning culture can be created in which continuous learning is taken for granted and work and learning are more closely linked. To this end, different forms of work are offered that meet the individual needs of employees in their different phases of life. The administration strives for an open and transparent culture of cooperation and leadership. This also includes the spaces in which the employees work. Therefore, modern office environments are gradually being created that enable and facilitate agile working. In addition, additional services are being implemented to strengthen the innovative power of the administration.

The goal is to learn from each other in the city and to develop standards together with the ministries and departments. One task will be to show and advise on good technical (e.g. successful SharePoint solutions developed in a public authority) and non-technical examples from different areas, to convince people of their merits and to highlight them as role models.

A non-technical example is the “Mensch.Digitalisierung” event format. Within the framework of this initiative, the Ministry of Finance, the Human Resources Department and ITD are already working closely together. This format creates a framework in which employees can network, exchange information on their understanding of digitalisation, inform themselves about their official plans and projects and deal with current issues in

connection with change management and cultural change. "Mensch.Digitalisierung" will reach an even larger number of city employees in the form of a major event in 2020.

With regard to these issues, the Transformation Agenda intends to use existing structures and services and, in line with the above holistic approach, to jointly develop them further in a systematic and consistent manner and also to explore new avenues. This also includes strategically considering transformation topics, challenges and perspectives in the development and design of related tasks, roles and structures (see 2.4.6, Cooperation in the Digital City).

The following initiatives will initially be pursued within the framework of the Transformation Agenda:

The Human Resources Department is developing the basis for a new understanding of leadership. Various documents have already been drawn up on this subject in the individual public authorities, and there are principles on which to build in order to further develop a common "guiding principle". The goal is to develop a uniform, contemporary understanding of leadership that provides orientation for managers, enables employees to take greater personal responsibility and strengthens team-oriented, cross-organisational work. The basis for a new understanding of leadership also include the development of a modern culture of error and learning.

The Ministry of Finance, ITD and the State Agency Centre for Education and Training and Occupational Medical Service (ZAF/AMD) will jointly design and implement an innovation workshop and make it available for ministerial and district plans and projects. In this workshop, innovative approaches are developed and promoted through holistic advice and support, and cross-ministry and cross-departmental work is supported. The goal is to strengthen the innovative competence of employees in a protected environment. The use of the expertise of non-urban actors is also made possible here.

The Ministry of Finance will continue to expand its services for professionalising project management and supporting process management and supplement them with concepts and services for agile forms of organisation.

These services will be developed further in connection with ITD and, if necessary, also included in a version 2.0 of the ITD framework for digital strategies in order to support public authorities and district offices in the Digital Strategy process and the implementation phase.

The Ministry of Finance will further expand its existing consulting services to support public authorities in introducing modern office workplace concepts. The establishment of modern office environments is intended to support the cultural change necessary for digitalisation.

In addition to the user-oriented design of digital solutions and services, it is important to actively support their introduction and, if necessary, to accompany them on site so that employees can use these services as comprehensively and efficiently as possible.

The ZAF/AMD state agency is planning to develop a new dual course of study in administrative IT. In addition, the Public Management course and the training at the School of Administration will be reformed and expanded to include clear focal points in line with digitalisation. The instruments of human resources management will be successively digitalised and their content will also be adapted to the needs of digitalisation.

In addition, the city must make greater efforts at all levels to be an attractive employer in the digital age. Recruitment profiles, career paths and further training opportunities, among other things, must be fundamentally reassessed and re-implemented centrally and decentrally.

Finally, the manifold changes that accompany the digital transformation must be accompanied in terms of change management. This also requires centralised and decentralised resources and competences; which Hamburg will increasingly develop further within the framework of the Transformation Agenda. To this end, the ZAF/AMD state agency is further developing all further training courses for the city's employees with regard to the necessary digital skills. With its Hanseatic Academy, the ZAF/AMD state agency is developing new further training formats (e.g. management workshops) that enable managers to accompany change processes, network, exchange experiences and develop solutions for concrete problems.

