DCEx

Digital City Experts

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Imprint

This handbook was developed for the ERASMUS+ Project "Digital City Experts (DCEx)" Project Number: 2020-1-DE02-KA204-007745 by the Project partners: Future Place Leadership, IAL Marche, IHK Projektgesellschaft mbH, Schmiede Hallein, University of Tampere and Zentrum für Digitale Entwicklung GmbH.

Official name of the project: Digital City Experts – making administrative staff drivers for the digital era

Acronym: DCEx

Funding Programme: Erasmus+

Key Action: KA2 - Collaboration to promote innovation and share best practices.

Action Type: KA204 - Strategic partnerships in adult education

Project Number: 2020-1-DE02-KA204-007745

Agreement Number:

Starting date: 1. November 2020

Ending date: 30. April 2023

Duration: 30 months

Project website: https://digitalcityexpert.com/

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Introduction

Digital transformation is a certainty, but how it will unfold and what concrete impact it will have on our lives is one of the most uncertain questions of our time. It is influenced by a multitude of different, interacting social, political, economic, technological and environmental drivers. Deciphering the complex picture that emerges from the interplay of these current and future drivers will be one of the most important challenges for the EU and its success as a public administration (1).

Smart City is a generic term for holistic development plans that aim to make cities more liveable, efficient, technologically advanced, ecological, sustainable and socially inclusive, and to intelligently link these different areas. With the help of digital progress, a positive impact can be achieved in the analogue world. In this sense, the Smart City is understood as a digitally networked city. For the digital transformation necessary on this path, we need openness to new technologies and a strong sense of values and goals in order to be able to use them wisely and with foresight. Therefore, Smart City can only function through integrated urban development, in which the municipal challenges are also solved with the support of digital services and networking as well as with skilled and trained employees and HR managers working for municipalities (2).

Smart cities also advocate for sustainable and integrated urban development. The digital transformation offers cities, districts and municipalities opportunities to move in the direction of sustainability and promotes resource-saving, demand-oriented solutions to meet the central challenges of urban development. It should help these actors to recognise the opportunities and risks of future-oriented and responsible urban development at an early stage and to avoid undesirable developments and wrong paths (3).

Digital City Expert Project and its aims

Almost 60% of European citizens live in small and medium sized cities (4). These are the most dispersed urban areas in Europe. Moreover, small and medium-sized cities lack skills and knowledge, which is why these areas face greater difficulties in digitising processes and creating smart infrastructures.

The aim of the DCEx Project is to set up a European training- and knowledge platform that makes the digitisation of cities more tangible for administrative employees, administrative assistants as well as for stakeholders and citizens. The core of the training course is underpinned by a curriculum for training as a "Digital City Expert" with learning materials on relevant topics. Due to the rapid digital development, Smart City has to take on European dimensions as a concept and can only make sense in exchange.

This handbook serves to present the content and provide instructions, for instance how a Smart City Boot Camp can be implemented. Design thinking approaches are applied use to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test. In this regard, a schedule of the summer school and the content is drawn up in advance and then developed with the partners of the project.

The direct target groups are e.g. employees in municipal administrations (the digitalisation officers of the cities, chief digital officers (CDOs), specialist staff in the administrations of the municipalities, secretaries of the (lord) mayors, Smart City teams (officers, city planners, employees in civil engineering and road construction areas, business promoters, city marketeers) but also urban societies such as outsourced employees of municipal companies (city marketing, location development etc.) and municipal utilities. The establishment of a European partner network for Smart City solutions plays a key role in this. Furthermore, company employees are the implementers of "Digital City Hardware and Software Solutions" and contribute their know-how to the knowledge platform as trainers, coaches or multipliers. The indirect target groups can consist out of urban stakeholders like trade associations, honorary posts, political representatives of local politics, entrepreneurs, university and education representatives. Finally, citizens practically benefit from a Digital City as users and can also indirectly benefit from DCEx tutorials, MOOCS, workshops and the certified curriculum.

Once administrative staff better understand digital transformation and are empowered to translate it into strategies, they become key drivers rather than obstacles. This enables municipalities to understand digitalisation in terms of sustainable and integrated urban development in their locations, regions and communities and, above all, to shape it for their citizens. The impact goes far beyond the direct target groups to the individual citizen in the form of inclusion, participation and quality of life. The project thus actively contributes to the creation and maintenance of liveable communities. Technology is thus at the service of people. Free spaces are created and the digital divide in society, but also between companies and administrations, is avoided.

The digital transformation is shaping the everyday and working world with increasing dynamism (5). This handbook will serve to guide and convince sceptics and traditionalist educators within municipalities of the advantages of Smart Cities. It is crucial for the success of a Digital City project to involve this part of the target group which usually prefers tangible products over digital papers. This way, barriers in dealing with Digital Cities can be lowered and public awareness raised.

Part One

The consequences of digitalisation for small and medium-size cities

Network Efficiency

Organisations in the public sector, as the private and non-profit organization too, are increasingly facing complex situations and circumstances in which they operate and whilst operating make decisions (Klijn & Koppenjan, 2015). The complexity is at least partly due to the many stakeholders and networks that are formed (Goldsmith & Eggers, 2005). The network is formed to enhance and improve the operation in some way, for example resource sharing. Sharing knowledge is essential for any successful organization. What makes the scrutinizing harder is the fact that knowledge sharing may be observed and studied from different viewpoints. Already the organizations are each different, let alone the networks they form. One difference is for example whether the action consider the actual utilization of the knowledge or does it merely deal with transferring the content (Kukko 2013). Similarly, network efficiency may be measured by studying e. g. demands, costs, flows, and behavior (Nagurney & Qiang, 2007). Either way it may be argued that knowledge sharing entails processual stages of identifying and accessing the knowledge contents relevant for given purpose and its dissemination within the organization according to agreed needs and requirements (Christensen, 2007). It seems rather obvious that the modern day's ever evolving ICT (information and communication technology), with its tools and techniques, is an invaluable aid in optimizing this in various organizations be it in the public sector or in private companies.

The motivation and the aim of knowledge sharing is to complete the tasks in chosen processes faster, better, and more efficiently than before (Christensen, 2007). Sometimes these measures are taken in order to streamline the operation by making the tasks more transparent and thus open for further development. This may be related to scrutinizing the temporal throughput which is also related to cost structure. In any case knowledge sharing may be used to link the organizational level to individual level, i. e. the competitive edge formulation and the economic value creation are linked to the party making things happen and where it is said the knowledge truly resides, the individuals (Helms et al., 2010; Hendriks, 2004; Rode, 2016). One possible way to study and even measure this is knowledge network analysis (KNA) (Helms et al., 2010). KNA is a technique to identify knowledge sharing barriers in knowledge networks. Within KNA different types of knowledge networks can be distinguished based on the type of knowledge exchange, for example advice seeking or learning. This means that the efficiency is also related to the cultural, human-related issues within the organisations forming the network.

The networks of organizations may be observed to utilize the resources of the other networked partners in order to benefit mutually from the activities, not only financially but also in larger extent. By this we may understand e. g. using various networks as a source and a basis for own development ideas, to gather experiences of various endeavors without having to invest one's own resources. The actual experiences are gathered in one organization and later the knowledge is disseminated in the network. Network efficiency measures how efficiently information is exchanged over the network. Digitalisation is one way to develop organizations operation towards the optimal. As digitalisation progresses, both problems and solutions are more diverse and integrated. The knowledge base, new technologies and ecosystem actors form an increasingly integrated entity. (Tarkka 2018.) At their best both the organizations and the networks they form may be seen as systems that are both globally and locally efficient. There are both benefits and threats formed with the digital approach to urban development, both in individual cities and in networks they form (below Table 1). The difference is at least partly formed due to the fact

that the various parties may perceive the situation differently. Technologically this may mean that in some parties define digitalisation still to mean the use of computer and/or information systems for certain parts of their operation, or in certain parts of the operation there are real live data that is being used to report of the proceedings. In the other end of digitalisation spectrum, the digitalisation may mean that the whole process is reengineered to match the newer way of working. Issues such as sustainability needs to be taken into consideration in all aspects of revisiting the operational plans. Digitalisation many offer yet unforeseen possibilities in this regard (see Table 1).

As shown, there are a few possible effects caused by digitalisation, both positive and negative. Basically, they all aim at streamlining the operation and giving way to the mindset of moving the goods only when necessary, knowledge to a maximum level leaving the individuals to move according to the need and will. As it may be observed, some of the notions, possible benefits and threats, refer to the ease of use and the increased willingness to use the digital solutions whereas others have more direct connection to financial aspects of making the best of digitalisation.

DIMENSIONS	BENEFITS	THREATS
Economic	• Innovation in business environment (new businesses, employment,...) • Improved user experience (e. g. easier use, more and quicker information,..) • Novel opportunities for urban activities	• I nnovation in labour market (e.g. automation and robots replace human hand) • Traditional shops face challenges • Need for innovation capabilities may overrun the actual resources (local businesses)
Efficiency	• Services may be produced for less costs and more efficiently • The management may be more future-oriented • Sharing of resources, goods and services, better facilitated	• Top-down, normative management • Vulnerability and security issues of critical infrastructure • Predatory labour activities and unintended urban consequences
Social	• Increased inhabitant participation • Improved access to information • Better, more suited solutions for various needs • Improved sense of belonging and community spirit	• Exclusion from the civic issues of those less digitalized • New social and spatial divides

Table 1. Possible benefits and threats of digitalization for a city (van Winden & de Carvalho, 2017)

Digital Divide and Digital Skills

The EU places great emphasis on bridging the innovation gap between Western and Eastern Europe. In the past, the West has driven innovation through research and development and the development of new technologies. For the new EU member states to catch up, more investment is needed to improve their infrastructure and support the adoption of existing technologies. The COVID 19 pandemic has accelerated digitisation as municipalities across Europe have significantly increased their use of digital technologies, including in regions that still need to catch up (1).

Digital Divide

First, we need to answer the question: what is digital divide? There is no one definition. At a high level, the digital divide is the gap between those who have and those who do not have internet access. However, the digital divide is multi-layered and includes many factors beyond access, such as affordability, quality and relevance. Quoting Michael Kende: "the digital divide is not a binary." (2).

