SMART CITY ICT SOLUTIONS FOR ENHANCING HUMAN SECURITY

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Abstract: Over the past two decades there has been a considerable shift toward information and communication technology (ICT) solutions that try to solve urban problems and provide services more efficiently. Such efforts are expressed through the idea of smart cities, an initiative that seeks to transform urban governance, management and way of living with the use of modern digital technology. Smart city technologies are promoted as an advanced way to counter and manage urban insecurities and risks through the effective and efficient delivery of services. The main objective of this paper, therefore, is to review some existing ICT solutions that citizens could apply in improving their own security. Based on the existing academic literature and research data, a deeper analysis of ICT solutions for improving human security in the urban environment will be conducted. The basic criterion for choosing technological solutions for enhancing security is that citizens are involved in formulating and/or that they participate in how security services are conceived and delivered. Potential security consequences and vulnerabilities regarding ICT solutions for human security in the city will also be tackled. New ICT solutions create new vulnerabilities and threats, which could make city infrastructure, services and residents insecure and open to diverse forms of criminal activity.

Technology contributes to the improvement of urban security in various ways, for example in emergency telecommunication, surveillance and wireless video streaming, predictive policing with the help of ICT, social media monitoring, etc. The use of these technologies has been critiqued for being technocratic and top-down, enacting forms of governance that control and discipline citizens. They are also seen as tools for producing and reinforcing the neoliberal logics of urban management, which serve the interests of states and corporations more than they do those of citizens. However, the core idea in smart city security initiatives is how citizens themselves could contribute to their personal safety and the safety of other citizens in distress, i.e. how to create a 'citizen-centric' smart city.

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ICT solutions in smart cities that will be discussed here have a stronger citizens' perspective in addressing security issues. Cities can simultaneously host all kinds of smart initiatives designed to interact with and serve citizens in different ways and produce a diverse range of citizen participation. The involvement of citizens in these ICT solutions can help in creating long-term effectiveness rather than short-term efficiency. However, researchers and practitioners should bear in mind that smart city technologies entail a number of security threats and risks that are prone to exploitation, and could amplify potential human security vulnerabilities.

Keywords: smart city, ICT solutions, human security, citizens' participation, urban insecurities

1. INTRODUCTION

Contemporary urban settlements are places of unprecedented complexity and diversity, with growing numbers of residents. The challenges for contemporary cities are therefore very diverse and range from crime and violence, poverty and inequality and natural hazards to the inadequate provision of services, critical infrastructure and unemployment. Attempts at solving these problems and preventing them are quite different but almost all of them encompass an advanced technological component.

Over the past two decades there has been a considerable shift toward information and communication technology (ICT) solutions that try to solve urban problems and provide services more efficiently. Such efforts are expressed through the idea of smart cities, an initiative that seeks to transform urban governance, management and way of living with the use of modern digital technology (Kitchin & Dodgge, 2017: 1). Smart city technologies are promoted as an advanced way to counter and manage urban insecurities and risks through the effective and efficient delivery of services.

One of the important issues regarding smart city initiatives is citizen participation in city management and governance. There are several levels of citizens' involvement in formulating and participating in how services are conceived and delivered (most notably presented in Arnstein's ladder of citizen participation (Arnstein, 1969)). The significance of citizen participation has motivated promoters and planners to develop initiatives that are citizen- or community-focused (Cardullo & Kitchin, 2017: 4).

The main objective of this paper is to review some existing ICT solutions that citizens could apply in improving their own security. Based on the existing academic literature and research data, a deeper analysis of ICT solutions for improving human security in the urban environment will be conducted. The basic criterion for choosing technological solutions for enhancing security is that citizens are involved in formulating and/or that they participate in how security services are conceived and delivered. Potential security consequences and vulnerabilities regarding ICT solutions for human security in the city will also be tackled.

2. REVIEW OF SOME ITC SOLUTIONS FOR ENHANCING HUMAN SECURITY

Technology contributes to the improvement of security in the city in various ways, for example in emergency telecommunication, surveillance and wireless video streaming, predictive policing with the help of ICT, social media monitoring etc. The use of these technologies has been critiqued for being technocratic and top-down, enacting forms of governance that control and discipline citizens. They are also seen as tools for producing and reinforcing the neoliberal logics of urban management, which serve the interests of states and corporations more than they do those of citizens (Kitchin 2014; Vanolo 2014; Datta 2015; Luque-Ayala & Marvin 2016; Kitchin et al., 2017). However, the core idea in smart city security initiatives is how citizens themselves could contribute to their personal safety and the safety of other citizens in distress, i.e. how to create a 'citizen-centric' smart city.

