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PECULIARITIES OF COMMUNICATION WITH RESIDENTS AND THE ROLE OF SOCIAL MEDIA IN SMART CITIES

The aim of the work is to outline the most effective communication channels with residents in smart cities.

Research methodology. *Both theoretical and empirical research methods were used in the research process. The research methodology consisted of several stages. The first was a comprehensive literature review to understand the current state of knowledge in the fields of smart city development, social media, and urban communication. This involved analyzing existing studies, articles, and reports on how social media is used within smart cities for engaging with residents. The next was data collection. This method was used to build a dataset of types of communication with residents in smart cities. After collecting a dataset of posts in social media, we extract relevant features that can be used to provide effective communication between local authorities and audience. These features include the frequency of writing posts in social media, the types of answers and comments, the explaining of sensitive topics.*

Results. *It was found out that effective communication with residents in smart cities should include such features: the use of digital platforms for communication (such as mobile apps, social media, or online forums) have seen increased engagement from residents. This could manifest in higher participation rates in city surveys, community events, or feedback mechanisms. Also it was examined that effective communication channels can lead to higher resident satisfaction. This might be due to quicker responses to complaints, more efficient service delivery, or a greater sense of being heard and considered by city administrations.*

Novelty. *The novelty of this work is the proposed effective types of communication with residents in smart cities. For example, younger residents may prefer social media or apps, while older residents might rely on more traditional methods like community newsletters or public meetings. The next studies might also explore how communication technologies impact the social and cultural fabric of urban communities, possibly affecting community bonding, local culture preservation, and social inclusivity.*

Practical meaning. *Effective communication channels can lead to higher resident satisfaction. This might be due to quicker responses to complaints, more efficient service delivery, or a greater sense of being heard and considered by city administrations. Moreover, smart city communication strategies might be particularly effective in enhancing public safety. Quick dissemination of information regarding emergencies, health alerts, or public safety incidents can be a significant benefit.*

Key words: *social media, communication, audience, smart cities.*

I. Introduction

Formulation of the problem. Smart cities are characterized by their ability to integrate and analyze data from various sources. This integration is primarily achieved through advanced communication networks that connect sensors, devices, and systems across the urban landscape. From traffic management to energy distribution, these networks facilitate real-time data exchange, enabling cities to respond swiftly to the needs of their residents and the environment.

In the era of rapid urbanization and technological advancement, the concept of smart cities has emerged as a beacon of sustainable and efficient urban living. At the core of this transformation lies effective communication, bridging the gap between technology and the urban populace. This article delves into how communication plays a pivotal role in the development and operation of smart cities, ensuring they are not just hubs of technology, but also inclusive and responsive communities.

One of the hallmarks of smart cities is their focus on citizen engagement. Modern communication platforms, such as social media, mobile applications, and interactive kiosks, have become vital tools in

fostering a two-way dialogue between city administrations and residents. These platforms not only disseminate information effectively but also invite feedback and participation, making citizens active contributors to urban development.

Analysis of recent research and publications. There's a growing body of work on how smart cities use technology to engage citizens in governance. Digital platforms for feedback, participatory planning apps, and social media have been analyzed for their effectiveness in fostering a more inclusive and responsive urban governance model. Communication networks have become a critical element in the development of smart cities. The information flows generated by thousands of sensors and systems must be managed to assure the adequate guarantees of quality, availability, and security [2, p. 122]. For example, Yagoob et al. declares that it is necessary to make an attempt to understand the role of communication networks in the support of smart city applications [10, p. 113]. The authors insist that these are special applications that can be an effective way of communication with residents in smart based cities. I. Al Ridhawi says that smart cities are growing on a daily basis, and are providing faster, sustainable and more diverse services for societies in a variety of areas such as traffic, health-care, education and much more [1]. Mollinilo et al. found out that smart cities have similar ways of communicating via social media. Facebook and Twitter were the official social media sites most commonly mentioned in the cities' official websites, while Instagram was also used by most of the cities, though it was not mentioned in all the cities' official websites [6, p. 250]. Although social media were used differently by cities to fit their communication strategies, Facebook was the most widely used channel. As a continuation of this topic Yihong Yuan et al. outline that social networking sites (SNS), such as Facebook and Twitter, have attracted users worldwide by providing a means to communicate and share opinions and experiences of daily lives. When empowered by pervasive location acquisition technologies, location-based social media (LBSM) has become a potential resource for smart city applications to characterize social perceptions of place and model human activities [11, p. 140].