The following aspects can lead to inequalities and Internet access disparities:

- Availability: Is there internet access in your area? Is there any internet connection nearby? If so, this is only the first step towards internet access.
- Affordability: Is this access affordable? How high are the costs compared to other essential goods? What percentage of your income do you have to spend on access?
- Quality of service: Are upload and download speeds adequate for the local needs of local internet users?
- Relevance: Does the connected community have the necessary digital skills and technologies? Is there local interest and understanding of the importance of internet access? Are there locally available mobile apps and Programmes? Is there content in the local language that is relevant to people in the community?
- Additional divides: Further areas that can create digital inequality are security, interconnectivity, digital literacy, and access to equipment.

These gaps in availability, affordability, interest, and digital literacy exist at the international level as well as the neighbourhood level. In countries that have high connectivity rates overall, there are often still large inequalities within rural, remote and even small and medium urban areas. Often these inequalities go hand in hand with other disparities such as income and gender inequality (3).

Nowadays, digital technologies play an important role in the everyday lives of most people in Europe. The internet enables people, businesses and governments to change the way they communicate and exchange with each other. Yet some parts of the population are still excluded from using these digital methods. Improving high-speed broadband internet infrastructure in the EU is as important as improving citizens' digital skills.

A 10% increase in broadband penetration can increase gross domestic product (GDP) by 1-1.5% and by 2020 90% of jobs will require digital skills. The digital divide has narrowed considerably in Europe over the last decade, but it is far from closed. According to the European Commission's 2015 Digital Agenda Scoreboard, two related targets have already been achieved (all EU households have access to basic broadband and

75% of all Europeans are regular internet users). However, there is a risk that the targets related to fast and ultra-fast broadband connections will be missed, especially in rural areas. In addition, there are still major challenges in internet use, as about half of the less educated and older people do not use the internet regularly and about 58 million EU citizens (aged 16-74) have never used it. The digital divide also varies between Member States. The European Commission is working to improve the situation through the Digital Agenda for Europe and the Digital Single Market (DSM) strategy. Key EU support measures include proposals for legislation, various broadband funding mechanisms and support for multi-stakeholder partnerships and research projects to improve digital inclusion and supporting technologies (4).

In summary, as digitalisation progresses, the digital divide in Europe is also growing. Small and medium cities in regions with lacking digital infrastructure risk being left behind. Therefore, Europe needs to focus on three areas in particular: an enabling ecosystem, a European vision to address the imbalances in the European Union, and sufficient policy support to address funding and skills gaps (5).

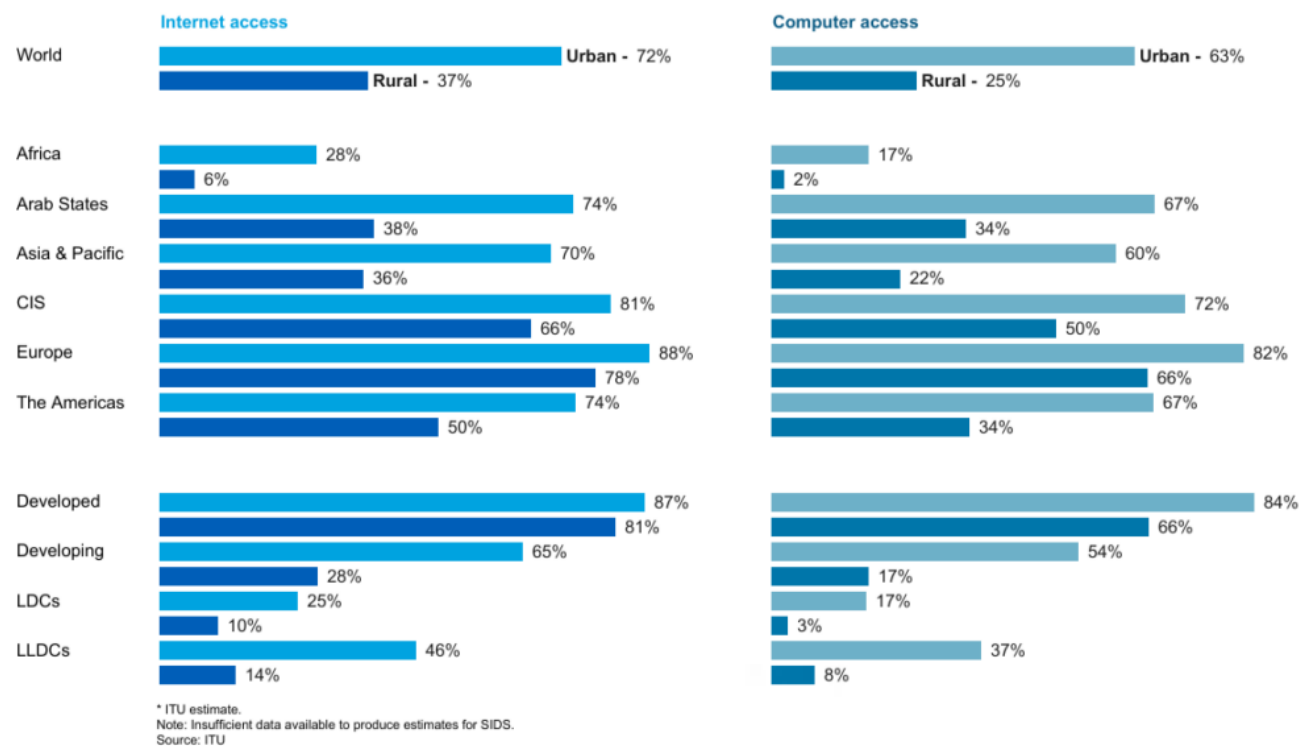**Internet access at home in urban areas twice as high as in rural areas**

Figure 1. Percentage of households with comuter and/or internet access at home, 2019*. Sourse: ITU.

Digital Skills

Acording to the UNESCO's definition, digital skills are "a range of abilities to use digital devices, communication applications, and networks to access and manage information. These skills enable people to create and distribute digital content, communicate and collaborate, and solve problems for effective and creative self-fulfilment in life, learning, work and social activities" (7).

In short, digital skills include using digital platforms and technologies to create content and share, communicate and manage information. In the business world, these skills help companies to market their products better while communicating effectively with their customers on digital platforms (8).

As a result of the rise of technology and society's dependence on the internet, the need to learn a digital skill has increased. Nowadays, learning digital skills is of great advantage as major activities take place in the virtual world and soft skill jobs are better paid.

Some of the top digital skills in 2022 are:

- Basic computing skills
- Graphics Designing
- Coding
- Data Visualization
- Copywriting
- Search Engine Marketing
- Data Analysis
- Content Marketing
- Marketing automation
- Email marketing (10).

The availability of people with digital skills supports the digital transformation. Municipalities in countries where a higher share of the population has above-average digital skills tend to have implemented more digital technologies. They are also more likely to have taken action on increasing their digitalisation. To reap the benefits of digitisation, education and training systems and online learning need to be improved for groups currently excluded from the digital economy (11).

During the COVID-19 crisis, municipalities needed to put more complex digitalisation processes on hold. In contrast to the more general digital transformation, the adoption of new advanced digital technologies is stalling. Beyond the short-term response to COVID-19, another structural element for the digital transformation of the EU economy is the implementation of advanced digital technologies such as advanced robotics, 3D printing, big data analytics and artificial intelligence, augmented or virtual reality and drones. Adopting advanced digital technologies is often a complex process, requiring a reorganisation of the business and retraining of staff. It is likely that, against the backdrop of the pandemic, they have been delaying the most complex investment projects, focusing on their immediate needs.

New advanced and complex digital technologies appear to have been less of a priority for many during the COVID-19 crisis (12).
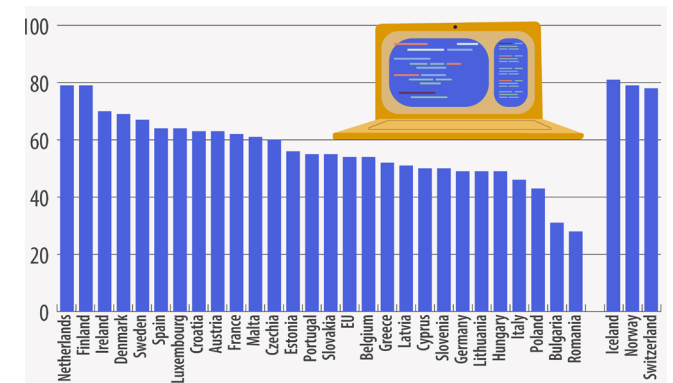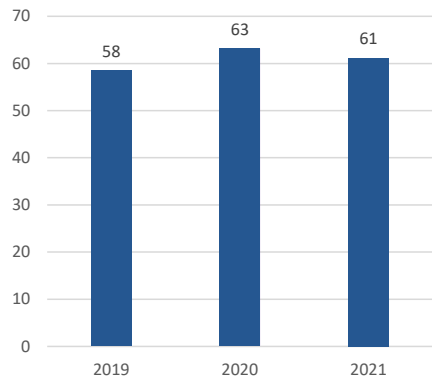

Figure 2. People with at least basic overall digital skills in 2021 (% of people aged 16-74) Source (9)

Use of advanced digital technologies (in %), 2019-2021

Year	Value
2019	58
2020	63
2021	61

Uptake of advances digital technologies in the last year (in %), 2020-2021

Year	Value
2020	40
2021	32

Source: EIBIS (2019, 2020, 2021), firms in EU27.

Note: A firm is identified as having adopted an "advanced digital technology" if at least one digital technology specific to its sector was implemented in parts of the business and/or if the entire business is organised around at least one digital technology. The question on whether any new digital technology was introduced in the last year was not asked in EIBIS 2019.

