Bridging the digital divide for Generation X and Boomers in the Western Balkan region through smart cities

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Abstract
Western Balkan region is advancing in digital transformation, digitalization is not only a national priority for countries in the region but as well as it is a key regional priority especially due to the process of EU(European Union) integration. The focus of digitalization has mostly been digital infrastructures and digital infrastructure. The digital divide in the region persists even though the digitalization of workflow and services has evolved. The population in the region is getting older, Generation X and Boomers are expected to stay longer in the labor market and they will need more digitalized services, especially in terms of health e, e-services, and mobility. The main cities in the Western Balkan region have the ambition to be smart cities. This paper aims to explore how smart cities in the Western Balkan region can help bridge the digital divide for Generation X and Boomers. Previous research has focused mostly on smart city functionalities to provide social inclusion to bridge the digital divide. STAM (Senior Technology Adaptation Model) provided a framework for explaining digital inclusion. There is no specific study on the topic especially focusing on the Western Balkan region. This study uses a system literature review approach to provide a framework for smart cities as catalysts for bridging the digital divide in the Western Balkan region. This study provides a framework for Generation X and Boomers in the Smart Cities in the Western Balkan region not only as citizens but as well as workers. This study is useful not only for researchers in the field but as well as for policymakers in the region while setting national and regional priorities in digital inclusion.

Keywords: digital inclusion, digital migrants, smart cities.

1. Introduction
Digital inclusion of older adults definition includes two dimensions, digital participation and digital engagement [1]. Digital participation is the active involvement into society through using digital tools whereas digital engagement refers to policies, research projects and practices that promote engagement in the society. According to [2], the main ways to insure digital inclusion of older adults is through the design of inclusive technology, the stopping of ageism, access to better health, data equality, needs of the older persons in the corporate world and digital literacy.

The first level of digital divide concerns equal access to digital infrastructure of elder adults. The second level of digital divide relates to digital exclusion caused by the lack of digital skills. Digital exclusion is defined as the marginalization of an individual or a group of individuals that is derived from the access on digital technologies which can limit participation on social, economic and political life in the society [3] [4] study digital exclusion rates in High Income Countries (HICs) and Lower Middle Income Countries (LMICs), it is concluded that digital exclusion rate it is higher in LMICs and lower in HICs, several factor influence digital exclusion rate such as socio-economic status, health conditions, awareness and cultural context. Digital exclusion has a major influence on health. One of the region where digitl exclusion is persistent is the Western Balkan (WB) region especially for Baby Boomers and Generation X.

This study aims to explore literature review in the field of digital inclusion of Baby Boomers in order to propose a conceptual model of digital inclusion for Baby Boomers and Generation based on the Senior Technology Adaption Model (STAM). This is crucial for the development of smarter cities in the region.

2.Digital inclusion of baby boomers and generation X

[5] revised the Digital Competence Framework (2017) adapted for the needs of elder citizens based on a study in Sweden. The areas of the revised Digital Competence Framework are as it follows : information and data literacy (browsing, searching filtering data and digital content, accessing to news, evaluating data, information and digital content, managing data, information and digital content); communication and collaboration (interacting through digital technologies, communicating with family, engaging in citizenship through digital technologies) ; transaction-using services (local governement services and banking and financial services) and safety(protecting personal data and privacy, avoiding fraud and identity theft, protecting health and well-being, avoiding increased social isolation). [6] argue that digital skills for older adults require prerequisites in other digital skills such as ICT- jargon and terminology, hardware, software and the internet, these prerequisites are necessary for older adults in order to set higher goals in the achievement of their digital skills. [7] conclude that the main reasons for older adults to participate in digital skills capacity building are individual reasons such as such staying active and mentally fit, gaming and hobbies, social reasons such as social contacts and social pressure to adapt to technology and technology reasons. One of the effective ways of learning digital skills is peer tutoring as it as showed by a study with Finnish citizens by [8].

