CITY'S DIGITAL INFRASTRUCTURE AS A FACTOR OF SUSTAINABILITY

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The sustainable development of the city creates new opportunities for technological progress, business growth and improved employment. It is known that the concept of sustainable development provides for the active use of information and communication technologies (ICT).

Electronic technologies are widely used to plan, maintain, govern, the cities. The world leader in information and communication technologies and related operations is the Finnish city of Oulu. In the recent years, the ecosystem of the technology industry of this city has changed into a hub of tens of global product development units. By combining expertise in wireless know-how to different sectors, like health and life science technologies, smart ICT solutions are introduced in order to deliver advanced, personalized and connected services for all business sectors [1]. Digital infrastructure allows to combine territorial, socio-economic parameters, as well as to apply an integrated approach in the implementation of sustainable development strategies. Within the new technological paradigm, new forms of spatial mechanisms of the city are formed, the so-called "spaces of flows" [2, p.146].

ICT helps increase the levels of participation, efficiency and accountability in public urban policies, if the tools were appropriately used [3–5]. The UN Digital Governance in Municipalities is comprehensive and assesses five important components (security and privacy, usability, content, services, and citizen participation) [6]. Depending on the context of the vision of urban development and the ways in which digital technologies support the city, such models can be called Digital City, Intelligent City, and Smart City.

Digital cities represent the best entry point for pursuing Sustainable Development Goals. The local e-governments have the proximity to translate the principles of good urban governance to effectively manage, govern and develop a city and to ensure equitable access to citizenship. A Digital City is based on the

integration of digital technology into the city infrastructure: informatics (communication), city portals for online information services. Intelligent Cities have intelligent systems (functionality), online web-based e-learning systems integrated and interoperable with other city platforms. Smart Cities besides technology integration also include innovation (advanced visualization and simulation tools), e-Learning platform and knowledge management, and benchmarking requirements. The major difference between Intelligent Cities and Smart Cities is the special focus of the latter on social and human concerns (quality of life) and ecological systems (sustainability). City's well-developed fiber network is one of the pre-conditions to e-services. The goal of the city's fiber network efforts is to build a competition infrastructure capable of spur economic activity.

Among the successful examples of digital infrastructure is the Finnish city of Oulu. The city's economy was built in the 1980s around Nokia's technology park. However, when Nokia after a long dominance in the market of mobile wireless devices began to lose leadership against the background of the growth of smartphones (Apple iPhone and Samsung Galaxy). This affected the citizens both economically and psychologically [7]. However, the city "survived" economically, thanks to the fact that former Nokia employees have created new startups that focus on the Internet of Things (IoT), artificial intelligence (Artificial Intelligence, AI), big data analytics and digitalization.

Oulu City Council has a special unit (BusinessOulu), which is responsible for implementing the city's policy in terms of "promoting business, employment and business activity". The city also offers other environments for innovation – places where you can develop and test new IT and business solutions. The city has a free PanOULU network that connects Wi-Fi infrastructure to 17 organizations and 25,000 users, as well as a web portal for municipal e-government to provide services to citizens.

By combining expertise in wireless know-how to different sectors, like health and life science technologies, smart ICT solutions are introduced in order to deliver advanced, personalized and connected services for all business sectors. Oulu's strengths and know-how are clearly visible in numerous products available on the international markets, such as in-car media systems and accessories, a variety of smart devices, printed colour changing surfaces, not to mention Oulu's solutions for the financial sector, which are regularly used by millions of people all over the world. Also the indoor positioning technology that was considered challenging and rare is accessible today by means of many innovations developed right in this city. Oulu's ecosystems for new technologies and practical cooperation between companies, research organizations, universities, and the public sector are being continuously developed. The University of Oulu has started to make headway in 6G development.

Digital infrastructure should understandably be assessed on its environmental characteristics, but don't underestimate the significant social impact. It contributes positively to productivity and economic growth.

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МОДЕЛЮВАННЯ ТА РОЗРОБКА МОБІЛЬНОГО ДОДАТКУ «ХАРКІВ ТУРИСТИЧНИЙ»

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Необхідність широкого використання навігації досить актуальна в даний час. Сучасний туризм є неможливим без допоміжної інформації та різноманітних мобільних пристроїв. При подорожі туристи повсюдно використовують довідкові матеріали для вивчення місцевості і планування маршрутів. Значна кількість туристів обирають самостійні поїздки (без підготовлених маршрутів, гідів), які не можуть обійтися без сучасного та надійного інформаційного супроводу.

Тому можна стверджувати, що моделювання та створення запропонованого мобільного додатку, що допомагає дізнатися більше корисної та цікавої інформації про місце Харків є важливим аспектом комфортної та цікавої подорожі для гостей нашого міста або для прогулянки мешканців міста.

Для реалізації програмного продукту, що розробляється потрібно розв'язати наступні наукові задачі:

− сформувати список пам'яток місця зі координатами їх розташування, та докладним описом, з яких формується база даних мобільного додатку;