report:
SERVING CITIZENS TECHNOLOGY

Created by: COGITO TECH
Partner: geobike
Patrons:
EXECUTIVE SUMMARY

Dear Sir or Madam,

with the unequivocal satisfaction, we present you the report Serving citizens technology. This is the first report in Poland on innovative solutions in public spaces. We include in it what from our perspective is the most interesting for cities, namely solutions that aim to make the cities more attractive to their residents and above all, more resilient, sustainable and inclusive.

Our report is an open proposition that includes a dialogue between academia, business and municipalities. Hence, it involves commentaries from 7 expert from various areas of city management, starting with transport, through circular economy, citizens participation to municipal data. Each of the articles touches on a different aspect of the dimension of innovation. After all, the city's task is to create a strategy that will take into account and integrate all of diverse and interdisciplinary aspects.

In the report you can find examples of how the Polish innovative solutions respond to the needs of the 21st century city. Most of the examples presented are embedded in the use of innovative technology, but the key factor in the choice was to find as many projects that can support sustainable society. Not without reason our partner is Geobike - a company offering a modern system of city bikes without station GeoVelo, which gives a new dimension to the sustainable transport strategy.

In the course of our work on the report we analyzed over 100 different companies and projects, and we chose 15 solutions that are worth sharing. Universal in nature, they can be introduced in cities of all sizes and at different stages of strategy implementation, helping them to become more aware of existing resources, as well as residents’ needs and opportunities.

COGITO strives to identify the needs of residents and city representatives while cooperating with cities, municipal companies and private enterprises. COGITO supports innovative solutions from customers’ perspective, as well as the selection of partners implementing these projects collaboratively. COGITO’s main objective is to build cooperation platforms between individual project stakeholders, especially between business, science and public entities. We implement projects in the field of strategic consulting, innovation development and relations building. Through our report, we want to show that cities are and can be changed in a consistent manner by the use of cooperation of various entities.

We wish you an interesting reading,

The COGITO team

AFTER ALL, THERE IS NOTHING MORE CHANGEABLE IN THE ENTIRE UNIVERSE THAN A CITY. AND CHANGEABLE CANNOT BE EVER ULTIMATELY DEFINED.

Tadeusz Peiper
Notes about the rights of poetry in: Scirpts, v. 2, 1974
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Cities are currently a very popular topic. Numerous evidence proves their extraordinary potential as well as the scale of problems that they currently have to deal with. According to the World Bank, more than 50% of the world's population lives in urban areas (in 2007 the number of urban residents equaled the number of rural residents) and in 2050 this ratio will exceed 65%. Cities produce over 50% of global GDP, occupying only 3% of land. UN Habitat (2017) reports that the cities consume over two thirds of global energy, accounting for 70% of CO2 emissions. Urban agglomeration processes operate on different scales on different continents, but globally it is estimated that 1 million people from the countryside are moving to the city every week. Although this increase may contribute to new opportunities for development or improvement of public services, it can also cause many new problems such as overpopulation, access to education, insufficient number of jobs, lack of housing, inefficient infrastructure, security of residents or low efficiency energy. Some cities consequently are facing increasing levels of poverty, crime, gentrification of districts or degradation of natural environment.

According to Accenture (2015), only cities that achieve the following two goals:

1) Reducing negative impact of inhabitants and enterprises on natural environment by providing public services with an appropriate quality, and

2) Creating an attractive economic and social environment supporting residents’ and companies’ development will be successful in the future.
While searching for a new development model cities began to formulate their smart city strategies. This concept remains vague, because no universal definition of what "smart city" implies is in place. Cities use many different paradigms while trying to pursue their strategy, and that includes a happy city, sharing city, sustainable city, digital city, green city, resilient city, livable city, and alike. The need of the cities to create a standardized management system shows how much a framework and a concept for implementing innovations are needed.

Despite the fact that at the beginning the idea of "smart city" was associated mainly with hard technology, it quickly became clear to city decision makers that innovation refers not only to a new device or a system, but also to intelligent local governance systems and most importantly, intelligent residents. Although infrastructure development and investments remain key issues for the Polish cities, their competitive advantage lies in the growing awareness of threats related to smart cities such as over digitalization. By imposing market solutions to cities without education and building processes related to innovation, cities are misled with some generic solutions. Instead they should be provided with incentives to develop tailor-made solutions in cooperation with business and science that respond to the real needs of residents. The paradox of cities that offer a wide range of digital services relates to the unnecessary implementations of complex solutions rather than conducting projects that are in a position to solve some significant problems such as basic infrastructure.

In our report, our experts present the most important solutions that will be pivotal for the development of the cities:

- Circular Economy,
- Open Data,
- Sustainable Transportation,
- Promotional Narratives,
- Innovation with Behavioral Economics,
- CivicSourcing (Using Inhabitants’ Intelligence),
- Collaborative Governance.

Experts’ analysis shows that it is not technological issues that will determine the future development of cities, but such factors as caring for the environment, residents’ safety and including them in building the city’s brand, co-management, as well as creating solutions for the problems.
SUSTAINABLE MOBILITY AS A KEY TO INNOVATIVE TRANSPORT SYSTEM

The rapidly-evolving sector of urban passenger transport has seen in recent years a burst in new technologies, which is progressively changing the game for operators, authorities and all stakeholders in urban mobility.

While this technological switch is largely taking place at operational level, the urban passenger transport sector is also facing critical environmental challenges such as urban air quality, which deterioration of will remain at the heart of policy debates. While this technological switch is progressively changing the perception of transport, and propose a complete range of mobility services available easily and at no cost. As a flagship example, Mobility as a Service (MaaS) shifts the concept of getting information from various transport providers to a single mobility service accessible on demand. Following this trend, we can expect in the near future that our electronic devices will increasingly dematerialise mobility services, and connect and interact with a greater frequency and accuracy, which we can already see impacting transport ticketing systems and free-floating vehicles fleets, for example.