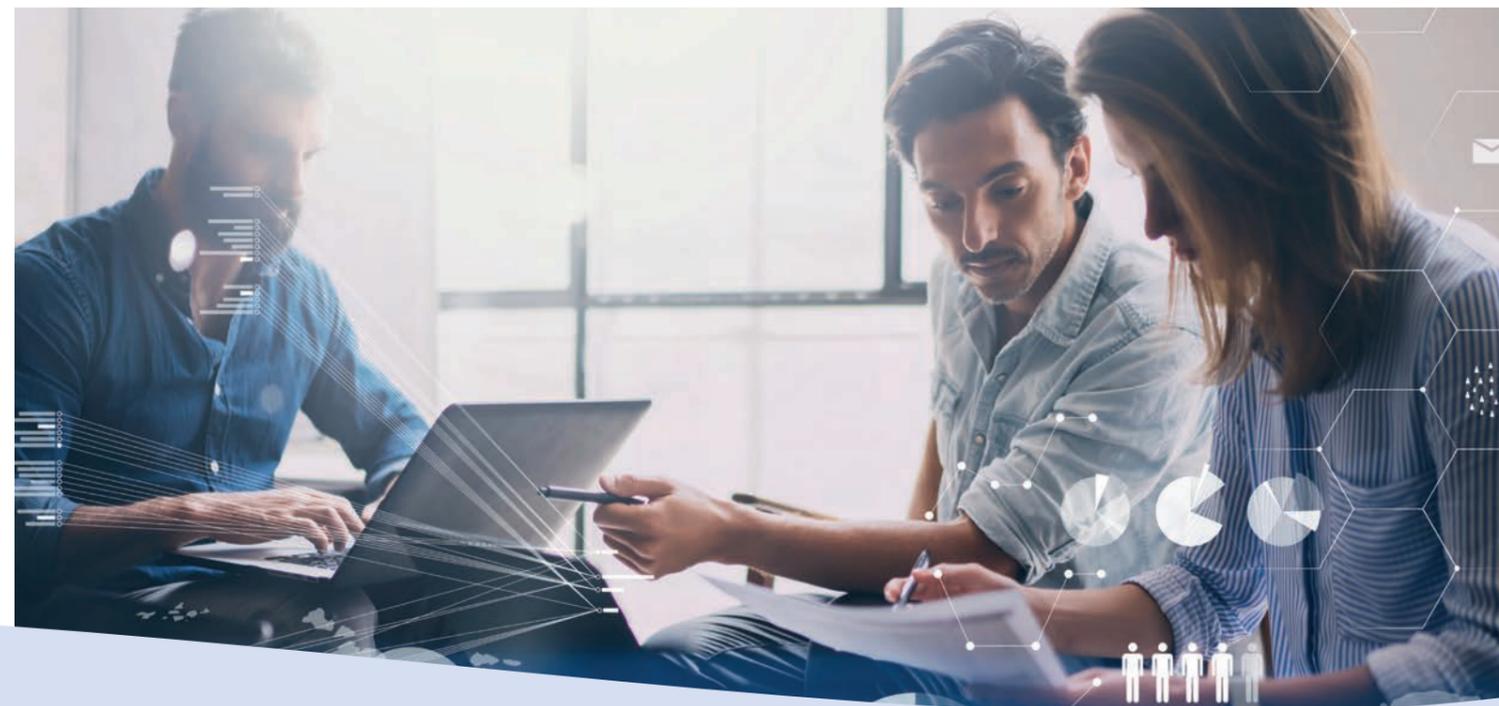
Cross-departmental Projects

In future, the various actors in the Digital City will work together even more closely and across disciplinary boundaries. After all, a key factor of success for solving the increasingly complex challenges of tomorrow is increased cross-departmental cooperation. Such a networked approach (see 1.2, Digital Spaces) goes beyond traditional disciplinary responsibilities, as several are affected or no formal responsibilities exist yet. This concerns the interdisciplinary work within and between the individual departments (e.g. public authorities, district administration, state agencies) as well as with other partners (e.g. public companies, universities). In order to be able to move even more cross-departmental projects, responsive, agile forms of organisation are decisive, which enable low-threshold and short-term cooperation on projects and plans. This must be tested in protected spaces, supported by management and implemented in the daily work routine.

This will be supported and promoted in Hamburg by creating a framework for trying out agile forms of organisation and evaluating their possible use on a wider scale (see 2.4.3, Transformation Agenda). This includes formally anchoring networking beyond the line more firmly, as it facilitates cross-departmental exchange and often supports the identification of suitable actors for a project. In addition to the idea of networking, it is of fundamental importance that, if necessary, project managers with interdepartmental competences can be quickly appointed in coordination with the responsible

decision-makers in order to be able to address inter-organisational issues better, faster and above all more effectively. In addition to the possibility of developing new support services, it is being examined how existing resources such as the IT project pool at the Department of IT and Digitalisation (ITD) or the project knowledge centre of the Ministry of Finance can also be used to take on such tasks.

Overall, the goal is to create starting points to enable more topics to be included which, due to the lack of traditional responsibilities, cannot easily be developed or implemented in the usual way. The following aspects in particular play a role in this, which are considered in developing the supporting framework: Projects and ideas must be able to be taken up and examined quickly before they reach project maturity. And it must be decided on this basis whether a project is pursued or rejected ("fail fast"). This is not always perfectly possible along traditional line functions, which can lead to promising project approaches not being pursued. It is also important to create opportunities that make it easier to establish authentic ownership for the respective project. Similarly, the allocation or (also centralised) assumption of financial, human and spatial resources may also have to be used in the case of cross-departmental projects. Finally, after completion of a project, a seamless transition to the line must be ensured to ensure the success of the project.



Cooperation Beyond the City Limits

Digitalisation does not end at city or state borders. Hamburg cooperates with other European and national partners in various projects of the Digital City and is also well networked outside Europe. These forms of cooperation and mutual exchange of knowledge between metropolitan areas will continue to play an important role in future, and will be further expanded and systematised.

In IT matters, Hamburg has been working actively together with the federal and state governments for many years and, most recently, as chair of the Conference of the Heads of Government of the Federal States (Prime Ministers' Conference, MPK), has set digitalisation as a key topic. Hamburg also assumes leading positions in working groups of the IT Planning Council. Hamburg's goal is to develop shared standards, applications and administrative agreements as well as necessary legal changes.

Since Dataport was founded, cooperation with the Dataport owner states has played a special role. Synergies are created in the operation of common applications and infrastructures. Infrastructures are being consolidated and joint multi-client solutions are being implemented in the owner states.

Hamburg is actively involved in strategically overarching issues, such as the cross-state strategy on electronic identities, the interoperability of company and citizen accounts, and register modernisation.