Figure 3. Use of advanced digital techinoliges. Source: DIGITALISATION IN EUROPE 2021-2022 (13)

Internet access and broadband connections in households, by NUTS 2 regions, 2008

Share of households with Internet access and broadband connection

DE, FR, EL, HU, PL, SE: by NUTS 1 regions
IE, SI: national level
FI: FI20 combined with FI19

Data source: Eurostat
© EuroGeographics Association, for the administrative boundaries
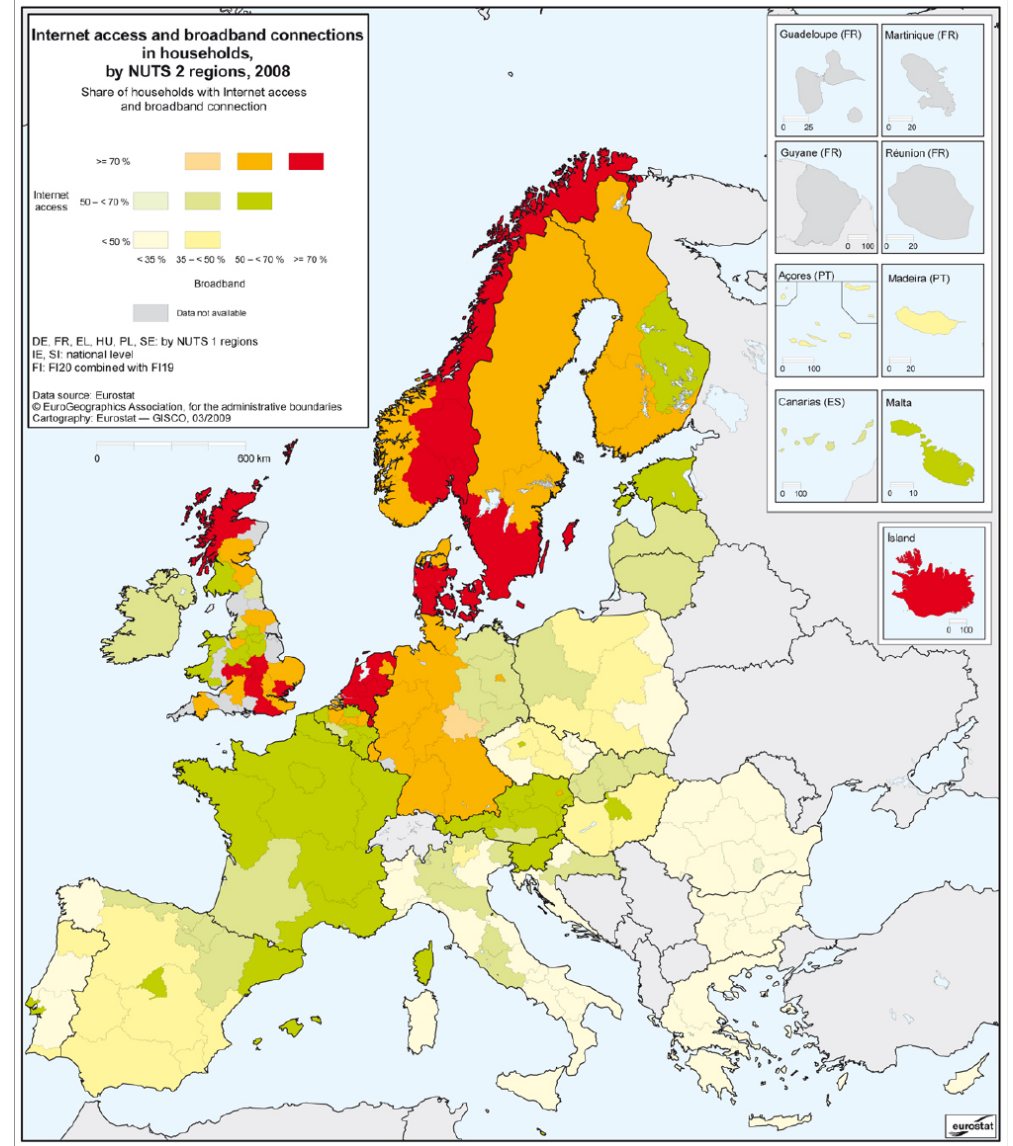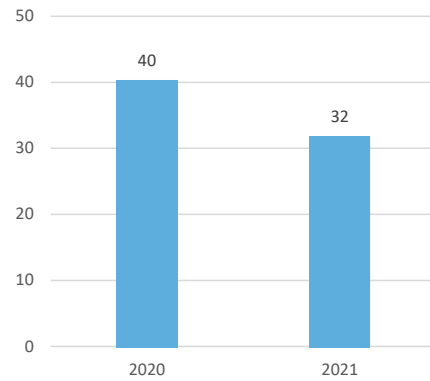Cartography: Eurostat — GISCO, 03/2009

Figure 4. Internet access and broadband connections in households (2008). Source: Eurostat (14)

Case Study: Digital Divide and Digital Skills

For all the complexity and uncertainty that digital transformation brings, the COVID-19 crisis led to a need to make massive structural changes for digitalisation also at the city level. It offers the opportunity to make more efficient and targeted use of public resources, ease the burden on citizens and businesses, and strengthen social cohesion.

CityLAB Berlin

One example of city that tries to find ways to overcome the digital divide is Berlin with their "CityLAB Berlin". They organized a series of online workshops in which they tested online administrative forms together with citizens, collected feedback and developed ideas for improvements. Involving citizens in the development of online services increases acceptance of the administration's online offerings and makes them more user-friendly what also bridges the digital divide (15).

City of Dortmund's "Digital Scouts"

Another example is City of Dortmund with "Digital Scouts" Workshops. The Digital Scouts workshop series makes employees fit for digitization processes in every company and city administration. The workshops provide an initial practical introduction to the complex field of digitization and help to overcome own reservations and develop and initiate sound digitization strategies. Continuing education in digital skills with a practical focus is essential. IT must be part of basic education in order to lead our industry into the new world and secure our prosperity. Only those who are prepared for the digital future through training will be better able to cope with it and accept new technologies and the associated constant change (16).

CityLAB Berlin. Source: CityLAB Berlin.

Digitalisation and Collaboration

As it connects people and organisations from all over the world, digitalisation is by nature a transborder and transdisciplinary phenomena. Building a digital town, where infrastructures and services accommodate the existing and changing needs of citizens, requires a high degree of integration between sectors and organisations so they can share data and technologies. improving patient journeys from the hospital to their home requires that the healthcare workers from various entities can fill in and access patient data from the same interface, which in turn set new requirements for the patient systems used in the SoWe-sector. Similarly, monitoring air pollution with sensors is both relevant for public urban and traffic planners from the municipal and regional levels, police authorities in charge of regulating traffic, as well as researchers and companies who develop solutions. Fighting the challenges introduced by digitalisation such as the digital divide or the protection of human and democratic rights online, also involve coordinated responses and policies, and therefore the collaboration of various stakeholders.

Even though digitalisation has traditionally involved an emphasis on technologies and infrastructures, what is critical is how people and organisations interact with each other.

In a nutshell, the goal of collaboration is to:

1. Set long-term and integrated strategies to tackle transdisciplinary challenges: i.e environmental crisis, quality of life and wellbeing, etc.

2. Optimise the efficiency of public services and public administration: i.e, avoiding citizens filling in information twice, and sharing data to enhance the decision-making capacities of all stakeholders.

3. Enhance problem-solving capacity: i.e, exchange skills, expertise, and information to create new solutions and greater societal impacts

4. Create a space for learning and experimentation: i.e learn from the experiences of users

5. Enhance emergency response-capacity

Within collaboration, we can distinguish between intersectoral collaboration between different departments of a municipality, to more comprehensive programmes and policies; interorganisational collaboration involving different public and private entities; and community collaboration involving the participation of citizens in the production and management of public goods and services. Researcher Sherry Arnstein developed the "Ladder of Citizen Participation" model (see Figure 1) to assess the levels of citizen agency, control, and power, in community collaboration projects. Without any power, citizens' participation can end up being a counterproductive process (1).

How to start?

- Identify individuals and organisations impacted by the issue. Get key leaders onboard (politicians), medium-managers, and employees

- Create a sense of urgency by sharing and defining challenges

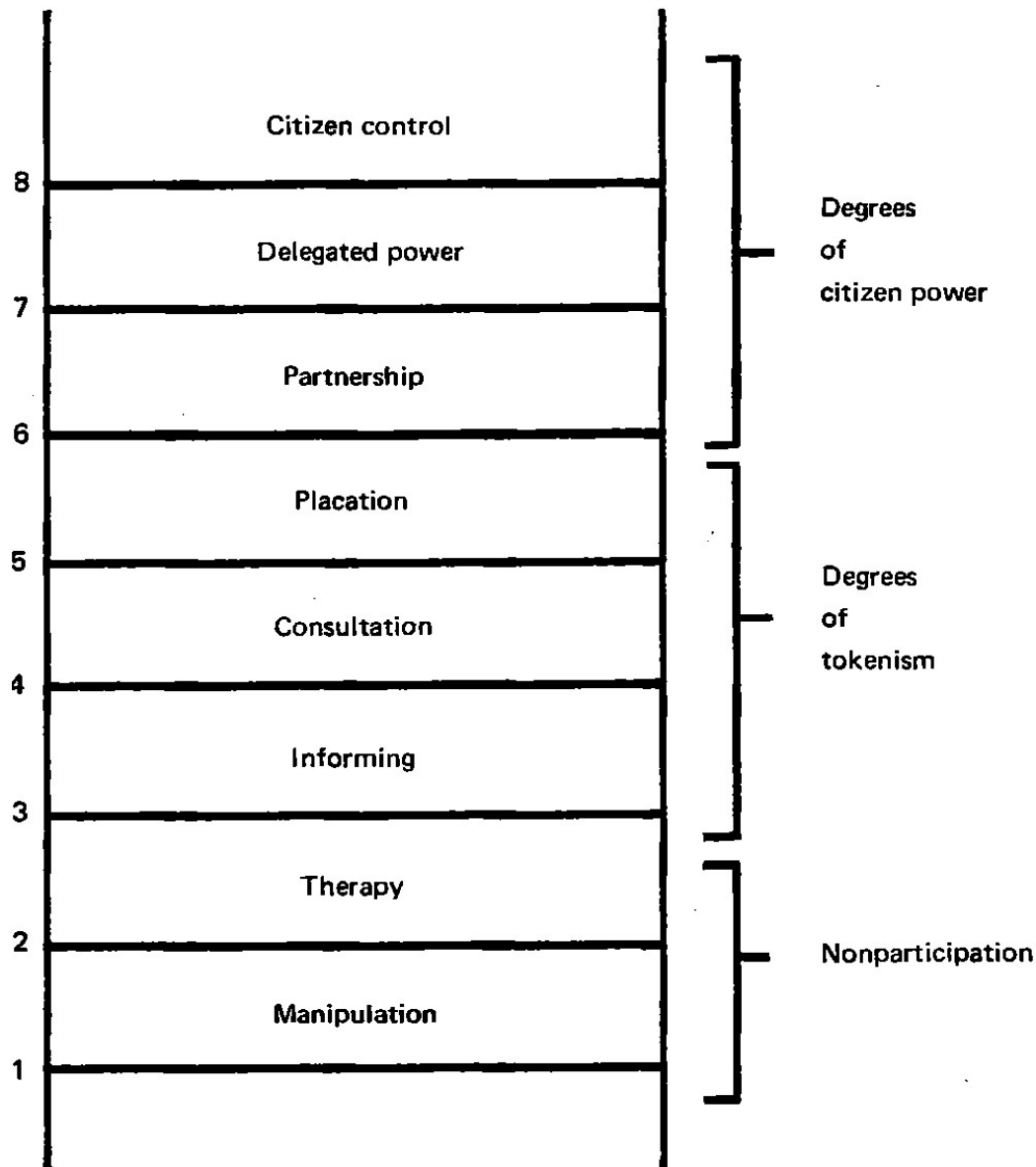- Create a governance structure: network, forum, facilitators etc.