To conclude with, through knowledge and experience of these new systems, fast-forwarding technologies can support decision-makers in proposing a smoother and dematerialised mobility in their cities, while achieving their environmental objectives and providing an increasingly sustainable mobility offer to their local populations. On citizens’ side, these systems will reply to increasing wishes for real-time, connected, shared and seamless mobility.

We can expect in the near future that our electronic devices will increasingly dematerialise mobility services.
URBAN DATA, COMMON GOOD

In modern cities, data can create as important infrastructure as physical networks can. Electricity, sewage or transport, although invisible and immaterial, they can play an equally important role, supporting existing urban infrastructure. However, proper data management is required for that and city authorities are responsible for creating an ecosystem in which data serves all inhabitants, and not only some specific groups of interest. This ecosystem must be based on different values rather than data monetization and profit. So a narrative, that the data is like oil - raw material which you can make a fortune on - should be changed. the basis for a new paradigm must be based on the awareness that data that we are using belongs to people.

Alek Tarkowski (PhD)

Urban data ecosystem must include not only public data, but also this data that is generated by private entities.

First of all, it is about data generated thanks to sharing economy applications - for example the real estate market or urban transport. A good example for that may be data from popular city bicycle, sharing systems. If properly used, it could support better planning of transport policy. To make this possible, this data cannot be given away to commercial entities. Some examples of efforts towards regulating these are in place. In New York city, companies such as Uber need to share traffic data on vehicles operating in their network. These data, made available in the open data portal, becomes a common good - accessible to everyone.

Cities should also experiment with new types and new sources of data. New opportunities can be created by emergence of Internet of Things (IoT), that is based on networks of sensors capable of downloading almost any type of data. For example, in Barcelona Sentilo sensor network allows to optimize waste disposal schedule. But it is not only about new types of sensors, but also about involvement of residents and including them as partners. It is claimed that in smart cities, the residents should be smart citizens - they should participate in the processes of data collection and use it actively. A good example can be measurement of air pollution - cheap metering system installed by citizens can work just as well as a few official measurement stations.

Today we all are a source of data - it is in the public interest to collect data properly, organize it and make it available for public use.

This ecosystem is created to a certain extent by combining efforts of entrepreneurs and citizens, the role of city authorities is to define the rules according to which entities should share their data. On one hand, we should take an example from business entities who have understood that data is a new source of energy that drives urban life. However, we need an alternative system of values, thanks to which data will serve us all. Nowadays, we can hear about technological sovereignty in the context of open data - creating an open data ecosystem that serves citizens. Such an approach can be developed bottom-up by city movements (or the Third Sector), but its full implementation requires support of the city authorities.

Alek Tarkowski (PhD) - sociologist, digital rights advocate and researcher of digital society. Co-founder and President of Centrum Cyfrowe Foundation, a think-and-do tank building a digital civic society in Poland. Member of the Steering Committee of Internet Governance Forum Poland. In 2011, he co-authored the “Roadmap for Open Government in Poland”, which highlighted the importance open data and open government models, both at national and metropolitan levels. Since then, he has been actively involved in debates about open and big data, and the social and civic aspects of new technologies. In his work, he combines experience in strategic planning, regulation of digital technologies and civic policymaking.
CIRCULAR CITIES
TO GET TRULY SMART, CITIES HAVE TO BECOME CIRCULAR

The Circular Economy

We now live in what has been referred to as linear economy, where we extract many biotic such as plants or animals, or abiotic substances like mineral or metal resources. Then we use them, and then send them to a landfill or disperse them into the environment in a way that they are unrecoverable – for example, through incineration, spraying of chemicals, or the use of products like paints that are not designed for recovery.

Less than 10% of the materials that pass through our economy each year are recycled[1]. In a circular economy, by contrast, all products and materials are recovered for beneficial reuse and the value-generating life cycle of products is extended to the greatest degree possible. The basic directives of such a model include:

• Design all products, including buildings and infrastructure, to be fully recyclable and, ideally, made of easy-to-disassemble subcomponents that can first be reused at higher value than the materials themselves.
• Create the necessary business structures and incentives to get these materials back into the economy at their highest possible value – for instance as whole products or components.
• Strive to use only renewable resources for both energy and material provision, without overstretching the regenerative capacity of ecosystems.
• Avoid the use of toxic substances, especially if these have any risk of continuing to circulate in our environment.

To achieve these gains, it is not enough for us to simply become better at reverse logistics and recycling. We must orchestrate a systemic transition that supports, among other things, new forms of collaboration across value chains, the adoption of alternative business models, and a shift in consumer behavior. When we test different implementation scenarios of the circular approach, we see that it has to be taken even further in order to account for preservation of human health and wellbeing and to function within known planetary limits, such as climate change. In its fullest implementation, the circular economy can ultimately be defined as a new economic model for addressing human needs and fairly distributing resources without undermining the functioning of the biosphere or crossing any planetary boundaries.

A Vision for Circular Cities

So how should circular cities look like? Following up on the definition of a circular economy, we may expect that, for instance, all material cycles flowing through cities should be recovered for reuse or recycling and that a majority of all consumed resources should come from renewable and non-toxic sources. Though this is, broadly speaking, the scale at which these goals are achieved will not necessarily occur at the level of individual cities. Indeed, if we wish to continue having an economy that includes a global supply of tropical fruits and the continued proliferation of personal electronic devices, then complete localized self-sufficiency in terms of resource flows is neither possible nor desirable. Urban circularity in a global economy will look quite different from autarky. However, activities within cities should not violate the possibility of operating the circular economy on a broader scale, and should support it widely. Certain resources such as water, energy, and certain ubiquitous materials should ideally be harvested and reprocessed directly on the urban scale, greatly reducing historic reliance on hinterland production.

1) BIODIVERSITY:

The city is integrated into its hinterlands through a continuum of natural areas and green corridors. Flora and fauna are able to flourish in the circular city, with many dedicated habitat zones and limited hard surfaces. In relation to a number of spheres the city feels more like a natural habitat integrated with buildings than a cement landscape with a few interspersed parks.

2) WATER:

All essential nutrients and other resources from liquid wastes, are safely recovered for use in agriculture, and other productive systems. Cities are designed to handle periods of both drought and heavy rainfall through the use of adaptive infrastructure.