Federal, state and local municipalities are also working together in the context of the Online Access Act (OZG) in an overarching and division of labour, for example in the OZG cooperation with Mecklenburg-Western Pomerania on listed building permits and listed building tax assessments. Together with the Federal Ministry for Economic Affairs and Energy, Hamburg has taken the lead for the implementation in the field of business management and development (UFE). Hamburg will adopt solutions developed in other municipalities or states, if possible without Hamburg-specific adaptations and (as far as technically possible) use the implemented online services.

In the Online Gateway Project – a core element of nationwide infrastructure for the easy accessibility of administrative services – Hamburg is leading the project together with the Federal Ministry for Economic Affairs and Energy.



Cooperation in the Digital City

In addition to the perspective of the city as a whole (see 1.2, Digital Spaces), digitisation also requires changed forms of cooperation between the authorities, the institutions within their area of responsibility and district administration. If necessary, this also includes a careful, task-related adjustment of the respective internal organisation or the digitalisation-related understanding of roles in and between the respective institutions.

Such roles and structures are developed on the basis of this document in a consensual, inter-agency and cross-ministerial process under the leadership of the Department of IT and Digitalisation (ITD). Responsibility for the overall control and design of this process lies with the existing Steering Committee for Digitalisation.

General drivers for changing forms of cooperation and organisation are above all a more interdisciplinary inter-agency and cross-ministerial perspective, a holistic process view beyond traditional responsibilities, the interaction of people, organisation and technology, and the adoption of less hierarchy-based, user-oriented solutions. This is based on a new understanding of leadership and a modern culture of error. In addition, digital applications without any media discontinuities across public authorities require more standardised, better coordinated and more reliable processes than is required for individual, analogue, and in any case non-automated processing. At the same time, digital technologies are increasingly permeating even formerly purely technical subject areas. For this reason, the central and decentralised recording, evaluation

and control of digital and IT projects and their implementation is becoming increasingly important for the strategic orientation of public authorities, district administration and municipal institutions. Finally, a citywide orchestration of central and decentralised digitalisation and IT projects requires technically and personally resilient, comprehensive and responsive structures and roles in the public authorities.

The following sections of this chapter outline relevant starting points – but explicitly not necessary end points – for the orientation of the above-mentioned inter-agency and cross-ministerial process for the further development of cooperation in the Digital City. On the one hand, this concerns tasks, roles and structures in the ministries and departments. A committee structure must also be developed in order to be able to bundle in a suitable form the tasks and

roles being developed and, if necessary, mapped in the ministries. The goal is to develop efficient decision-making structures for the city as a whole.

The tasks, roles and structures as well as the structure of the committees described in the following are thus initially only a guideline for the inter-agency and cross-ministerial process. At the same time, however, this calls for the development of a more precisely defined assumption of functions within the ministries as well as in the committees to be set up and the resulting responsibilities and roles for the various digitalisation topics. Existing tasks, roles and structures in the ministries and departments as well as committees are explicitly taken into account in the inter-agency and cross-ministerial process (e.g. IT representatives, digital managers, IT management).

Tasks, Roles and Structures

The roles and structures being developed should be particularly suitable for meeting the following requirements and tasks:

Clear Responsibilities

The goal is to appoint a person responsible for all digitalisation and IT projects and the digitalisation strategy of the public authority from a portfolio perspective. It represents the public authority in these matters externally and within the Urban CDO Board and has direct access to management of the public authority. Direct project responsibility remains with the each of the responsible technical departments.

Decentralised Portfolio and Implementation Management

Depending on the size of the digitalisation and IT portfolio of the public authority, a structure (e.g. a project management office) may be required which records, evaluates and controls the digital and IT projects in planning, development and operation from an overview portfolio perspective. For the monitoring and prioritisation of projects of particularly strategic relevance, an interdisciplinary, inter-agency or cross-ministerial committee can be set up in the public authorities, in which the building management will also be involved (Digital Portfolio Steering Committee).

Innovation Orientation and Interdisciplinary Coordination

Rapid progress in digitalisation also depends on the ability to take up innovative approaches at short notice and to move them beyond or alongside traditional subject classifications. Suitable structures must also be

created for this purpose. It is also important to keep an eye on the various digitalisation initiatives and sites in the city as well as relevant actors in each Digital Space.

In addition, human resource and organisation-related issues are of central importance in the digital transformation (see 2.4.3, Transformation Agenda). With a view to the inner-authority design of digitalisation-related change processes, appropriate capacities must be used, re-prioritised and/or expanded and, in line with the above understanding of transformation, moved together with digital and IT issues on an equal footing and in a holistic manner. In order to ensure this, appropriate regular structures and decision-making channels between the respective responsible departments must be set up in the buildings.

If the human resource and organisational issues are not the responsibility of the respective member of the CDO

Committees

In addition to the further development of existing decentralised tasks, roles and structures, a committee structure that is as lean as possible will be developed and subsequently set up as part of the inter-agency and cross-ministerial process. In this way, the Digitalisation Steering Committee is flanked and thus the digitalisation strategy of the Senate, its inter-agency and cross-ministerial technical structure and the urban Digital Strategy

Digitalisation Steering Committee

The Digitalisation Steering Committee will continue to act as the steering group for the Senate's digitalisation strategy. The committee, which has been meeting in this form since September 2019, includes all members of the Board of State Secretaries, the district administrations responsible for digitalisation, the Dataport Board of

Urban CDO Board (Working Title)

The Urban CDO Board prepares the decisions of the Digitalisation Steering Committee and is responsible for the technical design and further development of the Senate's digitalisation strategy including the technical investment decisions associated with it. The ministries are each represented individually, the district administration by a leader and the Budget and Task Planning Office of the Ministry of Finance additionally by

Board, the role of a transformation manager must also be defined. The latter is then a member of the Urban Change Board. The member of the CDO Board and the Change Board of a public authority are responsible for a coordinated position of the public authority in both bodies and have established continuous exchange formats.