There are a growing number of applications available that could be helpful in citizen reporting, social platforms to discuss urban security problems and emergency applications for alerting family and friends (Habeeb Rahman, 2013). The main advantage of these ICT tools is that they are easily accessible and user-friendly for everyone who has a smart device.

Sexual violence and harassment are major security challenges for women and girls in many cities around the world. The prevalence of this serious threat to human security has resulted in the launching of several very useful ICT solutions for addressing and preventing gender-based sexual harassment and violence. **Safecity**[1] is a web platform that crowdsources personal stories of sexual harassment and abuse in public spaces. The idea is to make this data useful for individuals, local communities and local administration by helping to identify the factors that cause the behavior that leads to violence and work on strategies for solutions. To tackle the serious issue of sexual violence against women, **Harassmap**[2] was developed as a web service with a digital map to address the harassment and abuses against women and change attitudes towards such abuses. It is a social platform for women to report harassment incidents via text messages and social media to increase awareness about sexual harassment and the necessity to report such crime. Inspired by Harassmap, the **FightBack** smartphone application enables women in Delhi to send SOS alerts via email, Twitter and Facebook to their friends and family any time they are in danger. The **Circleof6**[3] application allows users to choose six of their friends and alert them when they want immediate help or want to be interrupted when in an uncomfortable situation. Originally designed to prevent sexual violence among college students, the application is designed for everyone who needs help in distress. **Hollaback**[4]

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[1] The collected data is aggregated as hotspots on a map indicating trends at the local level. It currently contains around 10,000 stories from over 50 cities in India, Kenya, Cameroon and Nepal. http://safecity.in/

[2] https://harassmap.org/en/

[3] https://www.circleof6app.com/

[4] https://www.ihollaback.org/

is an application designed to help women, the LGBT population and other marginalized groups to share their stories of harassment and its main aim is to initiate public conversations and to develop innovative strategies to ensure equal access to public spaces.

ICT solutions for improving human security in the city are developed for more general problems in urban areas like crime, vandalism, congested traffic or signs of physical or social disorder. **Retio**[5], an iOS application available for cities in Mexico, allows citizens to report and have real time information about what is happening in their city. Users are allowed to warn fellow citizens and keep them informed by tweeting about shootings, risky situations and traffic. In Dublin, there is **Fix-Your-Street**[6], where citizens can use an online tool to report the location of issues that need to be addressed (such as potholes, graffiti, broken streetlights, illegal dumping) (Cardullo & Kitchin, 2017).

As far as different problems faced by urban dwellers are concerned, the **Sentinel** smartphone application was developed to help users to inform family and friends about their location during medical emergencies, accidents or in critical situations when they are being robbed or stalked. The advantage of this application, which differentiates it from similar applications, is that it encompasses a range of different urban security problems but can also send alerts even when there is fear that the phone will be destroyed or when the phone is out of the network coverage area. Based on social activism, citizen journalism and geospatial information, **Ushahidi**[7] is one of the most ambitious projects that use crowdsourcing and enable local observers to submit reports on different incidents using their mobile phones or the Internet.

Apart from mobile applications, there are also initiatives to install interactive screens in different centers in cities where people could share useful information about security issues in their urban environment. The screens would provide details about safe and unsafe locations in the city, such as risk areas, or the nearest police stations or health services. To complement the interactive screens, there could also be community reporting centers where citizens could anonymously send reports to the police (Habeeb Rahman, 2013). In Dublin, **Dublinked**[8] is the city's open data store, sharing a mix of administrative and operational data, including some real-time datasets related to transport and the environment. Much of these data, along with statistical and administrative data published by other government agencies, are made available to the public through the Dublin Dashboard in the form of interactive maps, graphs and apps (Kitchin *et al.*, 2016).