3) ENERGY:

All of the energy used within the city – whether for heating, lighting, cooking, or transport – comes from renewable resources. The city is vastly more energy efficient – consuming only a quarter of the energy overall – when compared with similar-sized cities of the past.

4) MATERIALS:

All materials entering the city are designed to be cycled at high value meaning that they are designed for reuse, refurbishment, recycling, or composting. All products made within the city itself are similarly designed for high-value recovery. Waste collection rates within the city are at 100% and all waste materials are processed for beneficial reuse, with incineration applied only to degraded or biohazardous products with no further option for treatment.

5) SOCIETY AND CULTURE:

Communities are close-knit and individuals are well supported by both families and friends. Social and cultural activities abound. Diversity is celebrated, and communication between different social groups is free of strain. People are fulfilled in their daily activities, with everyone in the population participating in activities they find meaningful while also fulfilling the needs of the broader group.

6) HEALTH AND WELLBEING:

Air quality in the circular city – both indoor and outdoor – is as pure as what was once found only in pristine natural areas. Moreover, nearly all sources of pollution have been eliminated. Streets and neighborhoods are designed for easy walkability and human-powered transport. An abundance of green areas leads to greater mental wellbeing and productivity, as do the abundant social support networks. Healthy food is abundant and readily accessible.

7) VALUE GENERATING:

The city has a robust economy that is built upon a mere fraction of the physical resources that cities of comparable size once consumed, using less than 10% of the imported virgin materials as was once common. The economic productivity of resources consumed has dramatically increased. Other forms of value, like aesthetic quality, disease-free-days, citizen subjective well-being, biological diversity, and innovation, are actively measured as benchmarks for economic performance alongside revenue generation.

CITIES OF THE MEANINGS - BUILDING PROMOTIONAL URBAN NARRATIVE FOR THE CITY

When it comes to building urban promotional narratives, what is important is not so much the real history of the place, but the way it is presented. Building an urban narrative means many times a clash with knowledge, experiences, beliefs and stereotypes that function in social consciousness. Promotion of the city as an artificially created cultural artefact determines a story chosen by the authorities and presents a chosen vision for that.

RESEARCH PROJECT “CITIES OF MEANINGS” [1]

Conducted research on (re) interpretation of cultural and historical threads in urban promotional narratives aimed at determining whether the promotional vision, created simulacrum, can be perceived as more authentic than the actual heritage and history of a given place. The research allowed to develop three main strategies for building a promotional narrative using cultural threads and possible consequences for making these activities credible[2]:

THE STRATEGY OF THE NEW INTERPRETATION (CONTINUATION)

describes a promotional narrative which, with minor (re) interpretations, pursues commonly known cultural threads. Such a built narration reassures the recipients with a belief that they have a right opinion about the city and legitimizes the city’s ideas. As a consequence, such activities are characterized by high credibility.

THE STRATEGY OF A NEW CHAPTER,

a continuation with a cut-off, describes a promotional narrative in which some (re) interpretations are introduced by cutting off from certain threads and presenting other, broadly unknown threads. As a result, the message contains unexpected content for the recipient. Although the content is authentic, the recipient can provoke dissonance, settled in favor of previous ideas. Consequently, such a narrative can be rejected as unreliable.

THE STRATEGY OF THE NEW HISTORY

describes the most paradoxical mechanism - a complete cut-off from the current cultural threads, where (re) interpretation is replaced by new history. Building a new narrative for the needs of promotion means that it is not required to address entire cultural context. The narrative of a completely new, fictional history, detached from cultural heritage, may be paradoxically more credible than the narrative of an authentic yet widely unknown history.

Actions

Choosing a strategy to build a relation with history (building on it or cutting it off) should not be arbitrary. Promotional narration of a given city should be tailor-made. Using inspiration, “good practices” or benchmarks is a good starting point for discussion, but it is not necessarily the subject of discussion. Among the specific activities undertaken by cities in connection with building - or verifying the existing - promotional narrative, it is particularly important to use social research and participatory tools. Research instruments provide a wide range of possibilities from well-known surveys and in-depth interviews (individual, group), through consistent collection of big data, through workshops or public consultations to processes of co-designing services and the use of design thinking methodology to diagnosing problems, generating ideas and prototyping solutions.

An advantage could be taken of the fact that the promotional narration can function as a starting point for social discussion on local identity, and thus support the integration of the inhabitants, the way in which cultural threads are formulated in a promotional narrative is very important to their recipients who can oppose whenever they encounter some inconsistencies.

Tools based on the participation of various stakeholder groups are not only passive feedback gathering, but verification and co-design of new solutions. The following questions: “How do we want to talk about the city?”, “What should be the content of the urban promotional narrative?” should be answered by the city, that is, the inhabitants. This is why sensitivity to local cultural threads, their simulacra and distortions in promotional narratives is so important to manage the city in a socially and culturally responsible manner.

Implementation

the practical implementation of the promotional narrative, using available technologies can be based on virtual and non-virtual channels of communication, supporting both a solid brand and a partner relationship with residents. Among the existing solutions, it is worth mentioning such activities as: two-way communication of social media, quick access to in-depth content through QR (“quick response”), immersion experiments using extended or virtual reality (“augmentedreality”, “virtualreality”) or other non-standardized forms of promotion (so-called “ambient”), adapting the urban space with the use of techniques such as for example mapping.

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Aleksandra Wycisk ([Warsaw University of Technology], PhD in sociology (hon),

graduate in sociology and cultural studies at University of Silesia, Katowice, Poland. In Research and Analysis Department, WUT, Aleksandra specializes in qualitative methods and focuses on processes of social adaptation of innovation. Aleksandra is passionate about urban sociology and research on the processes of reinterpretation of urban meanings. Her doctoral thesis concerned the social reception of city marketing and process of building the image of the city (National Science Centre grant, more on the “Cities of meanings” project at: https://miastaznaczen.wordpress.com/about/).