Appropriate structures and processes must be established for the further design, coordination and control of Hamburg's diverse digital and IT projects (Urban Digital Strategic Portfolio). These must be used, for example, to ensure inter-agency and cross-ministerial comparison with regard to the milestone planning of important projects or the development of important specialist procedures.

portfolio are efficiently controlled and supported. A final decision on the differentiated structure of the individual committees (e.g. composition, selection of representatives of the ministries) will be made in the course of the inter-agency and cross-ministerial process. In this context, a balanced composition of the committees from a gender equality perspective is strongly sought.

Directors, the Hamburg Commissioner for Data Privacy and Freedom of Information as well as the leading trade union organisations. It is chaired by the head of the Senate Chancellery, and its office is located at the Department of IT and Digitalisation (ITD).

the Budget Director. Competent representatives from state agencies or municipal companies at management level may be invited to attend in coordination with ITD and the responsible public authority. The Dataport Board of Directors is also represented. It is chaired by the Chief Digital Officer of Hamburg (CDO), and its office is located at ITD.



Urban Change Board (Working Title)

In coordination between the Ministry of Finance, the Human Resources Department and ITD, an Urban Change Board will be set up and its exact structure will be elaborated. The Change Board is responsible

in particular for the strategic further development of human resource and organisation-related issues of the digital transformation of the administration.

Digital City Coordination Round

The objectives and composition of the Digital City coordination round (see printed matter 2015/14) will be realigned. ITD will make a proposal to this effect and convene the Committee in a new form. As the digitalisation topics, which are more strongly influenced by the public authorities and districts, will be included in the above-mentioned committees, the reorientation

goals in particular to make better use of the innovation potential of municipal companies for the Digital City. Among other things, the goal is to strengthen mutual exchange, address common technological topics (see 2.1.1, The "Digital Backbone") and develop and sharpen the citywide perspective on funding projects.

The Strategic Development Area "Transformation and Cultural Change" Includes the Following Topics and Projects:

TRANSFORMATION AND CULTURAL CHANGE

Accessibility and Participation

In order to promote accessibility and the participation of everyone in public online services, Hamburg follows European guidelines and recognised design guidelines in the DigitalFirst program. In addition, the obligation to design barrier-free intranet and internet websites was legally anchored in the "Regulation for the Creation of Barrier-free Information Technology for People with Disabilities". "Easy language" and sign language in the online media of the Free and Hanseatic City of Hamburg will be introduced in the project "Hamburg's Online Contribution to Barrier-free IT".

Equality

In order to ensure that everyone participates on an equal footing and without discrimination, Hamburg relies on heterogeneous design teams and a variety of perspectives. Websites and apps are designed in terms of content, appearance and handling so that all genders are equally addressed and have the same equal opportunity of access and use.

Citizen Participation

In the Digital Participation Project (DIPAS), the Ministry of Urban Development and Housing (BSW), the State Agency for Geoinformation and Surveying (LGV) and the CityScienceLab of HafenCity University Hamburg (HCU) are combining an online participation tool and digital planning tables to create an integrated system free of media discontinuities for informal citizen participation. It is continuously being further developed in practical cooperation with other plans and projects of the city and expanded by new functions.

House of the Digital World (Working Title)

With the "House of the Digital World", Hamburg wants to create a novel and networked place for information, communication, discussion, learning and meeting for everyone living in Hamburg. It is planned that the "House of the Digital World" will be the new location of the Central Library, creating one of the most modern libraries in Europe. The headquarters of the Hamburg Adult Education Centre will also relocate there and

will accommodate the comprehensive range of further education courses offered by the adult education centres as well as courses designed specifically for digital education. Universities should also be given the opportunity to establish event formats in this building that make research transparent and enable them to experience the digital transformation.

Communication in the Digital City

hamburg.de is being developed further into a modern, citizen-friendly portal site. As the basis for an effective Hamburg presence on the national and international stage, a comprehensive marketing and communication strategy for the Digital City is being developed.

Transformation Agenda for the Hamburg Administration

The digital transformation of Hamburg's administration will only succeed if it is viewed as a holistic process. Technology, organisation and human resources are equal parts of this change process. They are "thought of together" in Hamburg and comprehensive solutions developed for them. This is a task for all municipal institutions, which is supported in an appropriate manner by central bodies such as ITD, the Human Resources Department and the Ministry of Finance. Examples of this are the "Mensch.Digitalisierung" event as well as the conception and development of an innovation workshop for the Hamburg administration – both initiatives in which the above-mentioned actors and the ZAF/AMD state agency are already cooperating.

Cooperation in the Digital City

The manifold changes brought about by digitalisation require a careful, task-related adjustment of the digitalisation-related understanding of roles in and between the respective ministries and departments. For the Digital Strategy of the Senate, its inter-agency and cross-ministerial technical structure and the urban Digital Strategy portfolio, committees are therefore developed and implemented in a consensual process between ministries and departments.