Figure 5. Sherry Arnstein's "Ladder of Citizen Participation" (1969)

Case Study: Digitalisation and Collaboration

Category A: Living Labs

The concept of Urban Living Lab was developed and promoted by JPI Urban Europe, as a way to tackle a wide variety of issues in everyday settings. It focuses on involving a variety of actors in the process of co-creation, co-production, and experiments. The main characteristics include: involving those affected by the situation, focusing on responding to challenges rather than creating new solutions, increasing the capacity of stakeholders to handle challenges, embracing flexibility and iteration, and being located in context to produce and demonstrate clear outcomes (2).

Examples

Lisbon Living Lab
Led by the Lisbon Regional Coordination and Development Commission (CCDR-LVT) and Instituto Superior Técnico (IST), the Lisbon Living Lab will collaborate with local stakeholders, like the municipalities of Mafra and Setúbal, Lisbon Supply Market (MARL), ICNF, A2S, Wine Institute, Regional Directorate of Agriculture of Lisbon and Tagus Valley, and Aldeia da Mata Pequena. Together, they will explore how urban-rural linkages can help transform rural and urban economies and communities. The Living Lab will also look at mutual dependencies, competitive or synergistic relationships, networks and flows across territories, describe institutional policy contexts and influences, and build on local assets to improve adaptation and resilience to global changes (3).

The Amsterdam Smart Citizens Lab
Run by Waag Futurelab in collaboration with eg. the City of Amsterdam, the lab explores the tools and applications to map the world around us. It deals with themes ranging from air quality to the conditions of bathing water to noise pollution. Thanks to today's technology, measuring has become much easier, and can help citizens learn more about their city, town, or neighbourhood. With smartphones, smart watches and wristbands, it's becoming increasingly simple to collect the data around us, but open data from the municipality and DIY sensors are also playing a major role in the retrieval of (new) data. In order to make the most of the data, it also needs to be merged and analysed. Once that has been done, it could then lead to new connections and insights, which in turn make it easier to make our environment healthier and cleaner. In 2014, Amsterdam Smart Citizen Lab also experimented with "Smart Citizen Kit", an open-source device that monitors the environment. And although the technology was not yet ready at that moment, the exchange of experiences helped understand what the possibilities of citizen science are (4).

The Amsterdam Smart City Lab. Source: Waag Fututre Labs (9)

Category B:
Crowd-soruce data and platforms

With digitalisation, a new source of information has become available in the form of user-generated content accessible over the internet through mobile and web applications. The exploitation, integration, and application of these sources offers an unprecedented opportunity to conduct research on a variety of topics at multiple scales and for diversified objectives (5). The participation component is a fundamental aspect of crowdsourced information, and it reveals a new way of doing science with a problem-solving approach. Crowdsourcing is seen as an approach that allows large groups of non-experts to undertake specialized tasks for the purpose of problem solving and creating new knowledge and ideas (6).
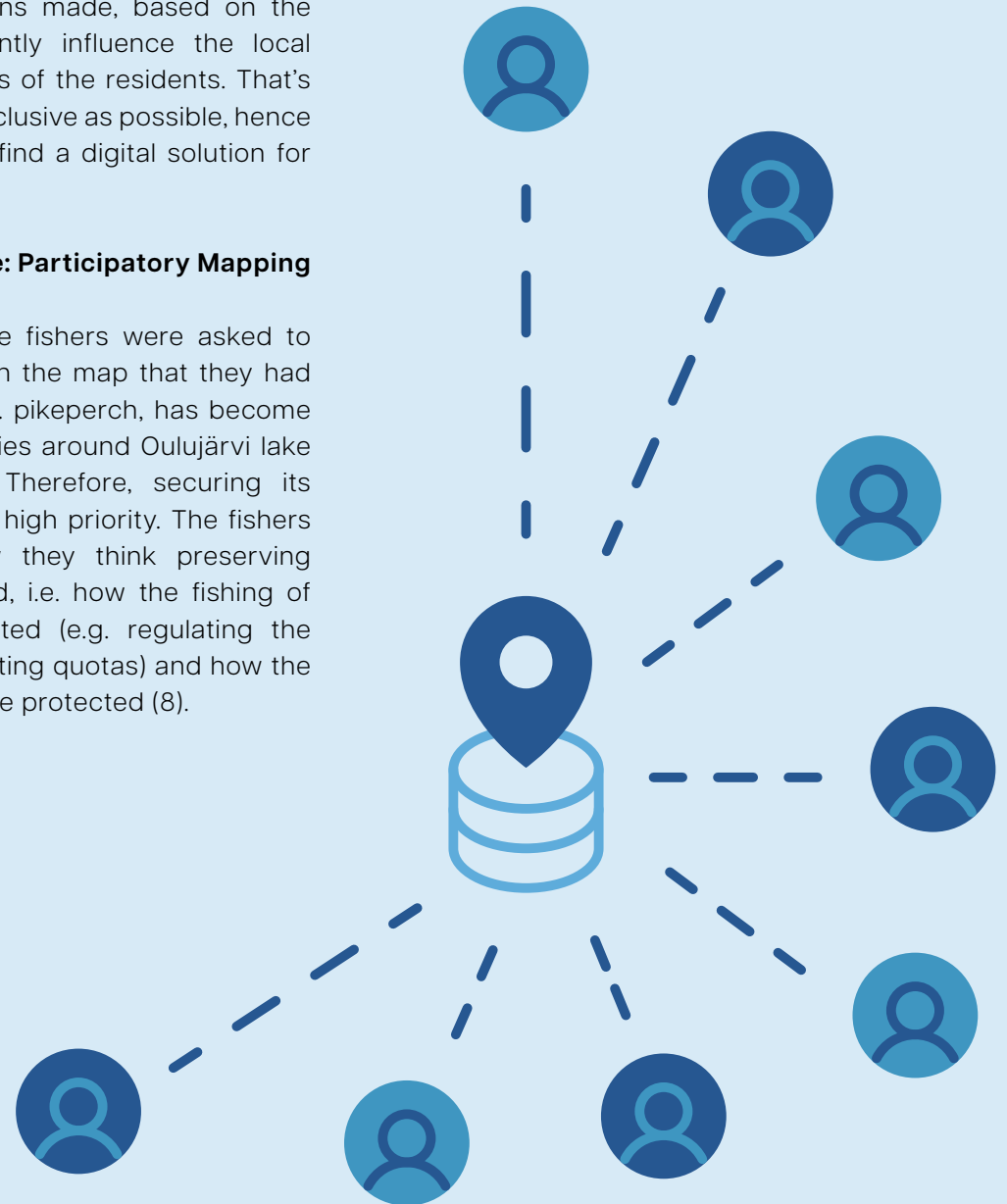
Examples

Slezska Ostrava: Increasing Transparency of Decision Making in Ostrava – Maptionnaire | Community Engagement Platform
Slezská Ostrava needed to collect a large pool of data linked to specific locations that could be analysed easily. In general, they wanted to avoid delaying and prolonging projects while still gathering the opinion of as many residents

as possible. The decisions made, based on the collected data, significantly influence the local environment and the lives of the residents. That's why they want to be as inclusive as possible, hence the need for wanting to find a digital solution for participation (7).

Where Fish Meet to Mate: Participatory Mapping in Kainuu
In the Oulujärvi case, the fishers were asked to mark spawning places on the map that they had observed. Zander, a. k. a. pikeperch, has become the most important species around Oulujärvi lake for economic reasons. Therefore, securing its natural reproduction is a high priority. The fishers were asked about how they think preserving zander could be secured, i.e. how the fishing of zander could be regulated (e.g. regulating the fishing equipment, regulating quotas) and how the spawning season could be protected (8).
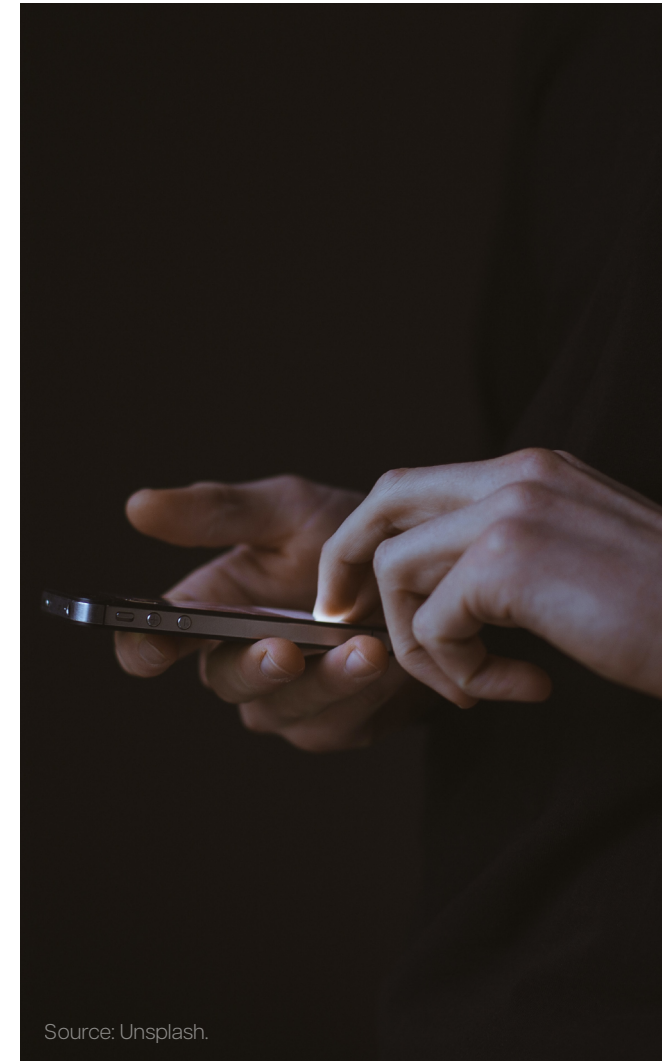
Security in Digitalisation

Digitalization describes how information technology can be used to modify existing business processes. This can mean for example the creation of new online communication channels that allows customers to connect with organizations. (Verhoef et al. 2021.) With digitalization, the issues of security and privacy has been pointed out. In the public sector, privacy and security concerns are named to be one of the top reasons for not adopting new digital services. (Jonathan et al. 2020.) When digitalization is increasing, it also increases many vulnerabilities within a city. These vulnerabilities can be found in equipment, devices, and systems. (Jansäter & Olsson 2018.) This makes security measures even more important.