[1] the research was carried out with the grant from the National Science Center: “Cities of meanings: images of Polish cities and social reception of their promotion and transformation of the themes of tradition and cultural content” (no. DEC-2012/05 / N / HS6 / 00962) at the University of Silesia in Katowice in the period of 2013-14. More information: https://miastaznaczen.wordpress.com/.


Aleksandra Wycisk (PhD)
INNOVATION FOR CITIES WITH BEHAVIORAL ECONOMICS

What is behavioral economics?
Behavioral economics is the younger sister of economics - it was founded only 50 years ago and became a science focused on effective decision making. It is based on the premise of finding the most effective methods of influencing people's behavior, especially those undesirable from the point of view of the public interest (e.g. the city).
Therefore, behavioral economics can be seen as a set of tools and rules that explain the behavior of people, consumers or residents, and allow to indicate an effective way to change it. These are usually simple and small changes that can bring significant benefits if used on a large scale.

Why does it work? What does it bring?
Why have the representatives of behavioral economics received already two Nobel prizes in economics in the 21st century? The reason for the high efficiency of this method is in-depth analysis of decision-making process and facilitation of making decisions in a difficult moment. We face similar problems in making decisions, and unwanted behaviors become widespread - who among us did not settle income tax for a few days (hours?) before the deadline? How many of us postpone difficult savings decisions for later? How many of the New Year’s resolutions do we keep until the end of the year?

These types of problems affect everyone. Some of them can be applied in the context of city activities. Applying the outcomes of behavioral economics to the cities’ problems can therefore help to improve the operation and the satisfaction of their residents.

How can behavioral economics be applied to the benefit of the city?
Although behavioral economics has in most cases been used on a national scale, it can also be successfully applied locally. There are already a number of good examples showing effective changes of undesirable behavior of the citizens in the city dimension.

Thanks to knowledge about the behavior of residents, innovations and new technologies can be used in a much more effective way by the city authorities. Understanding how environment and a particular context affect the behavior of residents can help officials to create better guidelines for the city. The key to obtain this knowledge is not only to study the effectiveness or profitability of a given innovation, but also the way in which residents react to it.

Increase of the collection of real estate tax in Buenos Aires by improving the way of communication with residents - the text of the letters sent to residents has been enriched by ideas coming from psychology that motivate them effectively to act.

Increased participation in the waste program in San Jose thanks to better targeted and properly worded information.

The City of New Mexico has effectively reduced the number of incorrect or unjustified claims for unemployment insurance due to redrafted forms, saving almost $7 million.

Reduction of the number of road accidents at one of the most dangerous intersections in Chicago - triggering the psychological effect of the illusion of fast driving thanks to special signs causing the drivers to involuntarily slow down.

Denver, by using applications from behavioral economics, the percentage of entrepreneurs settling their taxes online was doubled.

Economist, graduate of Warsaw School of Economics (Bachelor and Master), doctor and scholarship holder of the Leon Koźmiński University, where he wrote and defended his thesis on the application of Behavioral Economics in Public Policy under supervision of prof. Kolodko. A former analyst at the Institute for Structural Research, a junior World Bank consultant in 2012-2013, from 2014 a consultant specializing in innovation and behavioral economics in the World Bank. Responsible for developing projects in the field of innovation and behavioral economics at the World Bank’s Warsaw office. Founder and vice-president of the Young Reform Poland Association.

Winner of many scholarships and competitions, including: the first edition of the Digital Poland 2020+ competition (Polish Chamber of Commerce and Orange), scholarship of Lesław A. Paga Foundation, multiple speaker at congresses and conferences, including: the European Economic Congress, the Innovative Economy Congress, the European Forum for New Ideas, the European Congress of Small and Medium Enterprises.
CIVICSOURCING: THE POTENTIAL OF “SMART” RESIDENTS

Civic participation is gaining importance today thanks to new technologies and the growing involvement of citizens around the world. Innovative solutions open new areas of the public sphere, enabling effective cooperation of specialists with communities. One of the most effective methods, used for a long time successfully in business, is crowdsourcing, or the use of so-called crowd intelligence. Well-known scientist and expert in this area Daren C. Brabham defines crowdsourcing as a digital and distributed model of production or problem solving by Internet users, realizing specific goals of the organizer, regardless of the actual character such as enterprise, government or individuals. Crowdsourcing is not just about technology and the use of a digital platform to solve problems.

There is no question of crowdsourcing without the existence of four conditions:

1) ORGANIZER
who has a task to solve (in this case local governments)

2) COMMUNITY
ready to solve them voluntarily (residents)

3) DIGITAL SPACE
where work and contact between the organizer and community takes place (e.g. crowdsourcing platform)

4) MUTUAL BENEFIT
for the organizer and for the community.

One of the crowdsourcing types used as a form of cooperation with citizens is called public or civic crowdsourcing, sometimes abbreviated as civicsourcing. Below are four ways to use civic crowdsourcing.

STOCK MARKET OF IDEAS AND COLLECTIVE PROBLEM SOLVING

Through joint cooperation and use of collective intelligence of citizens, cities are able to better plan their own development as well as to solve the most important problems of their residents. Some platforms allow for thorough discussions on almost every aspect of the metropolis's operation, while others focus only on certain sections. A common feature is always high user involvement. This type of platform includes, for example: SpeakUp Austin, CitizenLab, Nextistambul or Otwarta Warszawa.

REPORTING PROBLEMS
Residents equipped with smartphones are able to notice and inform the authorities about minor problems occurring in their area faster and more effectively. A hole on the road, a broken bulb in a streetlight or an inscription on the wall offending fans of one of the local teams, can be quickly marked by citizens on the map and communicate information to responsible services using a dedicated platform or application.

Thanks to the fact that the reported problems can be easily solved, platforms such as FixMyStreet, SeeClickFix or Polski Naprawmy.to can present high efficiency, sometimes reaching 90%.

CO-FINANCING PROJECTS (CIVIC CROWDFUNDING)
Sometimes the city budget does not cover expenditure on all investments, or the authorities consider them less important. This is where crowdsourcing meets crowdfunding. Residents of many cities are willing to voluntarily support in a bottom-up projects that can have a positive impact on the life of a community, their immediate surroundings or solving specific problems. The platforms like SpaceHive or ioby feature many projects that improve the quality of life of residents.