Innovation

As a Digital City, Hamburg emphatically pursues the goal of understanding and using innovations as opportunities. In order to continue doing so and to do justice to the multi-layered changes of the digital transformation, the starting point for a comprehensive, cross-departmental understanding of innovation is outlined below. This takes into account not only a technical component but also other components brought about by digitalisation.

As a result, innovations related to processes and business models in particular are increasingly coming into focus. In order to maintain and strengthen its innovative and renewal power, this understanding must not only be accepted in Hamburg by private sector actors – on their own responsibility, of course – but the Hamburg administration must also act accordingly. This applies to their openness to change both internally (see 2.4.3, Transformation Agenda) and in the city – either with specific projects or by designing suitable framework conditions for innovation (see 1.2, Digital Spaces and 2.5.3, CityScienceLab). Innovation is and will therefore remain the

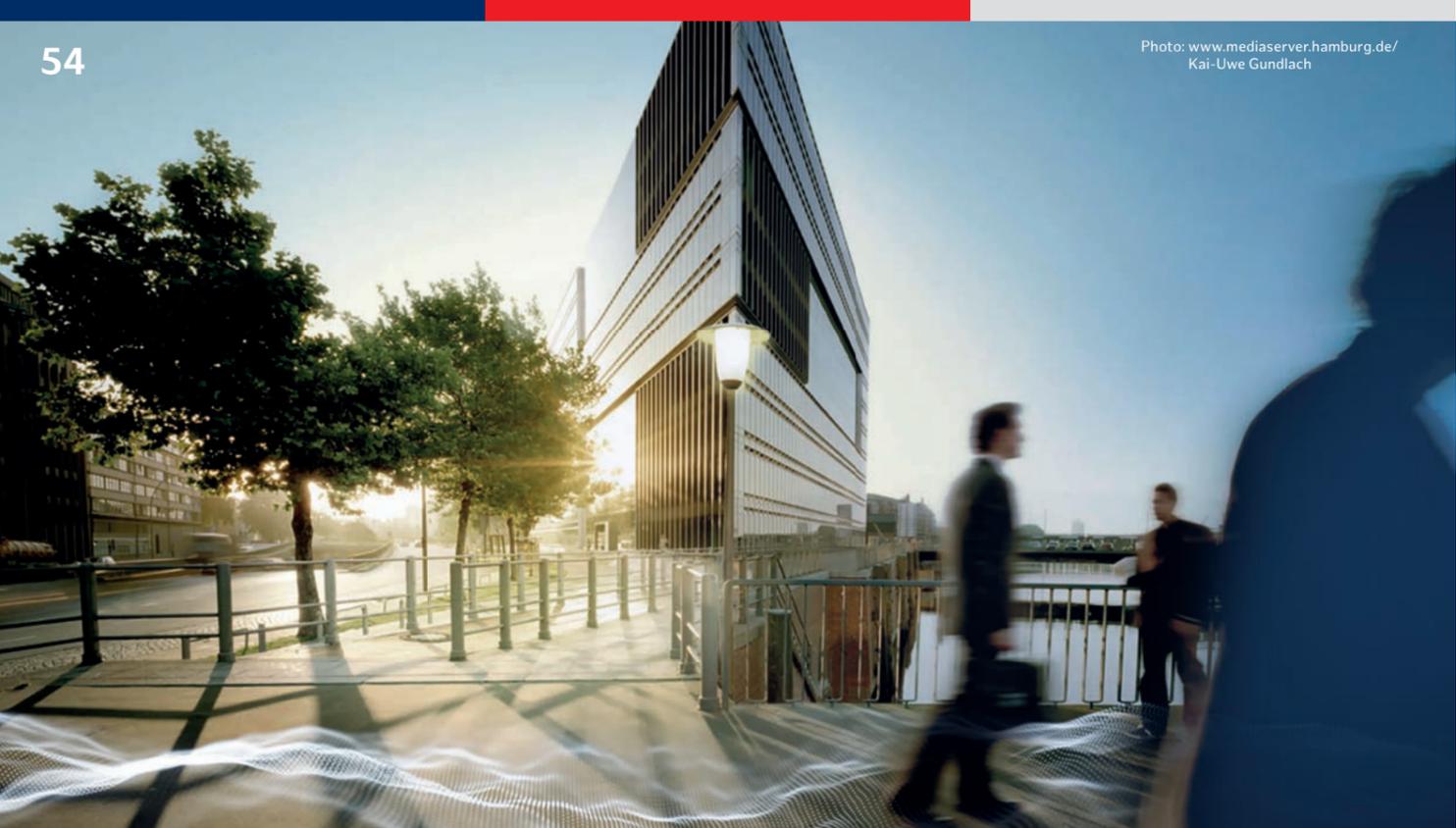
strategic core theme of the Digital City and will be considered accordingly in the further design of the strategy and the implementation components. In addition to the administration, it will be important for the location to have a broader understanding of innovation. Beyond traditional product innovation and the incremental improvement of existing products, the focus will be on process innovations, the development of new services or completely new business models, as well as new service offerings and broader opportunities for interaction with customers and partners, and the recalibration of instruments and methods of location development.

Hamburg also wants to establish new methods of gaining and transferring knowledge outside the realm of traditional business and research development. With these, Hamburg can solve specific local challenges, strengthen the location as a place for business and science, but also fundamentally contribute to the sustainable digital transformation of urban living spaces. Last but not least, more intensive involvement of the district level is a further success factor in this context.