II. Problem statement and research methods

The rapid evolution of smart city initiatives has transformed urban environments, leveraging technology to enhance service delivery and citizen engagement. Within this context, social media emerges as a critical tool, reshaping how city administrations and residents interact. However, there is a knowledge gap in understanding the full extent of social media's impact on urban management and civic engagement in smart cities. The problem is compounded by challenges such as digital divides, privacy concerns, and the need for effective strategies to utilize social media for inclusive and responsive governance. This research aims to investigate the role of social media in smart cities, focusing on its effectiveness in citizen engagement, its impact on urban governance, and the challenges and opportunities it presents. So the aim of the study is to outline the most effective communication channels with residents in smart cities.

Both theoretical and empirical research methods were used in the research process. The research methodology consisted of several stages. The first was a comprehensive literature review to understand the current state of knowledge in the fields of smart city development, social media, and urban communication. This involved analyzing existing studies, articles, and reports on how social media is used within smart cities for engaging with residents. The next was data collection. This method was used to build a dataset of types of communication with residents in smart cities. After collecting a dataset of posts in social media, we extract relevant features that can be used to provide effective communication between local authorities and audience. These features include the frequency of writing posts in social media, the types of answers and comments, the explaining of sensitive topics.

III. Results

Presentation of the main research material. Foreign researchers declare that smart cities refer to urban areas that leverage digital technology, information, and communication technologies (ICT), and data analytics to enhance the quality and performance of urban services, improve sustainability, and increase the quality of life for their residents. These technologies are integrated into a city's infrastructure and governance to manage a city's assets more efficiently and effectively [4, p. 287]. The concept of smart cities encompasses various aspects:

data-driven decision making (smart cities utilize data collected from various sources, such as sensors and IoT (Internet of Things) devices, to monitor and manage traffic, utilities, infrastructure, public services, and more). This data-driven approach allows for more informed decision-making and efficient resource management [7, p. 35]. The next are improved urban service, such as transportation (smart traffic management systems, public transit improvements), utilities (smart grids, water management), waste management, and public safety (surveillance, emergency response) [8, p. 68]. One more important feature of smart cities is enhanced citizen engagement. Smart based cities often use digital platforms to engage with residents. This includes mobile apps for reporting local issues, platforms for community input on city projects, and social media channels for information dissemination and feedback collection [9]. Also a significant aspect of smart cities is their emphasis on sustainability. This includes efforts to reduce carbon emissions, manage energy consumption efficiently (e.g., through smart energy grids), and implement green urban planning practices. Smart cities aim to foster economic growth by attracting businesses with advanced infrastructure, providing high-quality services, and creating a more

livable environment for residents and workers. Artificial intelligence and machine learning are increasingly being used in smart cities to analyze data, predict trends, optimize service delivery, and enhance the overall functionality of city systems [10, p. 118]. Enhanced connectivity through high-speed internet and mobile networks is a cornerstone of smart cities. This facilitates the seamless flow of information and supports various services, including autonomous vehicles and smart public transportation. With the increased use of technology, smart cities also focus on cybersecurity and data privacy to protect the information and rights of their citizens.

Smart cities strive to be inclusive, ensuring that technology benefits all residents, including vulnerable and marginalized groups. This involves addressing the digital divide and ensuring accessible design in both physical and digital spaces.

To analyze the peculiarities of communication and the role of social media in smart cities it was chosen Lviv city as a model of a smart trust based city. This Ukrainian city doesn't have all the features which we mentioned above due to the researches of foreign scientists, but it strives to become a smart city. Communication with residents of Lviv is widely promoted in social media. The mayor of the city Andrii Sadovyi has his own accounts such social media as Facebook, Twitter (X), Instagram. Also he has his channel in telegram. The most amount of his followers there are in Facebook (more than 1 million people). There the mayor of Lviv texts a lot of information about Ukrainian military and about the events which are current in our city. His posts there mostly have more than 100 comments. Andrii Sadovyi also has his channel Telegram [5]. There he has more than 100 hundred of followers and post the most current information. For example, about the air alarm, rocket attack, the route of rockets and drones etc. There are no comments in Telegram, but there is an opportunity to react on the post. So, the mayor of Lviv tries to be open for communication with citizens and often gives answer to those who comment his posts. But in the framework of communication in smart city it is not enough. For help to solve problems it was created a Hot Line of the City (Gariacha Linia Mista) in Facebook, where residents can write about the problems which they face to. This group has more than 100 hundreds of participants and each day there are near 10 new posts from citizens. The most often are so called problem posts, where residents write about problems with community transport, about the need of repair roads or buildings, about problems with traffic etc. The operator of hot line tries to get information from the local authorities and then give answers in social media. Despite diversity of channels in social media, the communication with residents in L'viv is not satisfactory. The proof of this statement can be a recent situation, when in center of L'viv, on the Rynok Square there was started the reconstruction of pavement. The residents were disturbed with this and wrote angry posts in social media that the ancient pavement will be stolen and that we shouldn't use community sources for this case. The next day after social indignation one of the representatives of local authorities explained that the sawing of pavement will be done to make it more comfortable for disabled people. And as a worker explained, the costs for this have been got as a grant from European Union. So they couldn't be used for other purposes. So, in this situation we can say that the communication with residents failed, because the amount of followers of the representative of local authorities is much lower than of the mayor's page or even Hot line of the city. The explaining of the works and the communication with residents should have been done ahead, but not after the beginning of the works. For such cases it would be useful to create an app of the resident of Lviv, where could be spread the most important information about the life of the city as well as about the green initiatives or responsible consumption.