In several European cities, a number of Living Lab projects have been implemented. Living Lab is an open innovation environment in real-life settings in which user-driven innovation drives the co-creation process for new services, products, and societal infrastructures (Bergvall-Kareborn & Stahlbrost, 2009:357). As a part of smart city initiatives for enhancing human security, Living Labs have served for measuring air or

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[5] https://ret.io/r/mx/DF/

[6] http://www.fixyourstreet.ie/

[7] https://www.ushahidi.com/

[8] http://www.dublinked.ie

noise pollution[9], or for more general issues such as raising the quality of life in a city, as in the Dublin Beta project.[10]

One of the main reasons for implementing ICT solutions for enhancing human security in the city is that research shows that, when faced with an emergency or a stressful situation, people will rather call a friend or a family member than report the incident to the police (Habeeb Rahman, 2013). People sometimes perceive the police as corrupt and insufficiently transparent and believe that reporting a crime is not going to solve their problem. This could be a useful way to change a grim statistic.

3. POTENTIAL CHALLENGES AND RISKS OF CITIZEN-CENTRIC ICT SOLUTIONS

While the advantages of ICT solutions for enhancing human security are undeniable, they are accompanied by unintended consequences and a variety of traditional problems (Datta, 2015; Townsend, 2013). New ICT solutions create new vulnerabilities and threats, which could make city infrastructure, services and residents insecure and open to diverse forms of criminal activity.

There are several preconditions for the successful implementation of citizen-centric ICT solutions (Habeeb Rahman, 2013). First is accessibility – in order to use the applications citizens need to have smart devices (Android or iOS). This precondition is not hard to meet in most developed cities around the world. But in other cities not all citizens have smartphones that could be used in emergency situations. Even in developed cities, there are marginalized or poor citizens that cannot afford a mobile phone. Second, there is the problem of connectivity, since proposed ICT solutions should work even when there is no possibility to connect online. Third, the time it takes to access an application needs to be reduced to a minimum because a citizen's primary concern in a life-threatening situation is to alert family and friends as soon as possible. Fourth, it is desirable for the proposed ICT solutions to be cost-free so that even the poorest and the most marginalized people could have access to them.

One of the major challenges for implementing ICT solutions is the safety of the stored data and user privacy. Reported incidents are publicly available and could be subject to serious misuse. Citizens use their phones when alerting family and friends or anonymously posting an experience of a crime, so skilled hackers could jeopardize their privacy (data on a person's movement and the places he/she visits or data on browsing habits). When using smart city ICT solutions, citizens create data that companies can then extract value from by mining them for the purposes of social sorting, predictive profiling, micro-marketing, and anticipatory governance (Kitchin 2014). Making cities "smart" by introducing modern ICT solutions has made systems exposed to software bugs, data errors, network viruses, hacks and criminal and terrorist attacks (Little, 2010; Kitchin & Dodge, 2011; Townsend, 2013). With interactive screens and community reporting centers, there is the possibility of

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[9] https://fablabbcn.org/0000/01/06/smart-citizen.html; http://www.sensornet.nl/english
[10] http://dccbeta.ie/

duplicating reports or of false reporting of incidents, so there needs to be a strict procedure for monitoring and analyzing the data.

In practice, bottom-up, inclusive and empowering citizen involvement in key decision-making processes in cities is difficult to achieve. In the case of smart cities, there are few successful examples of co-produced and citizen-led initiatives to date (Cardullo & Kitchin, 2017). Sharing or crowdsourcing apps have largely been co-opted within an economic frame and are owned by companies rather than communally (McLaren & Agyeman, 2015).

4. CONCLUSION

ICT solutions in smart cities discussed here have a strong citizens' perspective in addressing security issues. Cities can simultaneously host all kinds of smart initiatives designed to interact with and serve citizens in different ways and produce a diverse range of citizen participation (Cardullo & Kitchin, 2017: 18). The involvement of citizens in these ICT solutions can help in creating long-term effectiveness rather than short-term efficiency. They could strengthen citizens' responsibility for their own safety as well the safety of their fellow citizens and contribute to the quality of life in the city.

Smart city technologies are promoted as an effective way to counter and manage uncertainty and risk in contemporary cities. However, researchers and practitioners should bear in mind that smart city technologies entail a number of security threats and risks that are prone to exploitation and could amplify potential human security vulnerabilities.

In smart cities, there are as yet relatively few cases where citizens have single-handedly developed, created and implemented ICT solutions. Usually, examples are drawn from community development initiatives undertaken through partnerships between community organizations and the state, but such initiatives have not yet been created with regards to the smart city.

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