Understanding Innovation

With the strategic guidelines of the Innovation Alliance from 2010, the Senate has already drawn up a coherent image of innovation for Hamburg together with the urban actors through an innovation strategy. Through newly established structures and business and science policy instruments, it has been possible in recent years, both within and outside the administration, to implement innovation in the Digital City and to improve the transfer of application-oriented research into the economy and society (e.g. industrial clusters, university clusters, transfer centres, hubs, accelerators, and start-up support). The design of the Digital Spaces and the digital projects of the public authorities have also made a significant contribution to this (e.g. in the area of Intelligent Transport Systems).

In future, the Hamburg innovation strategy will be based on a relevant, new and broader concept of innovation. Innovations should no longer be thought of only in terms of technology, products or processes. Rather, social and cultural innovations are also moving into focus and gaining in regional and social relevance. For Hamburg, heterogeneous networks and ecosystems in particular will form the basis for successful positioning in the global competition for innovation, which is why Hamburg wants to systematically initiate and structure these network relationships. Physical proximity and personal relationships will be essential prerequisites for providing innovation-relevant actors with access to knowledge of new solutions from various disciplines and industrial sectors. The innovative strength of the location



will be largely determined by whether and how flexible structures can be used to react quickly to innovation-relevant developments. Approaches such as these also play a central role in Digital City projects and can in turn

encourage formation of the network. This also includes promoting innovation within the Hamburg metropolitan region.

2.5.2

Science-related Digitalisation Projects

Education and research institutions have always been driving forces for innovation and transformation by transferring their knowledge and ideas to the economy and general public – into the city and beyond. Climate, health, high-performance computing, city modelling – this is only a selection of the numerous fields in which Hamburg's scientific institutions, e.g. the University of Hamburg, are active. For example, through data analysis and processing and research on possible AI applications, the major emphasis and the necessary prerequisites for Hamburg to be perceived as a location for innovation will be created, also with regard to digitalisation.

Hamburg wants to enable, accompany and help shape the digital transformation in and with the scientific landscape in the city. Much has been achieved in recent years in cooperation with the universities and institutions

by funding cross-institutional digitalisation projects and programmes such as Hamburg Open Science (HOS), Hamburg Open Online University (HOOU) and ahoi.digital. The appeal of these initiatives already extends far beyond university and city boundaries. We must continue on this path together and intensify our commitment.

The experience gained from the three initiatives demonstrates the following: The key to successful digitalisation lies in the balance between reliability and mobility. Together with Hamburg's universities and research institutions, a framework will be created for innovative digitalisation projects that can be implemented quickly and developed further in a sustainable manner. In this way, innovative ideas from research and teaching benefit everyone: the participants themselves, the residents and the city's economy.

2.5.3

CityScienceLab

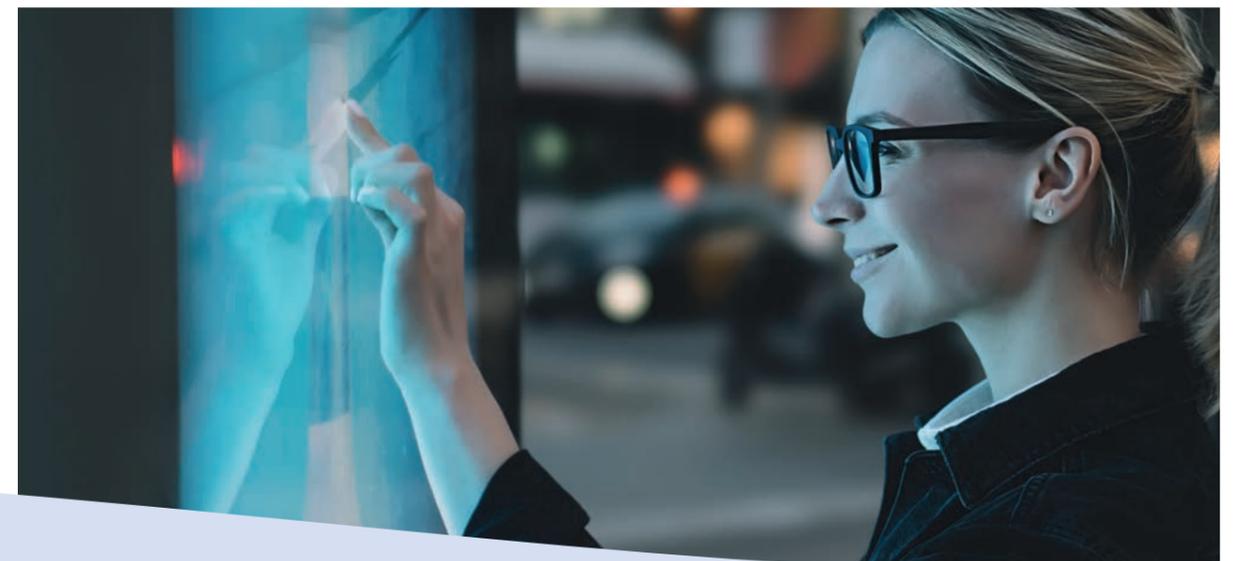
The digital transformation is changing cities and entire societies throughout the world. The CityScienceLab (CSL) at HafenCity University, which was initiated as part of the Digital City 2015 strategy, is one of the central scientific research units in Hamburg, providing scientific support for the high dynamics of this change. Since then, the CityScienceLab has been promoting interdisciplinary, inter-agency, cross-ministerial and cross-departmental projects (see 2.2.1, Urban Data Hub) in an exemplary manner, also with collaborative approaches. The CSL has thus been and will continue to be an important actor in the creation and implementation of innovative projects in Hamburg.