To ensure the security of digital information, it is important to recognize the criticality of information infrastructure. The recognition leads to the adoption of the cybersecurity concept. Cybersecurity means the security of the digital environment, which interacts with operations in the physical environment. (Salminen & Hossain 2017.) While digitalization is spreading in cities, it becomes more important to secure the information that is used in different functions. Smart cities, that are municipalities that use ICT to increase operational efficiency, are even more vulnerable to

security threads than cities, that do not use smart technologies and data analysis so much while optimizing city functions.

Problem with data protection, and security in digitalization, is the awareness of the exact security rules among people. Security is seen as something that the IT department does, but not as something that anyone can influence. (Ilvonen et al. 2016.) This is a mindset that needs to be changed if one really wants to secure their information in smart cities. One threat of digitalization in cities is the vulnerability and security of critical infrastructure (van Winden & de Carvalho 2017). Different functions need different kinds of protection to secure the information.

In smart cities, a lack of focus on cyber security may be caused by lack of knowledge and awareness of different security risks. That is why it is important to get people familiar with threats that can affect smart city functions. New innovative technological solutions need to follow standards that cities need to be aware of. Also, cyber security risks need to be identified and rated so cities can work effectively towards reducing the threat, vulnerability, and consequences of a security breach. (Jansäter & Olsson 2018.) So, when thinking about security,

Source: Unsplash.

smart cities should have a plan about how avoiding cybersecurity threats. It also needs to be regularly updated and checked.

Security is one of the most important things to be considered of in smart cities. Digitalization makes information available to everyone, but it also makes information vulnerable. Therefore, it is important that smart cities have a cyber security plan that is known to all. A well-thought-out security program protects information and allows digitalization to move forward.
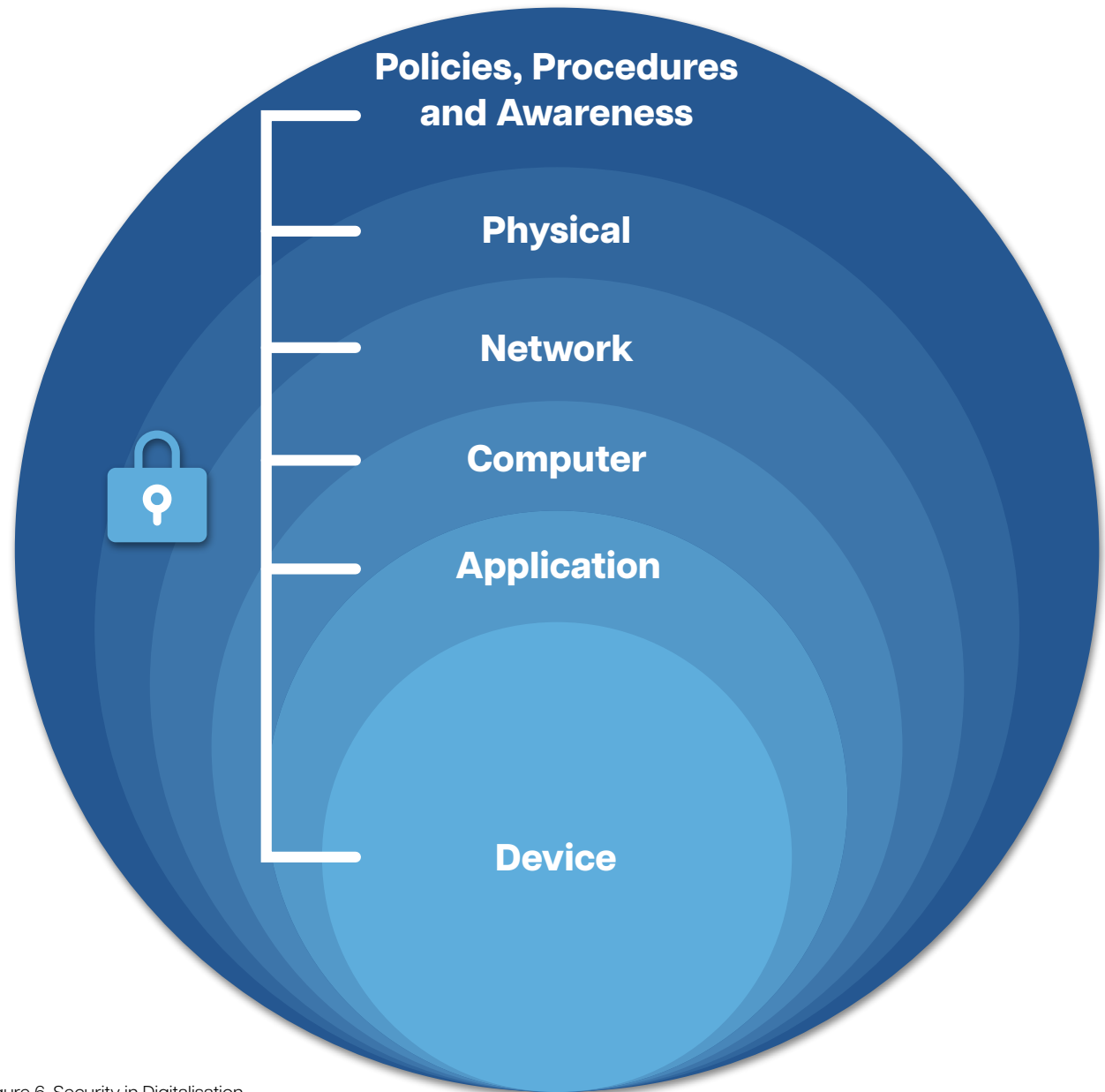

Figure 6. Security in Digitalisation.

Part Two

A roadmap to build up a digitalisation strategy

Sustainable Smart Cities

In the last decade, the term "smart city" has been used to describe an urban area, that has become more efficient, environmentally friendly, and socially inclusive by using digital technologies (1).

The UN Agenda 2030 "Leaving no one behind" with the 17 Sustainable Development Goals (SDGs) at its core, defined a new global development program, which outgrew the existing frameworks (2). Goal 11 of the Sustainable Development Goals focuses on sustainable cities and communities. It ensures a broader view of the idea of a sustainable smart city and emphasizes the importance of participatory approaches in facing social and environmental challenges (3).

In the context of the sustainable smart city, this could be seen as the shift from a largely centralized, technology-driven, top-down approach to a more collaborative perspective, which includes inhabitants (established fellow citizens and new ones), businesses (big players, SMEs and social entrepreneur) as well as academia – basically, the entirety of the "urban ecosystem". Digital technologies are the enabler of that transformation, but the real game-changer is collaboration and co-creation (4).

Figure 7. United Nation's Sustainable Development Goals. Souce: United Nations.

The sustainable smart city reinforces the involvement and engagement of the diversity of citizens, try to eliminate physical as well as digital barriers, and counteract the segregation of minorities. Encouraging the engagement, spaces, and places for meetings, and timeouts are essential to provide more opportunities to prevent particular groups from being left out of positive impact.

Education plays a crucial role in this process: smart education programs include digital literacy, innovative thinking, effective communication, and teamwork that will empower citizens and facilitate a more active role (5). Providing digital and physical platforms and networks for participation and recognizing knowledge as shared resource and cross-border cooperation is essential (6).
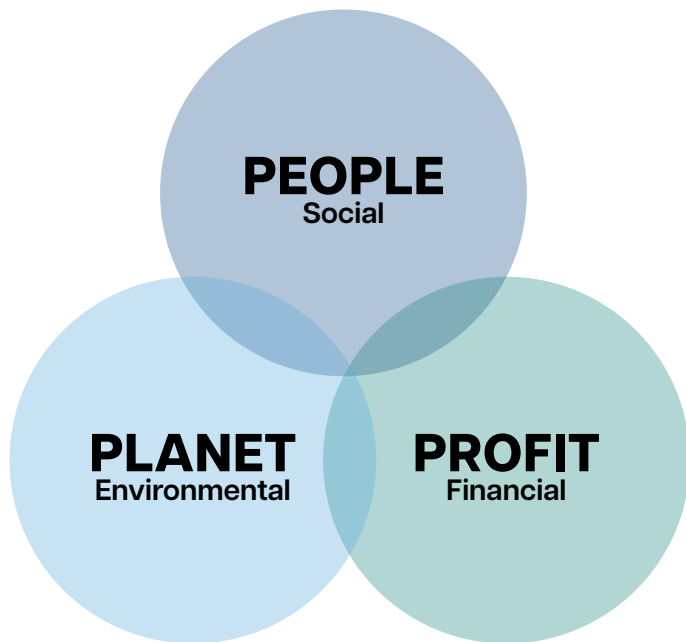
Figure 8. The three pillars of sustainability.

The sustainable smart city focuses on a human-centered design that includes citizens and grassroot organizations to participate in shaping local development.

Sustainable smart solutions require multi-level and cross-sectoral cooperation. Exchanges between cities allow the policy level to identify common challenges and exchange development strategies (for example: leveling-up regional disparities). Engaging citizens and public sector in decisions broadens the perspective of knowledge transfer and value creation (7).

A local example of a digital approach to inclusion and participation is the App "Wheelmap.org" – it enables inhabitants of Berlin with limited physical mobility to plan their train travels beforehand, based the information of functioning elevators. All users of the App are creators at the same time and responsible for updating the information along their journeys, if necessary.

Cities are strong drivers in terms of climate change. Looking at this topic from a global perspective ¾ of the world wide use of energy and over 70% of global CO_2 emissions are the result of urban living (8). The German Advisory Council on Global Change describes that digitalization can help us to achieve decarbonization, a circular economy, resource efficiency, emission reduction, and the monitoring and protection of ecosystems more easily and quickly. However, "the digitalization of the past decades – the internet, the many different terminal devices, the increase in production automation and product networking – has been accompanied by ever increasing energy and resource consumption, as well as global production and consumption patterns that place an even greater burden on ecosystems." (9).