CO-CREATING AND CONSULTING THE LAW
One of the most famous examples of co-creation of local law by citizens is the constitution of the city of Mexico. Through the change.org platform, residents can submit the proposals related to the text of the document, which after reaching the minimum number of votes and verifying by a committee of 21 experts had a chance to become law. The idea achieved the desired effect and involved citizens to send hundreds of proposals and cast thousands of votes on the platform. It is true that the actions of the authorities was repeatedly criticized for the populist character and selective treatment of citizens' proposals, but the outcome document was enriched by very important records that came straight from the crowd.

It seems that there are thousands of examples of using citizen's involvement in the city's development. It is important, however, that these activities do not become the asks of the crowd, but instead fueled by expert knowledge, consultations and consistent implementation of the strategy they are consistent with other activities of the city.
COLLABORATIVE GOVERNANCE IN THE CITIES

EXPERIENCE OF NEIGHBOURHOOD LABS IN BOLOGNA

Contemporary democracies are witnessing an increase in people’s participation in public life, through practice of collaborative governance (Arena, 1997). What contributes to this tendency are care for public spaces, urban commons (Foster and Iaione, 2015), as well as the use of new social media and ICTs in the public sphere (Boyd, 2008; Arteri, 2012). In the last years, we witnessed a hierarchical logic of political initiatives and traditional initiatives for citizens’ participation in the public sphere appear as no longer representative. Public administrations and institutions are challenged to innovate and not to simply govern on behalf of citizens, but also with citizens, which provide a great source of energy, talent and ideas.

One of the best practice examples when it comes to collaborative governance are Neighbourhood Labs[1] in Bologna. It is an initiative of the Office for Civic Imagination of Urban Center Bologna[2], the Municipality and its Districts and the University of Bologna and it is promoted in the frame-work of the Urban Innovation Plan. Laboratories are “spaces” dedicated to the interaction and the construction of relations, the purpose of the project is to establish stable processes for the engagement of citizens in the policy-making cycle in Bologna and for the innovation of the practices of the Administration, using also open data, digital tools and a municipal ICT platform. Specifically, citizens are engaged in co-design processes in order to decide how to spend money allocated for participatory budgeting, for the transformation of public space, how to use public buildings or identify the priorities of neighbourhoods’ agendas in the different fields, such as culture or welfare. Neighbourhood Labs are focused on the transformation of proximity areas, public space and public buildings.

Collaborative governance needs to be supported by methods and technologies that will increase the accountability and effectiveness of the process. In Bologna it is shaped by different tools of engagement. Namely, the citizens can participate in decision-making process by attending meetings and suggesting ideas, proposing concrete projects and co-designing urban actions with the support of municipal officials, attending, animation and community actions activated by the Office for Civic Imagination, voting for a project in their neighbourhood. In the first year of Neighbourhood Labs, almost 2500 citizens were engaged in more than 90 events and workshops and 14,585 voted for the projects of the Participatory budgeting, the peculiarity and the strength of Neighbourhood Labs is the capacity to mix traditional and digital engagement tools. Besides social media and digital storytelling[3], a digital space can be used for such projects. In case of Bologna it was community hosted by Iperbole. It allows every citizen, association, enterprise or informal groups of Bologna to have a public profile, a blog and to describe their own projects; to get informed on others citizens’ projects, share with them resources, collaborate and decide to manage together urban commons, also activating Collaboration Agreements[4] with the administration; to have an access to services and information on administrative deadlines; to interact with the Municipality also participating in consultations, tenders and announcements. At the end of May 2017, 43,483 citizens had a digital identity on Iperbole.

Digital spaces facilitate the process and the different phases of the Participatory budgeting allowing citizens to send their proposals online, to publish the projects and to sponsor them with the entire citizenship and to make people vote in the first digital consultation of the Municipality. It is important to stress that also in this case, technology supports citizens’ participation without replacing traditional forms of interaction. As an example, the staff of Office for Civic Imagination and neighbourhoods created assisted voting point during the entire voting phase to reduce as much as possible the impact of digital divide, the possibility to create a digital habitat for Neighbourhood Labs inside Iperbole constitutes a fundamental milestone for the city and its social capital since it can offer infrastructures, technology and crucial support for an initiative that is ever more central and strategic for the Municipality and for a community of practice that grows and increases its impact and inclusiveness.

Stefania Paolazzi

is a project manager and facilitator at the Office for Civic Imagination of Urban Center Bologna, working in the framework of the project Neighborhood Labs and supporting the implementation of the Digital agenda of Bologna’s Municipality. She studied European and international studies and she holds a post-graduate master in Smart Communities Design and Management. She previously worked for local authorities network as ICLEI and ANCI Toscana and for the Representation of South Tyrol in Brussels.

Michele d’Alena

is the coordinator of the Office for Civic Imagination of Urban Center Bologna. He previously worked in the social field and in private and public administration for the Municipality of Bologna, he worked on the implementation of Digital Agenda, on the project “Collaborare e Bologna” and at the redesign of the Iperbole civic network. As consultant he coordinated activities for the Tuscany Region, Italian Institute for Commerce and Trade, Italian Chamber of Commerce in Germany, O-One and Italian-Slovak Chamber of Commerce. Before that, for ANPAS ER and AUSL Bologna I have worked on social-health integration projects, social and intercultural communication, active citizenship. For the University of Bologna he worked on the TagoLab, a laboratory on territorial marketing in web 2.0 engaging young students.

References:


[2] Ufficio Immaginazione Civica (Office for Civic Imagination) is a space dedicated to the elaboration and definition of new forms of collaboration between urban actors, its aim is to experiment innovative and collaborative practices, working with the Districts of Bologna to promote and develop urban innovation projects.

[3] In 2017, the digital storytelling project has been led by Ufficio Immaginazione Civica but also by a group of youngsters aging between 18 and 25 that were engaged in the project LabUnder in order to use new languages and technology to improve their capabilities in the use of social media, enhance public communication and reach new publics.