IV. Conclusions

In conclusion, we can say that communication is the lifeblood of smart cities, essential for their functionality, efficiency, and inclusivity. As we advance further into the 21st century, the importance of developing and maintaining advanced communication systems in urban areas cannot be overstated. It's not just about making cities smarter, but also making them more connected, responsive, and attuned to the needs of their inhabitants. The future of urban living hinges on our ability to communicate effectively, harnessing the power of technology to create spaces that are not just habitable, but truly livable.

Smart cities should use advanced communication technologies, including mobile apps and social media platforms, have significantly enhanced citizen engagement. This phenomenon is a testament to how technology can bridge the gap between city administrations and residents, leading to more participatory and responsive urban governance. The most effective communication technologies, which should be used in smart cities can be: mobile apps for direct interaction (cities can develop mobile apps allowing residents to report issues like potholes, broken streetlights, or graffiti directly to the relevant city department. This immediate line of communication speeds up response times and makes residents feel more directly involved in the maintenance of their city); social media platforms for wider engagement (city administrations should use social media to quickly disseminate information about everything from planned roadworks and public health advisories to events and emergency alerts, ensuring a broad reach); interactive platforms for feedback (social media serves as an interactive platform where residents can voice their opinions, offer suggestions, and provide feedback on city initiatives, fostering a two-way communication channel), community groups and forums (online community groups and forums on social media platforms enable residents to discuss local issues, share information, and mobilize for local initiatives, promoting community solidarity and collective action).

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Кіца М. О. Особливості комунікації з мешканцями та роль соціальних медіа в «розумних містах»

Мета дослідження – окреслити найефективніші канали комунікації із жителями розумних міст.

Методологія дослідження. У процесі дослідження використано як теоретичні, так і емпіричні методи дослідження. Методологія дослідження складалася з кількох етапів. Першим був комплексний огляд літератури, щоб зрозуміти поточний стан знань у сферах розвитку розумних міст, соціальних медіа та міської комунікації. Це включало аналіз досліджень, статей і звітів про те, як соціальні мережі використовують у розумних містах для взаємодії з мешканцями. Наступний етап – збір даних. Цей метод використано для створення набору даних щодо типів спілкування з мешканцями розумних міст на прикладі комунікації у Львові. Проаналізовано публікації в соціальних мережах і виділено відповідні функції, які можна використовувати для забезпечення ефективного спілкування між місцевою владою та аудиторією. До таких особливостей належать частота написання постів у соцмережах, типи відповідей і коментарів, пояснення делікатних тем.

Результати. З'ясовано, що ефективна комунікація з мешканцями в розумних містах має включати такі особливості: використання цифрових платформ для спілкування (таких як мобільні застосунки, соціальні медіа чи онлайн-форуми), що може збільшити зацікавленість жителів. Це може проявлятися у вищому рівні участі в міських опитуваннях, громадських заходах або механізмах зворотного зв'язку. Також було встановлено, що ефективні канали комунікації можуть призвести до більшої задоволеності мешканців. Це може бути пов'язано зі швидшим реагуванням на скарги, ефективнішим наданням послуг або більшим відчуттям того, що міська адміністрація вас почує та врахує.

Новизна. Новизною роботи є запропоновані ефективні види комунікації із жителями розумних міст. Наприклад, молодші жителі можуть надавати перевагу соціальним мережам або застосункам, тоді як літні жителі можуть покладатися на більш традиційні методи, такі як розсилка новин громади або публічні зустрічі. Наступні дослідження можуть бути присвячені вивченню впливу комунікаційних технологій на соціальну та культурну структуру міських спільнот, зв'язки між громадами, збереження місцевої культури та соціальної інклюзивності.

Практичне значення. Ефективні канали зв'язку можуть підвищити рівень задоволеності мешканців. Це може бути пов'язано зі швидшим реагуванням на скарги, ефективнішим наданням послуг або більшим відчуттям того, що міська адміністрація вас почує та врахує. Крім того, комунікаційні стратегії розумного міста можуть бути особливо ефективними для підвищення громадської безпеки. Швидке розповсюдження інформації про надзвичайні ситуації, попередження про здоров'я чи інциденти громадської безпеки можуть бути значною перевагою.

Ключові слова: соціальні медіа, комунікація, аудиторія, розумні міста.