How do sustainable smart cities handle this paradox? Sustainable smart cities walk on a tightrope deciding how much digitalization is sustainable in terms of solving urban social and environmental challenges. The principle of regenerative cities and regions indicates the respect for the earth's atmosphere, oceans and, ecosystems. Sustainable smart cities and communities strive not only to sustain but actively regenerate the natural resources that they use and absorb. Cutting the CO_2 emissions and implementing circular economy solutions across sectors is the first step (10). The Danish capital Copenhagen set the ambitious goal to become the world`s first carbon-neutral city by the year 2025 (11). The Swiss City Zürich manages the supply of 80% renewable energies in the city center.

The third dimension of sustainable smart cities is found in new economic opportunities, that are opening up through innovations.

Paris "Lulu Dans Ma Rue" ("Lulu in my street") is a local store to support the neighborhood with different offers – starting from DIY jobs, and support with administrative stuff to fixing a laptop (and more) for very fair prices. "Lulus" are self-employed citizens who want to earn a bit more money or build an existence – the range starts with students to people who get a new chance to participate in the labor market. Customers can book Lulu´s services in an App or the local store and support a socially more inclusive neighborhood that opens up new economic chances (12).

The aim of the sustainable smart city is not to succeed in one of the three areas of sustainability but to find the balance to connect all of the endeavors in one network.

Figure 9. Lulu Dans Ma Rue. Source: Expatriates Magazine Paris.

Keywords

1. **Collaboration:** The situation of two or more people working together to create or achieve the same thing (13). A collaboration involving multiple actors from all sectors is utilized by governments when faced with a problem that has not been resolved through traditional hierarchical relationships (14) because it enhances problem-solving capacity and achieves efficiency and effectiveness (15).

2. **Co-creation:** We define co-creation as the collaborative development of new value (concepts, solutions, products and services) together with experts and/or stakeholders (such as customers, suppliers etc.). Co-creation is a form of collaborative innovation: ideas are shared and improved together, rather than kept to oneself. It is closely connected to – and mentioned alongside – two other buzz-words: 'open source' and 'mass-customization' (16).

3. **Sustainable Development Goals (SGDs):** The Sustainable Development Goals are a universal call to action to end poverty, protect the planet and improve the lives and prospects of everyone, everywhere. The 17 Goals were adopted by all UN Member States in 2015, as part of the 2030 Agenda for Sustainable Development which set out a 15-year plan to achieve the Goals (17).

4. **ICLEI – Local Governments for Sustainability:** ICLEI is an international membership association of local governments dedicated to addressing environmental issues through local action. More than 350 cities, towns, and counties in the United States—and more than 770 communities worldwide—are ICLEI members and participate in the Cities for Climate Protection® (CCP) Campaign to reduce the pollution that causes global warming. ICLEI provides programs, tools, software assistance and technical and policy expertise to help local governments quantify and reduce their greenhouse gas emissions (18).

Tool: Materiality Analysis

Education is the key factor in the successful translation of Sustainable Development Goals (SDGs) into the Smart City context. Studies show that there has been a lot of effort in implementing the SDGs without long-term success (1) - so the need for Inner Development Goals (IDGs) occurred. The Inner Development Goals represent a set of 23 skills clustered into 5 different categories that reflect the inner foundation of individuals needed to reach and maintain the SDGs (2). The success of the Sustainable Smart City approach will depend on the significance and the effort put into education along the IDGs.

Materiality Analysis

Next to the long-term purpose of education, we would like to introduce you to a methodology that assists you in building a consistent sustainability strategy. Due to the complexity of the Materiality Analysis, we will approach the focus areas through the framework of the Golden Circle (3).
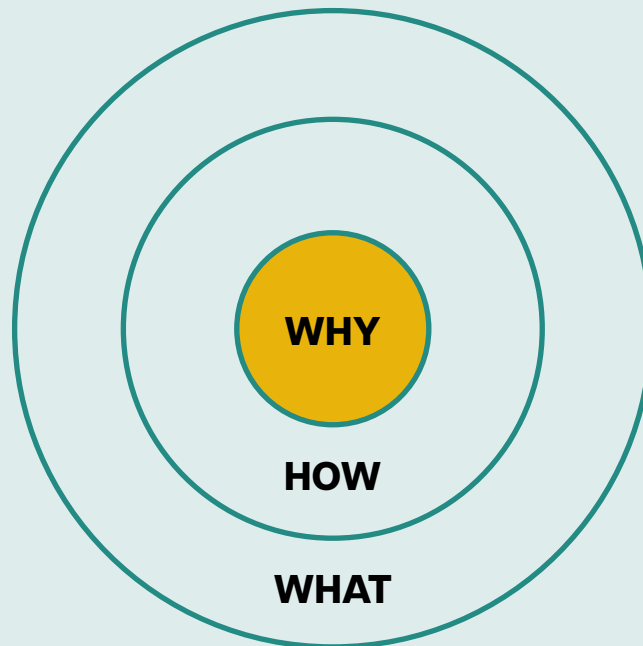
WHY

HOW

WHAT

Figure 10. The "Golden Circle".

Why?

Facing the complexity of sustainable development, the Materiality Analysis offers municipalities clarity and direction in focusing on solving particular pressing sustainable problems. The elaborated action plan provides transparency regarding sustainable topics and relevant strategies for all stakeholders. As such, it lays a foundation for dialogs with internal and external stakeholders and illustrates priorities for sustainable development projects. Materiality Analysis also represents the connection between sustainability themes that are impacting the infrastructure of the Smart City as well as such impacted by it.

Materiality aspects should ideally be not only defined by the communal authorities, but also by its stakeholders. The process of fulfilling the SDGs and creating the Sustainable Smart City needs to be a Multi-Stakeholderprocess due to its complexity (4).

Condensing the complexity of the Materiality Analysis, the following passage reflects a shortened version offering a hands-on approach to the methodology.

How?

Outside-In Analysis
Impact of sustainable themes and challenges to the Sustainable Smart City and its inhabitants.

Environmental Sustainability: What is the impact of climate change on the city? What does the data of the IPCC (Intergovernmental Panel on Climate Change) indicate for our region and its future challenges? (5).

Social Sustainability: What social challenges are we facing right now? Which ones are becoming more urgent if we do not act on them as soon as possible?

Economic Sustainability: How do global sustainable challenges impact the Smart City in future prosperity? Which role do global sustainable challenges play in indicating the price development of resources and resilience strategies?

Inside-Out Analysis
Impact of Sustainable Smart City life on the topics and challenges of sustainable development.

Environmental Sustainability: What is the impact of the Smart City´s ecological footprint? What is the ratio of use of renewable energies? Does circular economy play any role in the planning of processes?

Social Sustainability: How are the current challenges further impacting social inequality? How can we build a more inclusive society?

Economic Sustainability: How can we create a Sustainable Smart City within the planetary boundaries that will turn challenges into chances and grow in its prosperity and abundance in the way it is moving forward?

What?

Aspect 1: Describe the characteristics of the municipal administration and the authorities that influence the topic of sustainability.

Aspect 2: Describe and justify which municipal transformation levers and challenges arise from these features for the sustainable development.

Aspect 3: Explain the relationship between the identified transformation levers and challenges with the central fields of action defined in the sustainability strategy (6).

Intelligent Systems

Different types of systems

Today organisational life and operations therein rely not only on those systems the organisations have had from the days prior to digitalisation but also the newer acquisitions. The so-called legacy systems often contain information still relevant and important for the operation. Moreover, these are the systems that the employees are accustomed to use. To develop the operation, the organizations,need to update their systems. Today the new acquisitions may also be of more modern nature. Intelligent systems are technologically advanced machines that work with the world around them. Intelligent systems can take many forms, such as automatic lawnmowers to facial recognition programs (1).

Intelligent systems can be widely used in smart cities, for example in health care, customer targeting, or detecting faults in electric power systems (2, 3, 4). An additional aim of using intelligent systems is to change the focus from routine tasks to more subject-centered actions for the employees. This may also be interpreted to mean more meaningful and cognitive duties instead of mere routine. Smart cities use ICT to make them work more efficiently, so using intelligent systems is very important to make smart cities work in the most efficient way.

Three characteristics

The concept of smart city is based on three characteristics. The first one is instrumented, which means a city that is covered with various technical devices such as sensors and actuators. The core systems of the cities have access to real-time information through these devices. The information which is then utilized for decision-making varying from ad hoc -nature to longer term strategic planning. The second characteristic is interconnectedness. This means that the city has a set of systems that are cooperating with one another to provide information products collected and combined from various sources. The third characteristic is intelligence, which combines the two first characteristics and refers to a city, that utilizes the information obtained from various systems towards the ultimate goal of improving the quality of life of the citizens. (5) This logically requires already sophistication both in mind-set of the actors, thinking, and in the tools and technologies in use.

The benefits of intelligent systems

Studies show that smart cities have brought significant improvements in quality of life and services to citizens and urban environments. Smart cities can provide intelligent information to citizens for example in and from healthcare, transportation, public safety, and smart parking (6) Intelligent systems can take advantage of machine learning algorithms, that allow automatic extraction of information from previous examples (7). This, however, is still an area in which much development is to be awaited in the future as the technologies develop further and mature.

Smart cities have started to use new solutions that are taking advantage of IoT (Internet of Things), cloud computing technologies, and big data. This is made to establish a profound connection between each layer of the city (8). The layers cover various areas of the city and its administration; the environment, infrastructure, resources, services, and social systems (9). The development of smart cities boosts the development of innovative IT technologies that are based on Artificial Intelligence, which use new algorithms, advanced

intelligent systems, and complex software (10). One way to acquaint oneself with this area is to follow various operators of the area and try to keep up the various examples. As each environment is unique, rigid rules or regulation may not prove to be the best possible approach to the theme.

Figure 11. Internet of Things (IoT) Architecture Components. Source: Cvar, N. (11)

The Conditions for Innovation

A lot has been said and written about the potentials of digitalisation to tackle the big issues of our era. Here, we want to look at the general conditions needed for innovation. So, how can digitalisation be implemented in order to generate the desired benefits?

First, we have to see that digitalisation is not only a technological, but most of all an organizational change. Data such as the OECD Broadband Atlas1 show that many countries still lack the digital infrastructure needed for true digital transformation. The Covid pandemic has made clear though that some aspects of technology can be developed surprisingly fast. What takes longer is changing underlying organizational habits of people.