[4] In Bologna, thanks to the “Regulation on collaboration between citizens and administration for the care and regeneration of urban commons”, citizens can promote actions for the care of urban commons supported by the Municipality. For more information about the Regulation see Iaione, 2016.

Stefania Paolazzi / Michele d’Alena
15 MOST INNOVATIVE URBAN SOLUTIONS

WHAT DOES IT MEAN THE BEST TECHNOLOGY?
Best technology implies the highest value for an individual, in the context of urban space for city dwellers. In this part of the report, we present innovative solutions which implementation of in our opinion directly affects the improvement of the quality of residents’ life. Below we present our methodology, a group of experts and evaluation criteria.

CHOICE
the COGITO team has created a database of over 100 Polish innovative solutions in the urban space. The solutions concerned such areas as: transport, energy, environment, social innovations, industrial solutions, ICT solutions, architecture, education, applications, GIS solutions, intelligent payments, artificial intelligence and virtual intelligence. 15 examples presented in this report have been selected from the database.

EXPERTS
the choice of solutions presented was made by a 5-members team: 3 employees of COGITO (Natalia Kobza, Małgorzata Hermanowicz and Zdzisław Heydel), our expert Dr. Jerzy Toborowicz and PhD candidate at the University of Warsaw from the Department of Geography and Regional Studies Dorota Petryk.

CRITERIA
Experts applied both quantitative and qualitative criteria. Due to the wide range of applications of urban solutions including hard, virtual, urban to social solutions, it was difficult to apply a unified rating system. Therefore, the most important criteria were:
- Satisfying real needs of residents,
- State of the art / the level of scientific development of technology,
- Number of operating solutions and implementations,
- Market potential and scalability of the solution,
- Innovation and uniqueness of technology,
- the costs of implementing the solution for cities,
- Impact on the environment,
- the possibility of integrating the solution with existing services or products,
- Following sustainable development strategy outlines,
- Impact on indicators of the quality of residents’ life.
City bike systems introduced in Polish cities on a larger scale have been a huge success. Bicycles have the chance to fill in the transport gap, now faced by both larger and smaller cities across Poland. GeoVelo is a system which gives the bicycle revolution a completely new meaning: the bike becomes a full-fledged means of transport in cities. the new area of activity of GeoBike, one of the largest producers of electric bicycles in Poland, is the creation and management of a nationwide public bicycle system designed for cities, tourist resorts, universities, academic centers, hotels and companies. GeoVelo can become a milestone in the modern urban transport ecosystem.

GeoVelo is an ideal solution both for those cities that cannot afford to invest in cycling infrastructure, but also for the cities that want to plan this infrastructure. Namely, data collected from GeoBike bikes let you know where you need changes and how they will be most useful to residents. In addition, bicycles can measure the quality of air on their way, and also be used as mobile advertising in the urban space.

Residents gain a new means of transport that allows faster and more efficient navigation around the city than ordinary bicycles, while contributing to the reduction of air pollution. Through GeoVelo, the city can promote low-carbon transport, healthy lifestyle and rationally plan friendly infrastructure. the extension of this system can be electric bicycles, which allow to increase the range of the network and greater comfort of use. GeoVelo bike can be picked up anywhere, without any limitations regarding the route or distance.

**GEOVELO CAN BECOME A MILESTONE IN THE MODERN URBAN TRANSPORT ECOSYSTEM.**

How does it work?

Geobike provides the agreed amount of bikes free of charge as its own investment, eliminating the need to spend public funds for its purchase, benefiting from the rental of bicycles. the GeoVelo software works in all cities on the same basis, and no additional fee is charged for its use. GeoVelo bicycles are equipped with electronic locks, the latest technologies connected with the GPS location and data transmission are used. the GPS data collected by the system on the main routes on which cyclists move can be used to develop an urban strategy for the expansion of cycling routes and routes. GeoVelo technology can use cities to meet the expectations of its residents.

With the help of the appropriate application, the account can be activated by topping it up with a particular amount of money and through an interactive map the nearest bike is found. the advantage of this system is that it does not require investment in docking stations. However, it is possible to leave the bike in the parking zones designated by the city as GeoVelo works as a bicycle carsharing. the flexibility of this system is its unprecedented power. Geobike’s mission is to create a system ideally suited to the city structure and the requirements of the local community, as well as a system that using the advantages of cycling will increase the benefits that can flow from here to the city.
**ACTIVY**  
**Motivational bicycle app**

**Gamification / Mobility**

Activy is the first mobile cycling game. It won the startup Imagine Cup contest organized by Microsoft.

Activy’s idea is to convince the inhabitants of Polish cities to change their transport habits by encouraging them with rewards such as the BikeCoin currency, which are exchanged for real prizes, discounts and special deals. The application can be used in the incentive programs of large companies through the “Bike to Work” project, which engages employees and encourages them to switch to cycling by gamification. Hence, every ride transfers money from the company to a charity. In September 2018, in cooperation with several Polish cities, Activy is organizing city bike games that go hand in hand with the use of a bicycle as a permanent element of transport infrastructure.

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**BIN-E**  
**Intelligent trash can**

**Waste management**

BIN-e is the world’s first waste sorting device designed for places where people do not have time and options for it - offices, shopping centers, airports or railway stations. The functioning of BIN-e is built on the proprietary object recognition system based on machine learning and artificial intelligence algorithms. The system also includes the IoT platform necessary to manage a very large amount of data which enables constant monitoring of all devices on the network. The main clients are office and real estate operators who want to offer their tenants more than just a normal trash can. BIN-e is an element of the most advanced waste management system, which generates savings resulting from lowering costs of waste disposal and their compression.

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**ESCO**  
**Optimization of energy costs**

**Energy**

ESCO is an abbreviation of Energy Service Company: a company offering energy services. It deals with energy-saving investments: projects and services that, thanks to appropriate modernization, ensure a more sustainable use of energy. By means of the changes, the customer is able to get the savings, which in turn allow him to pay the project costs, because ESCO covers such costs at the beginning of the investment. As a result, the services of ESCO may be used by entities that do not have a budget appropriately secured for these purposes. Municipalities and public institutions such as: schools, hospitals, public utility buildings as well as communal apartments are the clients of ESCO. They cooperate with each other based on public-private partnership agreement. In addition to the clear savings allowed by modernization, optimization allows achieving CO2 reduction targets that include state units.