The CityScienceLab envisions Hamburg as a "living lab" for the Digital City and, in cooperation with the Media Lab at the Massachusetts Institute of Technology, is researching how new approaches in fields such as urban planning, migration and mobility can be translated into practical applications and new urbanisation concepts.

The scientific profile of the team is strongly interdisciplinary, linking urban researchers and social scientists with software and IT engineers as well as planners and designers. A major focus of the projects is the translation of large amounts of data and complex issues into descriptive models and simulation tools. This was exemplified by the "FindingPlaces" project, in which Hamburg residents used an interactive city model to search for and discuss the suitability of places to accommodate refugees. In "FindingPlaces", a data-based analysis of properties in the Hamburg urban area illustrated complex urban interrelationships for cooperation between experts and non-experts and enabled public participation in the city's planning with the help of modern technology.

Currently, about 15 projects are being worked on in local and international consortia. Focal points of cooperation in the Hamburg context include the expansion of digital tools for participation processes (BWS/DIPAS, see 2.4.1, Participation and Involvement in the Digital City) as well as the data ecosystem (see 2.2.1, Urban Data Hub) and the data infrastructure (see 2.1.2, Urban Data Platform). Internationally – in synergy with the United Nations Technology Innovation Lab (UNTIL) and projects with the Society for International Cooperation – the solutions developed in the Hamburg context will be transferred to partner states and institutions.

The United Nations Technology Innovation Labs is an initiative through which the United Nations promotes the implementation of Sustainable Development Goals (SDGs) through technological innovations with a global network. The Senate set the sustainability goals in 2017 in the context of "Implementation of the Sustainability Goals of the United Nations in Hamburg", especially in the area of "Environment and City" (see printed matter 21/9700). For the Senate, the establishment of the first German UNTIL site in Hamburg in 2020 therefore not only strengthens the city's image as a location for innovation, but also underpins Germany's "pioneering role" in the concrete use of technological innovations at local level. Docked to the CSL, UNTIL can draw on a sustainable regional and international network and solid interdisciplinary expertise and benefits from access to applications that have already been developed and tested. UNTIL gives Hamburg the opportunity to put the issues of sustainability and public welfare orientation in relation to digitalisation at the service of the global sustainability agenda and to leverage the new potential for the Digital City Hamburg.



Hammerbrooklyn.DigitalCampus

In addition to the CityScienceLab, another place of digital change has been created in Hamburg. The “Hammerbrooklyn.DigitalCampus” is available to established companies from all industrial sectors, organisations and start-ups and will become a place for designers of digital change. Here, an experimental space is being created in which people can learn from each other and in which innovations can be implemented so that digital change in the city, the economy, science and society can garner real support. Innovative strength and start-up dynamism are decisive factors in securing the sustainability of Hamburg as an industrial location and are essential prerequisites for social progress. The Senate has lent its full-throated support to this project and is committed to networking Hammerbrooklyn with the other ongoing public and private digitisation initiatives in Hamburg. As a place for digital transformation, where companies, together with other partners, embark on an expedition into

the future, Hammerbrooklyn will be this platform and the initiator of an exchange of innovative thrusts and cultural change – and thus support the sustainability of companies in Hamburg. In addition to work areas, there will be a town hall, an auditorium, workshop, co-working, co-creation and catering areas, which will promote cross-sectoral innovation and allow new things to emerge.



Photo: www.mediaserver.hamburg.de/
Timo Sommer und Lee Maas

The Strategic Development Area “Innovation” Includes the Following Topics and Projects:

INNOVATION

Understanding Innovation

The establishment of a competitive innovation ecosystem is a decisive factor for Hamburg as an industrial location. This also includes taking a broad concept of innovation as a basis, which focuses on social and cultural innovations in addition to those related to technology and products.

fields such as urban planning, migration and mobility can be translated into practical applications and new urbanisation concepts. The establishment of the first German location of a United Nations Technology Innovation Lab (UNTIL) in Hamburg in 2020 further improves the city’s image as a location for innovation.

Science Digitalisation Projects

In order to accelerate the transfer of innovative ideas from research and teaching to business and society, a framework for innovative digitalisation projects that are quickly implemented and sustainably further developed will be created together with Hamburg’s universities and research institutions.

CityScienceLab

The CityScienceLab (CSL) envisions Hamburg as a “living lab” for the Digital City and, in cooperation with the Media Lab of the Massachusetts Institute of Technology (MIT Media Lab), is researching how new approaches in

Hammerbrooklyn.DigitalCampus

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Other Future Fields

The further development of the Digital City also includes keeping up to date with innovations and potential (technological) future fields. The diversity and pace of development often make it difficult to know whether contemporary issues, some of which are overrepresented in the media, are actually creating robust paths for urban development. Accordingly, key

technologies must be pursued on a scientifically sound basis and evaluated from an overall urban perspective. Hamburg will continue to do so in relevant fields – often supported by interaction with a variety of actors, e.g. the Federal Ministry of Education and Research. For example, with regard to the potential of such technologies and innovations for Digital Spaces.