Accordingly, when looking for innovation-friendly conditions, we should always focus on the actual needs of actual stakeholders: lacking user friendliness is the greatest hurdle to the use of digital applications (2). If users-to-be do not understand why some digital tool is beneficial to their work or life and how they can use it in a convenient way, digitalisation of the respective processes is on a bad way. Therefore, principles such as Design Thinking have been developed. At the root of Design Thinking, we see a profound immersion into the nature of the problem to be tackled: What is this issue about, where did it come from and what can we do to tackle it? This sounds surprisingly simple, but if we look into the reality of digitalisation in an administrative setting, we will soon realize that this kind of problem analysis is not yet fully deployed. Also, Design Thinking needs organizations to switch from an organisation-centric view to a human centred perspective. Administrations as organizations are in fact responsible for people and businesses, so this shift of perspective can only help them in fulfilling this role. Also, the role of technology and data in supporting the human centred design of solutions has to be understood. Technological skills are an important asset in this regard. In terms of digital transformation it is important to point out that not everyone is an engineer, so where should administrations look for skills? A lead could be to tap into the knowledge which exists in local businesses, since many businesses are ahead for example in terms of data usage. The entire Design Thinking approach definitely requires structural change in the administrations. Therefore, implementation of meaningful change management processes should be seen as a prerequisite. As a part of this, measurement of success can be derived along criteria such as the well-being of people or the vitality of the region.

Another characteristic of Design Thinking is the iterative approach: After having analyzed the problem, we will draft a first suggested solution. This does not have to be perfect, simply because it cannot be! The solution draft will be tested, and gradual improvements will be made. Again, this does not sound like a big deal. But iterative searching for solutions is, again, not very common in the development of administrative processes. What it implies is a culture of failure – the ability of an organization to change its view on the nature of what we commonly call "mistakes". Design Thinking and other iterative principles see "mistakes" as a natural event on the way to progress. Of course, not all mistakes can be turned into something entirely positive, but if the framework is designed accordingly, changing the organizational view on "failure" is possible.

What do we mean by a "framework that is designed accordingly", besides it perceiving mistakes as chances for innovation? The said framework should definitely put emphasis on agility. A strategy or process is considered agile if it is able to adapt

quickly and effectively to changes in either the milestones towards a given goal or even the nature of the goal itself. This principle is part of the European quality management standard EFQM (3). Especially administrations are struggling with agility, since their traditional approach is to standardize and control processes rather tightly. There are good reasons for this, but also administrations have to adapt to the VUCA world, VUCA meaning: Volatility, Uncertainty, Complexity and Ambiguity (4). How it can be done? Please flip the page!
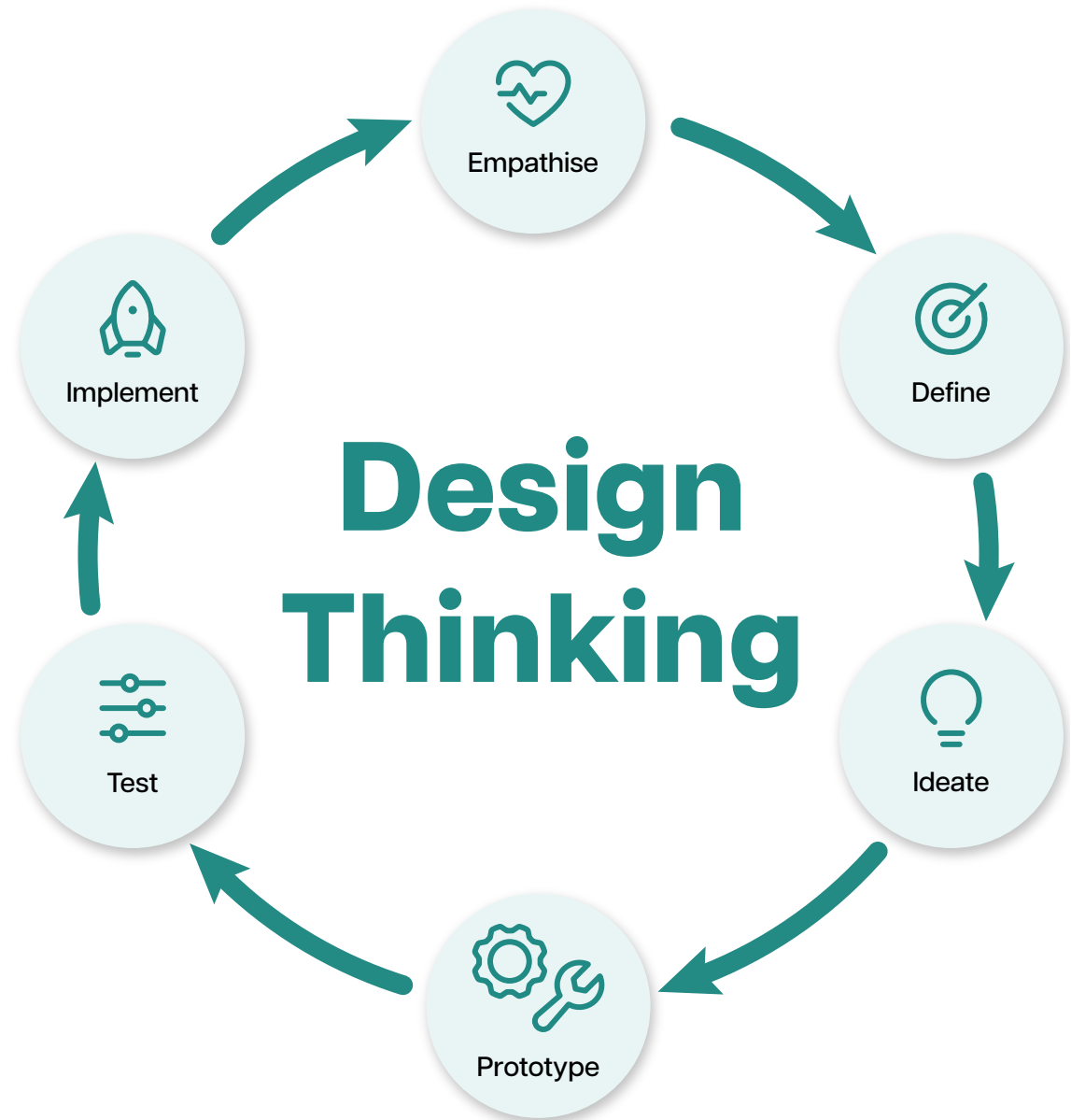
Design Thinking

Empathise

Define

Ideate

Prototype

Test

Implement

Figure 10. The "Design Thinking" process.

Tool: Design Thinking

Design Thinking starts with the right people: make sure you include all relevant people in your project team right from the start, formally or informally. Thus, they are part of the project and not just concerned by it.

You also need an appropriate space for your Design Thinking sessions and some basic materials: A flipchart, paper, felt pens, some adhesive tape maybe and whatever you feel the need to use. Be creative!

Phase one: Understanding the issue. Depending on the topic you are working on, this can start by a tour of a location, a focus group, a questionnaire, interviews, a collective immersion into the user role or an analysis of all possible errors in the process-to-be. Mind-map the issue as precisely as possible, talk your way through it in the group and: observe! As good as possible.

Phase two: Definition. You want to map out an ideal future scenario that solves your issue. It does not have to be realistic in all aspects. This, though, clearly shows you the real issues currently "obstructing the way" to solution. User personas can also help. Then, re-phrase all issues identified in the user scenario into simple questions, such as:

"How can we create an attraction for young people in the city centre without bothering the surrounding population?" Thereby, you are transforming a blurry big issue into more concise smaller issues.

Phase three: Brainstorming. Generate as many ideas as possible. What helps is strict deadlines. For example, set the brainstorming or sketching time to 5 minutes.

Phase four: Decision Making. And, just as you did during the brainstorming, set the clock. Your team will now evaluate all ideas previously generated, for example through a simple thumbs up/thumbs down poll. The necessity to act quickly avoids getting stuck in details, at least in this phase. Details come in again in the pilot phase.

Phase five: Piloting. Create easy mock-ups, paper prototypes, sketches for sitemaps or maps, you will visualize processes in storyboards or even act them out in small roleplays.

Phase six: Testing. First in a collective cognitive process within the team, second with actual users. If you want to beam this method to the next level, maybe try something like the Google Design Sprint. (5)

Of course, Design Thinking alone will not make your administration an agile entity. But it is a good starting point. While the idea of agile organisation is still relatively easy to grasp within one team of 10 to 20 people, how can this work in an administration with several hundred persons involved?

If you want to learn more about how agility can be achieved for larger organisations, have a look at Scrumatscale and Product School: The Spotify Model (6,7).

Maybe you want to start an experiment: Could any of these models or at least some of their component be gradually introduced in an administration?

A Democratic Process

Cities and municipalities play a decisive role in tackling the great challenges of our time. Not only do the democratic constitutional state and its citizens meet here more directly than anywhere else, but the concrete measures for creating sustainable living spaces also become tangible here. Digitalisation is a decisive lever in this context.

Cities in particular are seen as the key to a consistent, sustainably designed digitalisation of society. However, the technologisation that goes hand in hand with increasing digitalisation also harbours the potential for conflict, as topics such as mobile phone expansion and the use of sensor technology in modern city centres repeatedly trigger discussions of a factual, unobjective or emotional nature. People sometimes worry about the health effects of new technologies and see problems with data protection.

What needs to be understood is that Smart City is also a democratic process. This has a lot to do with a new understanding of the communication relationship between the administration and public stakeholders. Ideally, this relationship should be symmetrical, i.e. communication-oriented, on an equal footing and based on continuous dialogue. Ideally, this will result in a transparent, communication-centred, agile administrative culture that paves the way for innovation and digitalisation.

Public participation is one of the cornerstones of democracy: those who feel heard, met and involved where they live, who directly experience the consequences of their input, experience the core of our social system. So the first step in smart city projects is to define the situation: Why should I get involved? What results can be expected, by when, and in which area? And how does this relate to all the other projects of the administration? This communicative framework is still completely missing in the reality of smart cities in many places. The result is often citizens who do not (or cannot) understand the development of their municipality, describe individual projects as "pointless" and do not participate out of their own motivation. How about the image of a continuous flow of development into which individual projects fit instead? Projects that bring a comprehensible added value or solve a very specific problem? Motivation to participate cannot be taken for granted by the mere provision of a given participation offer. To use an analogy from the corporate world: A very good product is a very good product. But success only materialises when the product is seen and bought. This is the responsibility of marketing and, in the longer term, corporate communication.

To achieve this, a project promoter must ensure a homogeneous external image. This transparency requires comprehensibility of communication and therefore a precise awareness of stakeholder relationships and resulting communication needs: What language does the target group speak? Which topics frighten them? Where can I best reach the target group? This applies to both the external and internal relations of the administration. How this can be achieved is described on the next page under "Tools".