The main barriers of digital inclusion of elder people are fear of new technologies, need of use ICT (Information and Communication Technologies), self-marginalization in the information society, the characteristics of new media, attitude to the life-long learning, physical limitations, economic determinants and infrastructural limitations [9]. Lack of social support is another barriers of adults aged from 57-89 years old. Social support is supposed to reinforce access of older adult's access to technology, motivate towards a positive approach for the use of technology and improvement of digital skills [10] especially in terms of creating appropriate learning environments and encouraging further learning. Individual and personal delivery of digital skills is supposed to empower older adults. Older adults need also appropriate user-friendly devices and training materials, technology changes very rapidly and it is important for older adults to ensure them lower costs of access to internet and accessible and updated training materials and training opportunities [11]. There are challenges related to self-efficacy issues because of the low perception that they have on their digital skills.

Digital skills have positive management of eHealth by older adults. In terms of digital health, Baby boomers are less comfortable than other generations but during the Covid-19 pandemic, they became more familiar with digital health and telemedicine, they still struggle with digital skills and digital literacy regarding privacy concerns. Generation X is more familiar with digital health but they act more like caregivers of their child and they are in constant need of integrated digital solutions in order to monitor their own health [12].

Digital government is a catalyst of increasing citizen participation, citizen participation of older adults. In order to increase citizen participation of older adults interfaces should be simplified, visual appeals should be improved, personal devices should be provided and a part from digital literacy programs, emotional attachment, self-actualization in terms digitalization, safety and trust should be promoted as well [13]. Governance networks are mechanisms of elaboration and delivery of digital literacy programs in order to foster digital inclusion of the older adults [14]. A study by [15] shows that different generations in Turkey perceive and use differently digital government services, Baby Boomers and especially Generation X uses actively digital government services compared to Generation Z. Generation Y is the most active in using digital government services. Baby Boomers and Generation X perceive that digital government is less likely to solve their problems related to bureaucracy. Older adults face issues in terms of financial literacy and digital transformation of financial services, a recent research shows that adults that live in rural areas and vulnerable areas are more exposed to safety issues of digital financial platforms.

Attention should be paid on capacity building in terms of digital financial literacy. Digital literacy improves as well raising awareness on fake news and misinformation among older adults . Empowering older adults with media literacy is one way of engaging them as active citizens. A study by [16] shows that age is an important when tailoring digital literacy programs among different age groups, Generation Y and Generation Z have different digital literacy needs compared to Baby Boomers and Generation X.

2.1. Baby boomers and generation X in the smart city

Urban development in the smart cities has to address both sustainable transformation and digital transformation. Smart cities should be able to retain and manage skilled human capital [17]. A people centered approach is supposed to make to cities smarter. Smart inclusive cities combine investment in digital technologies equitably distributed to the citizens. Smart cities can integrate different platforms in order to promote inclusion such as centrally controlled or community- platforms [18]. Artificial Intelligence (AI) can provide improvements in different areas of smart cities such as urban design, safety, mobility and energy solutions. According to [19], AI has affected healthcare, mobility, privacy and security, energy sector, the major is observed in the healthcare sector, and minor impact is in the energy sector. A recent study by [20] identified six smart areas of the impact of AI in the smart city, which are smart mobility, smart environment, smart governance, smart living, smart economy, and smart people.AI in smart cities has improved efficiency, accessibility and the quality of life. Smart cities through AI solutions can improve social inclusion [21]. In smart cities a new form of AI has emerged which is urban AI that aims to feed the transition from automation to economy.

Digitally driven urbanism resulted in changes in rules, ethics and rights that have been transforming the urban life, governments and governing bodies have to develop this regulatory framework involving different stakeholders especially the technology sector. European Smart Cities and Communities " Inclusive Smart Cities: An European Manifesto on Citizen Engagement" included several activities such as raise awareness of the citizens on collaboration projects, leadership and citizen engagement, exploit new collaborative models, improve procurement, promote and use open data and promote open innovation

and open science. It is important to increase citizen-oriented solutions based on digitalization.