Artificial Intelligence (AI)

AI applications are already playing an important role in many areas of life in our city. Examples of the economic use of AI can be found, for example, in mobility and transport systems (Intelligent Transport Systems, ITS) and in the early detection of diseases in the medical field. The EU and the German government published AI strategies as early as 2018. Against the backdrop of this first rough regulatory framework, Hamburg’s goal is to use AI as a cross-sectional technology and to promote its human-centric use across departments. It is still essential that people remain the focus of attention and that the rule of law is not undermined. Particularly in consideration of the findings in the report by the Data Ethics Commission of the German Federal Government, Hamburg also strives for high standards in the avoidance of any discrimination by AI, in ensuring the maturity and transparency of the algorithms used in each case, as well as legal certainty in dealing with AI.

this area is the transfer-oriented cooperation between the city, science and companies in the founding of the “Artificial Intelligence Center Hamburg” (ARIC). AI is also being tested and used in appropriate areas to support data-based and service-oriented administrative action in the performance of sovereign tasks. The Hamburg Services chatbot (“Frag-den-Michel”), for example, is based on a learning AI system and conveniently answers citizens’ questions about Hamburg’s administrative services at any time of day. The administration is also testing the use of AI in some areas to support the evaluation of objections, complaints and suggestions from citizens as well as tagging to assign metadata for electronic file management in a user-friendly way.

Taking these guidelines into account, the Senate will strengthen Hamburg as a location for science and business in the AI sector on a cross-sectoral and interdisciplinary basis. It will promote transfer-oriented heterogeneous ecosystems from science, established companies, small and medium-sized enterprises (SMEs) and start-ups. One example in



Photo: www.mediaserver.hamburg.de/
Hermes

Quantum Computing (Digital Annealing Technology)

Quantum computing is about to make the leap from vision to reality. The first major corporations are already using such technologies to solve a wide range of logic-based problems that cannot be solved using conventional computers. The benefits of quantum computers is their huge advantage in speed over conventional computational technologies. Fields of activity, for example in combinatorial optimisation, can be solved 10,000 times faster by quantum computer-like systems. Calculations that used to take hours are now possible in a matter of seconds and will thus become relevant for production. This so-called “digital

annealing technology” is based on conventional silicon-based chip sets, but on a very special computer hardware architecture. Wherever calculations with a large number of variables or possibilities arise, digital annealing is beneficial because it provides the necessary computing power and can process the relevant combinatorics. For example, it has the potential to strongly influence the future of the flow of goods and logistics, or to modify simulations for the construction of entire cities. Hamburg is therefore closely following the development and possible applications of this technological basis.

Extended Use of Cloud Technologies

Hamburg will make use of the possibilities of cloud technologies. However, at the centre of all considerations is always the preservation of the Free and Hanseatic City of Hamburg's digital sovereignty and respect for the European and German legal framework. Cloud technologies are services that enable flexible and targeted offers (e.g. a translation service) to be integrated into business processes or digital tools for work (e.g. a collaboration platform, office services or simple storage space). The services and tools provided in this way are not present on the local computer or server, but are figuratively outsourced to a digital cloud: The services are accessed or controlled via the internet.

Hamburg-based companies and organisations are active in the market for cloud as both suppliers and customers. Many business models and digital applications would be impossible without recourse to the cloud, such as digital mobility services or the "Kultur-Cloud" (a project on hybrid cloud technologies for Hamburg's cultural institutions). At the same time, cloud services also entail the risk of becoming dependent on a few large providers. In addition, companies and organisations must actively engage in shaping data protection and data security on their platforms and ensure the highest standards are permanently maintained. Cooperation and further development with Dataport plays a key role here as well.

Internet of Things / Big Data

Digital processes extend to all areas of human life and to an ever increasing number of mobile and stationary objects. This is resulting in the continuous growth of digital data, some of which are available in unstructured form in variety of formats (Big Data). Such data is not only produced by human behaviour but increasingly by networked and individual, intercommunicating technical systems (Internet of Things, IoT).

Urban Data Platform Hamburg. For modern cities such as Hamburg, the collection, processing and evaluation of IoT data will become an increasingly important instrument of urban management in future and is closely related to the topic of data (see 2.2, Data). It is necessary to promote the use of IoT data and Big Data for urban goals and the common good, while at the same time taking great care to ensure legal certainty for citizens.

Both fields are already playing a role in Hamburg in a wide range of private sector applications and also in the

Blockchain

Blockchain technology enables the permanent, encrypted and decentralised storage of digital information chains. The information is encrypted in the form of "blocks" and stored in all parts of the network. This technological approach results in a high level of security against any manipulation of the information stored in a block chain. It may therefore be potentially suitable for the secure mapping of any transaction chain (e.g. contracts, supply chains, authorisations) without the need of a trusted authority or central server. Against this backdrop, various applications of the technology will be discussed, the benefits of which for the Digital City will have to be evaluated on a case-by-case basis.

strengthening and supporting Hamburg as a location for blockchain and business with innovative ideas. The Senate promotes and supports the development of the Hamburg blockchain community and will continue the dialogue already begun with the various stakeholders (see also printed matter 21/17851).

Blockchain technology also has the potential to provide solutions for the existing challenges of sovereign tasks. In addition to the general orientation towards innovation in the Digital City, it must also be ensured when using blockchain technology that it is always the best technology for the intended solution to the specific problem and that its use is proportionate and conducive to achieving other urban goals (e.g. security, climate protection and sustainability).

Over the past few years, a lively and multi-layered blockchain community of companies, scientists and developers has established itself in Hamburg,





Free and Hanseatic City of Hamburg

Senate Chancellery

Department of IT and Digitalization

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