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**ESRI**  
**Geographical information system**

Esri Polska is a specialist consultancy which provides services in the design and development of geographic information systems. Maps created in the GIS system are multidimensional and can be used in many spheres of life. Esri offers its services to local governments for spatial planning, urban planning, transport management and waste management. The software has been used, among others, in creating a spatial base of multiple monuments and a four-dimensional model of the Wilanów Palace area, as well as in creating a map of the availability of public transport in the Warsaw agglomeration. In the first case, the maps allow for observing changes over the years and to control all elements using a single tool. In the second one, using the obtained public transportation data, it can easily identify places without optimal accessibility. Notably, the system allows publishing information to citizens using the online map service: thanks to this information is available to citizens, architects, planners and investors.
**FUTURE PROCESSING**

**Intelligent software**

Future processing is a company that implements innovative technological solutions for clients from various sectors. One of their tools is CIVICO, a tool for intelligent monitoring - it allows automatic detection of dangerous activities such as for instance vandalism. CIVICO learns from the city and parrellely draws lessons from its performance, thanks to which it becomes progressively more precise over time. Another tool developed is SmartFlow, which allows cities to manage the water supply network. Diverse Future Processing solutions can be applied in smaller and larger cities.

**GRADIS**

**Smart lights management system**

**Energy/ AI**

Gradis offers property managers and city councils software to support modernization of lighting. It allows to save up to 40% of energy costs related to the external lamps. With the use of specific algorithms, the environment and local conditions are considered, and thus improve energy efficiency. the benefits of the Gradis system are multidimensional and are associated with increased savings and safety, and limit the effects of light pollution. the company cooperates with local governments, producers of lighting fixtures, public and private institutions as well as energy operators and distributors. It received support from the National Center for Research and Development, and plans to export its solutions to the other continents.

**NAPRAWMY.TO**

**An application that facilitates communication with the local government**

**Society**

Overturned road sign? Trash? Scruffy sign on the wall? Cities are unable to monitor every minor fault and every urban problem. At the same time, residents seem to have no direct impact on these irritating defects. the system of information on irregularities often fails. Naprawmy.to is an application through which we can quickly send a request for a particular fault to be addressed. It has a quick turnaround as it goes directly to the appropriate cell of the local government administration without unnecessary bureaucracy. Although there are no deadlines nor official procedures in the system, users can view the progress of the reported case through the application interface. Naprawmy. to has already solved over 23,000 cases reported by residents. the founder of the site was Stefan Batory Foundation. "Shipyard" Social Research and Innovation Laboratory is responsible for the management of the website.

**ODDAM ODPADY**

**Ekomap**

**Waste management**

Oddam Odpady (ENG: I will give away the waste) is an association that implements actions related to waste education. Specialized in designing and promoting solutions for the circular economy they organize workshops on recycling, upcycling and sustainable development. While teaching about waste, members of the association noticed very specific problems related to waste segregation, so they decided to help to manage the waste. Consequently the Ekomap project that includes a series of maps of places where you can legally get rid of things, repair them or prevent waste has been created. the thematic maps include map of open composters, purchasing used goods or collection of expired drugs.
**PSZCZELARIUM**

**Beekeeping**

**Environment**

Pszczelarium is an initiative to save bees, but also to promote beekeeping and the diversification of urban fauna. Bees are becoming more and more vulnerable and need our help, and there are many places in the urban space where they can find a safe haven. Parks, green squares, allotments and flower-filled balconies constitute just a few. The beekeeping department checks whether the location is right, provides beehives and insects. It also conducts surveys and takes care of bees, the beekeeper covers part of the costs and enjoys his own honey. In Warsaw alone, Pszczelarium takes care of beehives in parks as well as on the roofs of office buildings or shopping malls. Pesticides are not used in cities, and despite appearances, bees have a better chance of survival in them. Municipal honeys are also clean: bees do not collect polluted nectar and the diversity of urban plants makes the taste of urban honey peculiar and unique. The beekeeping department also operates in Katowice and the Trójmiasto. Pszczelarium is also conducting beekeeping courses and workshops for children and adults.

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**SKRIWARE**

**3D printers and programming workshops**

**Education / 3D printing**

Skriware is a startup that provides solutions based on 3D printing technology. The company has developed a fully integrated ecosystem, which consists of easy to use 3D printers, fully programmable learning robots, an e-learning platform, a virtual library with printable models and a 3D model wizard. Skriware’s mission is to help users develop their interdisciplinary skills through the process of designing, building and programming smart toys. Thanks to the startup, young users can take advantage of the opportunities associated with learning 3D printing technology to educate the most desirable competencies of STEAM (Science, technology, engineering, and mathematics). The Skriware educational platform was created in cooperation with Dartmouth College, the ASTRO Center unit from the Texas university A&M, and EdPlay. The tool is currently being tested by children and youth from around the world, mainly through Skriware partners, such as Kids Code Fun, CoderDojo, IT for SHE or the Perspektywy Foundation. So far, workshops using the Skriware tool have been targeted mainly at children over the age of 9, but their potential in training people can be utilized for working against digital exclusion, or the development of classes in public cultural centres.

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**SKYCASH - MOBIPARKING**

**Mobiparking - Mobile payments**

**Usługi miejskie / Mobile application**

Mobile applications that make life easier in the city are not new phenomena. Also more and more applications improving the payments exist. Skycash went a step further and put these two functions in one tool, Mobiparking. Mobiparking in a smart and easy way allows for payment for parking using a phone. After creating an account in the system, the vehicle should be marked with a sticker, the system collects money from the account and all activities related to the payment of receivables are carried out within a few seconds without leaving the car. Drivers do not have to look for small or park parking, and in the case of prolonged parking, return to the car to put a new parking ticket behind the window. Importantly, SkyCash users pay exactly for the amount of time they spent.

