



CASE STUDY

Virtual Warsaw

Warsaw, Poland

SUMMARY

To ensure accessibility and inclusiveness for the visually impaired, the City of Warsaw launched “Virtual Warsaw”, a virtual smart city based on Internet of Things (IoT) technology that gives eyes to those who have trouble seeing. The city is deploying a network of hundreds of thousands of beacon sensors equipped with next-generation Bluetooth to help visually impaired residents move independently about the city with assistance from their smartphones.



THE PROBLEM

Tasks such as catching a bus to work or going to a museum with friends are often taken for granted by people with five fully functioning senses. However, the 40 000 Warsaw residents with visual impairment face additional challenges that limit their accessibility to important services, and by extension, limit their independence, employment and education opportunities, and overall wellbeing. About 85% of these sight-impaired residents report having a strong sense of dependency on others in order to live their lives, and over 80% are unemployed. This group also reports challenges in actively participating in activities such as shopping and spending free time with their friends. A major factor in these high rates is that it takes about 65-95 hours of work with an individual trainer to learn how to move safely about the city, *per place*.

AN INNOVATIVE SOLUTION

To make it easier to move about the city and to increase the accessibility of Warsaw and the happiness and independence of its visually impaired residents, the city launched Virtual Warsaw. Like the Wellbeing Project, Virtual Warsaw was a winner of the Bloomberg Mayors Challenge, which helped to kickstart the innovation. The programme consists of two major components:

- **A micro-navigation system:** a personal guide and assistant that allows any owner of a smartphone to receive written or verbal information on their surroundings, such as the location of bus stops, the number of arriving trains, the entrance to museums or where to queue in municipal offices.
- **A support system:** an individualised programme of activities and services specifically designed to help visually impaired people feel more independent in public spaces and the labour market. It consists of training, career consultations, internships, and a dedicated helpline to help them navigate the city and job market, and to connect with other visually impaired residents.

The micro-navigation system seeks to build a citywide infrastructure that supports and empowers the visually impaired to fully experience their city. It is powered by

an open network of micro-transmitters that serve as a layer of physical beacons which create a virtual space accessible to smartphone applications. These can then be navigated through a series of hand gestures on the screen. Information is provided to the user both visually and through audio. The system allows visually impaired individuals the ability to navigate the city outside, as well as inside buildings, even when no mobile signal is available. Because many of the potential beneficiaries have previously had little or no need for a smartphone, subsidies are available to residents unable to afford one. Users have reported that this step alone can be empowering, as they now have a reason to use the same types of phones as everyone else.

Virtual Warsaw is being rolled out incrementally. Starting with an initial pilot in one city building, it is in the process of expanding to the city centre, core bus routes, tourist attractions and restaurants. The city will continue to expand

Figure 4.7: Virtual Warsaw infographic



Source : Government of Warsaw.

the programme over the next several years, with full-scale implementation of Virtual Warsaw expected throughout the city and 24 regional municipalities by 2021. There is no limit to the number of connection points or the types of information that can be provided by Virtual Warsaw.

Although the focus for the present and near future is on improving lives for the visually impaired, this is just the beginning. The beacons being deployed around the city are multi-functional, and Warsaw has plans to leverage the citywide network for other purposes, including as guides for tourists, gauges for air quality and even for 20 000 meter-less parking spaces. Warsaw leaders believe there could be up to 200 000 monthly users for this system once it is fully operational.

IMPACT AND RESULTS

Although still in pilot mode, Virtual Warsaw is already starting to create opportunities for enhanced independence among the visually challenged population, and the potential is huge. This has the dual benefits of increasing the wellbeing of those using Virtual Warsaw, as well as improving the efficiency of government, as residents with improved independence require fewer city services. An indirect benefit is that the government has learned through this process that user-centred design can be highly successful, resulting in this model spreading to other government offices.

REPLICABILITY

At their core, the challenges for people with visual impairments are the same in every city. Like everyone else, these residents want to be independent in their daily activities, have a career they enjoy and friends with which they can enjoy the city. Micro-navigation and support systems can be deployed in any city, and Virtual Warsaw can serve as a template for others to quickly introduce such services, and build on the successes and lessons learned in Warsaw. Warsaw officials wanted to play an active role in the replication of Virtual Warsaw in other cities to benefit the visually impaired. This led to the launch of the Virtual Warsaw Think Tank dedicated to coordinating with cities around the world and providing information and assistance to others wanting to implement similar programmes. The demand for replication is strong, with almost 40 other cities expressing interest in replicating the programme in their communities.



Virtual Warsaw user testing.

CHALLENGES AND LESSONS LEARNED

The city faced challenges early on that stemmed from insufficient user perspective. The initial pilot version included features such as GPS-style turn-by-turn directions, which subsequent users found unnecessary and were later removed, resulting in loss of time and resources. This was a turning point, prompting Warsaw to shift to user-centred design. Now, as Virtual Warsaw expands, each step is carried out with visually impaired end users, who test the system and provide feedback to allow continuous improvement. In addition, the users generate ideas for locations and features to prioritise.

As well as working with users, leaders in Warsaw have found that building partnerships is critical to the success of Virtual Warsaw. They partnered with a small, local business to build the beacons, which they say is key, as a larger company might not have been able to build such a customised product. City officials also partnered with NGOs such as the Polish Blind People Association, universities and other experts in the fields of visual impairment to better understand the challenges and needs of the target audience, as well as specialists in user experience (UX) design, accessibility and software development. The Polish Blind People Association, in particular, has been helpful in recruiting testers, with the city learning that people may be more willing to place trust in an NGO. Warsaw officials believe that partnerships are key, because their partners may have wider access to the target groups, which can lead to services that best meet their needs, as well as broader adoption and use of the service.