If at one hand urban development is digitally driven at, the other hand digital divide issues emerge due that could make cities less accessible and inclusive for smart citizens [22]. This digital divide can be caused from technology-driven problems, disregard of the needs of people, lack of citizen participation and citizen engagement, lack of capabilities, lack of leadership, lack of financial resources and lack of a multi-stakeholder approach. Urban smartness is considered as an instrument of properly managing smart cities but at the same time, it is the cause of many inequalities. In the EU, the digital divide is connected negatively to the urban-smartness [23]. A study by [24] applies Amartya Sen capability approach in order to explore the implications for the digital divide for promoting climate-friendly cities that promote well-being, equity and societal participation. Capabilities refer to the opportunities that individuals have in order to access to a functioning life, thus the smart-city should provide to citizens these opportunities and redundancy.

The lack of digital inclusion in smart cities is reflected to the opportunities provided to disadvantaged people and especially to people with disabilities, which is a topic that it is not very often addressed in the literature as discussed by [25]. Another source of digital divide is digital financial inclusion; a study by [26] fintech solutions can enhance financial inclusion through improved levels of poverty, financial literacy and an increased collaboration between citizens. Governments must address the needs of underrepresented groups including universal design principles [27] stress that accessibility to technology remain one the main issues for citizens participation in the smart city, barriers on accessibility especially in the Global South have a negative impact in the smart city. Absence of policies and coordinated initiatives on privacy and safety are significant barriers for the development of the smart city [28].

The digital inclusion of older people has been an issue in many contexts. In a study by [29] in the locations of the European cities of Helsinki, Flanders and Santander is described how data of older people can be gathered respecting the entire regulatory framework and the laws of the EU. Smart devices and smart watches can be better used to connect senior citizens to the urban facilities of the smart cities. The healthy environment for the senior citizens can be provided through more equity, an accessible physical environment, accessible social environment and accessible digital environment for this it is needed to connect ageism to data and to pass from ageism to agency. Active participation of senior citizens through digital tools can help to improve their digital participation and to combat their risk of isolation. Senior citizens can also be involved in co-designing processes. Smart cities can take care of physical and mental needs of the smart citizens. AI powered data can make senior citizens to live more independently in the smart city. [30] considers that ageing in the digital era in the smart city possess problems of sustainability for the older adults especially in terms of how new technologies are incorporated in smart cities especially in terms of acceptance of new technologies and learning opportunities among other generations. [31] identify opportunities of development and deployment of the smart cities for older citizens such as improved health, social interactions and quality of life. Strategies for the development of the smart cities should integrate co-participation of older citizens.

Senior citizen participation could be enhanced also leisure and other connected activities in the smart city. In generational terms, Baby Boomers continue to feel insecure about some areas of the used of digital tools for the smart city especially in terms of privacy and safety.

3. Digital inclusion in the WB region

Digital Agenda for the WB region was launched in 2018; it has five main priorities such as lowering the roaming costs, development of broadband, strengthening the digital economy and the digital society, digitalization of industry and capacity building on digital trust and adoption, implementation and enforcement of EU acquis. Concerning the priority in strengthening the digital economy and society, the focus is put on the alignment with EU acquis in different areas such as e-government, digital public society, e-health, e-procurement and digital skills focusing mainly on digital literacy of young people. An emphasis is put in support offered for digital skills for employability.

According to the [32], WB region has made a lot of progress in terms of developing broadband, especially in developing rural broadband and in setting legal frameworks for data privacy and data protection although the level of enforcement remains low. WB region cybersecurity frameworks align the EU acquis. Digital government is becoming more user-centric but the level of digital literacy remains very low especially in Albania, Bosnia and Herzegovina, Kosovo and North Macedonia increasing the risk for a digital divide concerning the access and use of digital government services. Concerning e-commerce, there are still issues with customer protection.

In a study by [33] that compares digital skills between the WB region and EU, it is showed that Serbia and Montenegro align with the EU standards in terms of computer skills while North Macedonia and Montenegro align in terms of data analysis, content analysis and digital content. A study by [34] used PROMETHEE II method in order to rank digital skills of older adults aged over 55 years. It was found that WB countries need to pay attention to the digital literacy of older adults. Slovenia is the country that has the highest level of digital skills of older people and Albania has the lower level of digital skills of older people. Recent data show from [35] show that Albania has the highest score of digital exclusion in the region especially for senior citizens who still struggle in using digital services.