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**SOLATO**

**Remote heat management at home**

**Energy**

Solato is a system that facilitates effective energy management. It connects the controller of the heating device with the program that allows for managing its functions via the Internet. The program interface resembles an application for a phone, smartphone, tablet or computer. In the event of a device failure it enables remote analysis and possible repair without waiting for a professional at home or monitoring the operation of the device 24 hours a day, the system can be particularly useful for frequent travelers and those who are unable to control the heat in the house themselves. However, the system is not only a response to home needs but it also helps energy suppliers. All energy consumption data is saved and sent to an energy utility, which can predict energy demand for the future. Such data help the effective and sustainable management of energy sources.
STUDIO: NO
Urban temporary architecture
Architecture / community

How to design urban space in an efficient way? Architectural office from Wroclaw, Studio:no, designs furniture for urban spaces. They specialize in small and temporary architecture. Studio:no is more interested in solving spatial problems than building monuments. It implements projects in neglected spaces, such as stairs over the Odra River in Wroclaw. Resulting in installing of colorful sun loungers, the residents of Wroclaw are encouraged to rest outdoors. the essence is minimalism and the most effective use of space with its least amount. Studio designs are patching holes in urban tissue. In Polish cities, many places are empty or unfinished. Lack of use of the area limits the usable space of the city, and the inhabitants are overflowing. the temporary architecture is flexible as it gives the opportunity to transform projects into permanent projects or allows for a demolition if plans change or the project does not work.

SYNGEOS
Environmental sensors
Environment / IoT

Syneos designed an innovative environmental information system integrating the condition of air, water and soil. the sensor network transmits current information about the level of pollution, and thus raises awareness on local threats by identifying their source. Municipal and city authorities get information, thanks to which they can identify and diagnose pollution sources and implement preventive and preventive actions. the system uses IoT (Internet of Things), communication protocols to facilitate the further development of the network, and computational applications allowing to indicate predictions for subsequent days and hours. Devices operate with telemetry, they use GSM, LoRaWAN, Wifi and LAN technology.

WE BUILD CITIES WITH THEIR OWN IQ SERVING THEIR CITIZENS
COGITI TECHNOLOGY CONSULTING

COGITI is an advisory company providing crucial information to the cities, municipal companies and private companies in the area of smart city and innovation. We specialize in finding and creating tailor-made solutions for the cities. We help cities build their strategies, and companies adapt their products and services to the real needs of the clients.
THE CITY OF THE FUTURE AND ITS STRATEGY

With the increasing mobility of inhabitants, cities and even the districts are starting to compete between each other to become the most attractive to live. The better and more efficient and well-functioning city, the greater its advantage, the more it attracts companies and investors, and the more opportunities its residents will have as a result. No wonder that cities began to outdo the implementation of innovative solutions based on modern technologies. Conscious application of technology and innovation requires knowledge about what is actually needed. Knowledge of what solutions work for residents, which of them are effective and bring tangible results will be crucial, because cities are already competing with each other for residents. As a result, more and more cities want to be “smart” and use the latest technological achievements.

Together with the emergence of new smart products, gadgets, platforms and applications, cities want to strengthen their image. However, this is not always associated with making decisions based on accepted strategy, consisted of integrated activities and carefully planned steps. Such projects should be related to the city striving to connect urban contexts with:

- sustainable development,
- inclusiveness
- and adaptation to changes (resilience).

Often, however, the cities lack the so-called end-to-end thinking, which implies thinking about the city as a whole, as one entity that requires a common strategy. A chaotic approach towards development strategies, investments in untested solutions and concentration in selected areas leads to negligence of residents’ interest. A comprehensive approach to defining and implementing the set goals is needed. Cities do not need revolutionary solutions, but instead they need a specific vision based on data and available knowledge about their cities, as well as building residents’ trust in the implementation of these solutions.

In our report, we have drawn attention to many different elements that together have the potential to create smart cities: circular economy, city data management, mobility, promotional narratives, behavioral economics or urban community as the basis of the community. With the example of mobility in the city and the GeoVelo city bike system, we can observe how transformation of understanding of what is the function of transport, is currently underway: the residents, and not the cars have to become the end-users of transportation system.

Amongst the solutions that we selected in this report, there are companies dealing with the optimization of energy costs, as well as those that introduce bees into the cities. When reviewing this wide set, we must be aware that the point-based implementation of individual solutions will not create sustainable development strategies. It should be emphasized that

Cities do not need revolutionary solutions, but instead they need a specific vision based on data and available knowledge about their cities

The above-mentioned examples will not bring assumed results if the cities do not have carefully thought-out development strategies and do not consistently implement them. Each city is different and has different needs. It is crucial for the strategies prepared by cities to be:

- long-term, unlimited to local government’s term,
- measurable, data-based,
- created according to the rules of sustainable development,
- responding to the real needs of residents,
- consulted with residents at various levels and with different methods,
- created in cooperation with experts based on knowledge of economics, economy, transport, energy, environmental protection, etc.

Thanks to such strategies, the city will be able to avoid such mistakes as copying solutions of other cities, and will be prepared for new threats and challenges related to cyber security, climate change, migration, aging society, entering the new generation of the labor market or responding to (often opposing) needs of all social groups. So that the cities become smart, one needs to think about the strategy for everyone. Namely, a good strategy needs to consider people entering the labor market focused on modern technological solutions, as well as excluded people due to age or physical fitness, young people developing their careers and seeking new opportunities or families seeking to create a safe environment for your children.

Despite the popular belief that the cities cannot afford to prepare a thorough plan for implementing innovations, in a long run it may turn out that they cannot afford to make any mistakes that will result from lack of using technology in a deliberate and rational way.

Only building trust between city decision-makers and residents can result in successful operationalization and implementation of the city’s development strategy. The inhabitants are key to finding the right solutions, and their suppliers can only serve as a tool in achieving the goal of creating a city in the service of its inhabitants.
Miastonauci
watercolor series of Tytus Brzozowski
http://www.t-b.pl