Tool: Stakeholder Mapping

We should create awareness within our administration for the fact that communication has to be consistently implemented as a strategic management function of administrations. Communal action must not only be "legitimate" from the point of view of content, but also the communicative perspective. We want to make sure everybody in our teams has a basic understanding of the strategic importance of communication.

Next, we need a comprehensive, evolving picture of stakeholder relations that all administrative actors are aware of. Therefore, we create an interactive stakeholder map of our projects. Actually, you can try this right now, on the spot: Think of a project that is currently on your to-do list. Take the biggest sheet of paper you can find. Write the name of the project in the middle of the sheet. Around it, write down all the actors, groups of people, etc. who will be affected by the project in some way. Next, describe as succinctly as possible what the relationships are between these stakeholders and how they are related to the project. What do you know about each group and stakeholder? Do they have a positive or negative attitude towards the project? Why? And how much actual power do they have over the success of the project? Is there "dynamite", i.e. are there potential conflicts that

might, if they "explode", endanger the project as a whole? Hang the sheet on the wall and look at it from time to time. Show it to colleagues who are also involved in the project. Make additions. You will see: Your view will become sharper over time, your understanding of individual stakeholders will become greater - you will be able to act more strategically in the future. How does this sound? Easy, right? Still, even these most basic tools of strategic communications management are not yet developed in most administrations, yet they are crucial for making sure your democratic processes work right.

Of course, the stakeholder mapping can also be done digitally, using a collaborative tool all team members can access. In this map, we will become aware of possible issues that nobody would have thought of without this collective effort of thinking about stakeholder relations! Issues are potential conflict points in the project's context. If we have identified an issue, we can analyze it further and derive measures, using the following criteria: What is the exact issue? How probable is the issue to come true? How and how much could it influence project success? How big could public interest in this issue be? Which stakeholders are concerned by the issue? How will we as an administration

position ourselves with regard to this issue? Is it a "big" or a "small" issue? Do we have to look at it in more detail? If so, who will be doing what and until when so there is no further escalation of this issue?

As the process is collaborative, there will be many different perspectives on the project. And there lies all the beauty of this method: Nobody has a full view of an entire Smart City project with all of its details. And everybody has a different professional background, as well as different experiences. By bringing these together as described, and by talking about issues instead of just working "side by side" on our respective parts of the project, we get the best possible overview – and thus can derive the best measures possible to make sure our project succeeds!

Why Projects Fail

This section aims at guiding the reader towards a practical approach by explaining the reasons why some projects fail and by giving advice on how to manage projects successfully. Particularly, the attention will be focused on the communication issues.

Starting from the basis that the term "Smart City" describes the continuation of a participatory urban development towards an intelligently networked city in which the goals of sustainability, resource efficiency, quality of life and competitiveness are pursued with the help of information and communication technology as well as holistic organisational methods adapted to this purpose (cf. Röder, 2020); the quality of the participation and communication between stakeholder involved and citizens becomes a crucial point.

Indeed, an examination of many projects that have failed has shown that municipal project promoters face communication difficulties. The smart city is characterised by a large number of stakeholders including public administrations, companies delivering services and citizens. Consequently, processes must be designed in a participatory manner and this method does not fit with the typical conditions of municipal administrations. This is compounded by the resistance and fear from the population when facing this issue.

Case studies show how a wrong stakeholder involvement strategy can compromise the success of a project. It is crucial that stakeholders involved exactly know the objectives of the project as well as they'll be an integral part of the project. Formerly, the process to analyse the needs of the city requires also an accurate picture of the situation of stakeholders in the project environment for addressing challenges and outlining the objectives and strategy for achieving them.

It is crucial to involve stakeholder continuously during all the process: need analysis, challenges definition, objectives, strategy and implementation defining permanent working groups able to follow the project in all its milestones. Without proper communication addressed to stakeholders, the risk of failure is high.

The choice of appropriate images and symbols is also crucial. An example that testifies to this is the use of the picture of a camera intended to symbolise anonymous traffic counting – as it was the case in a German case study. This symbol had negative connotations for the stakeholders as it conveyed an erroneous message related to the surveillance of citizens. However, this logo linked to the topic of mobility is plausible only with knowledge of the contents of the project.

In the above example, the nature of the project communicated does not coincide with the actual nature of the project; this leads to a lack of complete and truthful information, which, together with a too technical vocabulary, unknown to the interested parties, has led to the failure of the project.

These shortcomings leave a lot of room for the sceptics and opponents of the project to act as significant resistance, especially on subjects that are still influential. If the objectives and benefits of the project are not communicated to the stakeholder in a comprehensible manner, a factual and fair judgement cannot be expected. Consequently, the stakeholder does not understand what is at stake and expresses scepticism or incomprehension. The promoter, in turn, interprets these reactions in such a way that stakeholder involvement yields no results other than confusion and wasted time. This reduces the level of participation and in the end both parties are dissatisfied and feel misunderstood.

Furthermore, when planning, it is crucial to consider that every city is different and therefore every smart city concept faces different challenges. It is therefore necessary to adopt customised and not standardised solutions. This would also make it possible to establish a connection between smart city projects and the cities' lived reality and thus ensure greater participation by the population.

The development of a communication strategy must start with a proper definition of the vision and objectives along with a mapping of the situation of internal and external factors. The roadmap to follow should include the following steps:

- **Define the Smart City:** stakeholders will only understand and support the project if the definition is meaningful and has sufficient references to the lived reality.

- **Provide an overview:** mapping stakeholders and stakeholder issues (what demands, interests and goals they have) is essential. It is also important to map stakeholder relations (who with whom, who against whom etc). The analysis of stakeholders and problems can never be considered complete, but it should be monitored throughout the project and be a fixed point of orientation for those involved.

- **Define working groups:** involving stakeholder concerned and committed to face the challenges and willing to participate during the whole project definition and implementation process.

- **Define internal and external communication:** In this step, a project management including representatives of all stakeholders should be appointed.

- **Establish communication as a central management function:** communication must be a priority. This may include a committee that assesses the impact of statements made by project representatives in prominent positions (press, media, city councils etc). For example, statements made by a mayor could be examined by the committee in advance to avoid confused situations and misinterpretations. Of course, the principles of seriousness and truthfulness must be respected, but always minimising potential attacks by sceptics.

- **Training the necessary communication skills in a team:** passive communication should be sensitised; every action of an employee in the project environment automatically has a communicative effect. It is important to create an idea of the communicative situations that can be created and the interlocutors who can be part of it (the language used with a technician will be different from the language used with a neophyte).

- **Building a learning culture:** learning from other participants who have been through similar situations and analysing past experience is a good method of improvement and helps to avoid making mistakes already made in other areas.

- **Users first:** focus on users' needs throughout the project activity. Offer stakeholders a solution to their everyday problems that they know and understand well (an annoying parking search, access to municipal services etc). Avoid using a too much technical approach that would be difficult to understand. Although it is rather a healthy and democratic activity of individual aspects of future-oriented urban development, which is implemented not for the sake of technologization, for the benefit of the citizen it must be clearly communicated.

- **Active participation:** projects that authentically originate from the city have a lower risk of failure than projects that are brought into the city from outside. Participation is crucial because it creates understanding, clarity, transparency and trust. However, citizen participation requires the willingness and ability to engage in dialogue. Such dialogue, unfortunately, is often considered a liability by many administrations and this attitude is reflected harmfully in participation activities.

- **Evolution instead of revolution:** presenting the principles of the smart city not as a project that replaces the existing one, but as part of ongoing urban development.
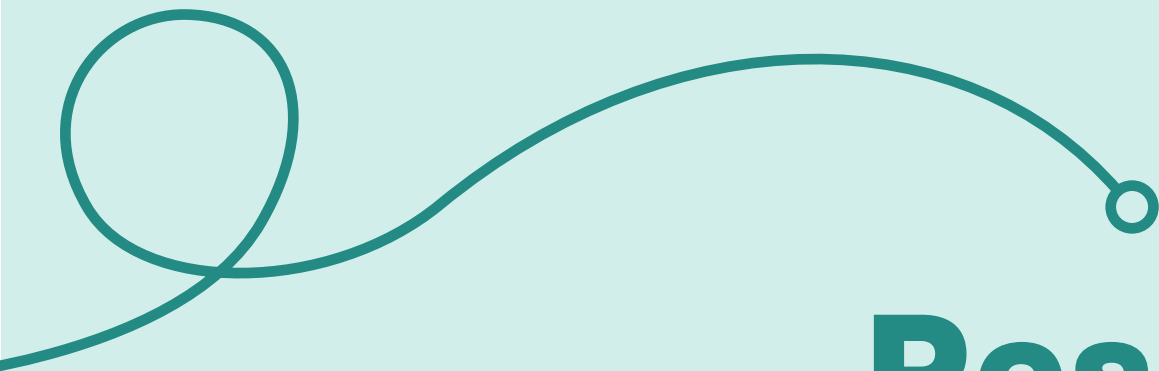
Resources

EU Policy Overview: A Europe Fit for the Digital Age

In March 2021, the EU Commission presented its vision "Europe's Digital Decade: digital targets for 2030" (1). The redefined vision builds on the 2020 strategy on "Shaping Europe's digital future" (2), while reconsidering the enormous changes brought about by Covid-19.

In this vision, the European Commission is targeting digital transformation by co-financing research, development and deployment of innovative technologies in 2021-2027, under the €7.5 billion Digital Europe program (2). Other EU programs also play a major role in funding digital infrastructure, including the Connecting Europe Facility and cohesion policy. Furthermore, at least 20% of the EU Recovery and Resilience Facility funds received by each EU country should be dedicated to the digital transition.

The digitalisation of public services is one of four main areas for action, also proposed as a Digital Compass (3):

1. Achieve a digitally-skilled population and highly-skilled digital professionals;
2. Implement secure and performant sustainable digital infrastructures;
3. Achieve the digital transformation of businesses
4. Achieve the digitalisation of public services.

Regarding the Digitalisation of public services the proposal states:

- All key public services should be available online
- All citizens will have access to their e-medical records.
- 80 % of citizens should use a digital identity (ID) solution.
- A vote on the Digital Identity Regulation is scheduled for October 2022.

Eventually, the Commission also addresses main challenges in its communication briefing: There are industry concerns about whether plans to keep 5G on track will be delivered, given all the complexity involved at technical level and the investment required. Other challenges to overcome include, for instance, the digital divide and the need to ensure ubiquitous connectivity, security concerns and other potential emerging issues, such as privacy and safety issues and ecological aspects.

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