In Albania a recent project, “Inclusive and user-centered services in Albania” was developed in mid-2024 [36]. The project aims to enhance digital inclusion of marginalized groups and older adults in order to provide them digital infrastructure and digital gaps and bridge the digital gaps, which will result as well in increased satisfaction regarding digital services and improved user experience.

Demographic changes in WB region require to pay attention to the development of smart cities especially even if the development of smart cities in the region faces problems of funding. There are still problems of implementation of smart cities projects in WB region even if effort and progress was made in Serbia, Bosnia and Herzegovina and North Macedonia. In Albania, smart growth pathways in terms of urbanization can be reached through the smart cities [37] .

There is a research in smart cities and digital inclusion of Baby Boomers and Generation X in WB region and especially in Albania and its connection to the smart cities. There are not previous studies that focus on digital inclusion of the senior citizens in the region.

4. Building a conceptual framework for digital inclusion in the smart cities

As there is a research in smart cities and digital inclusion of Baby Boomers and Generation X in smart cities in the WB region and especially in Albania, this study after reviewing the literature in the field of digital inclusion and smart cities aims to build a conceptual framework based on the previous literature review and in the STAM which was developed first as Technology Acceptance Model (TAM) [38] and the Unified Theory of Acceptance and Use of Technology Acceptance Model (UTAUT) [39].

The original model proposed by included these constructs, perceived usefulness, perceived ease of use, attitudes towards use, behavioral intention and actual use. [40] proposed a Senior Technology adoption model including constructs such as social influence, perceived ease of use, facilitating conditions, behavioral factors, socio economic factors and personal factors. [41] add other factors such as self-efficacy and health conditions [42] suggests as well that in order to measure the socio economic impact of the smart city it is crucial to adopt a multistakeholder approach which would assure as well a more equal, inclusive and sustainable citizen participation [43].

In the case of Baby boomers and Generation X the digital divide could be bridged through introducing digital skills, digital access and use for work-related purposes because the majority of the Generation X is still part of the working force and it should be staying longer in the workforce especially in the case of a smart city. It is important to add as well the wellness towards civic participation and community participation, which is crucial for the development of the smart cities.

The proposed conceptual model is represented in Figure 1.

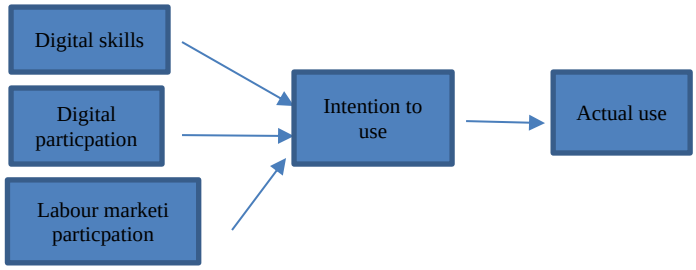

Fig. 1. Proposed conceptual model
Source: Author's own work

5. Conclusions

This paper explored the current literature in the field of digital inclusion of Baby boomers and Generation X where it was shown that even if the digital inclusion of Baby boomers and Generation X is a priority worldwide and especially in EU, digital inclusion is more digital exclusion. There is a need to bridge the digital gap especially in the smart cities where the urban development is technology-driven and it should be inclusive. In the WB

region especially in Albania, Baby boomers and Generation X continue to be digital excluded even if government made several effort in order to face digital transformation and to accomplish EU acquis which no specific effort on senior citizens. As suggested by [44] policy makers should be able to manage transformative approaches in the digital space that could benefit to citizens.

This study build a conceptual framework for digital inclusion of Baby boomers and generation starting from STAM model and introducing other constructs to the model such as digital skills, digital access and participation to the workforce, citizen participation and community participation. This model needs to be further developed and explored through qualitative methods that be focused in discussing different constructs and quantitative methods that can operationalize the variables.

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