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LOCALIZING SMART URBAN DEVELOPMENT IN AZERBAIJAN

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Localising Smart Urban Development in Azerbaijan

Introduction by the Special Editor Anar Valiyev

Cities urgently need innovative organisational and institutional arrangements to solve a great variety of emerging technical, physical, and social problems. Since the mid-2000s, global interest in innovative urban development has experienced a significant surge due to the increasing capabilities of new technology, as well as the ever-growing number of people living in urban areas. There is an urgent need for a 'smart city' concept to ensure real changes in the lives of these people rather than being merely a prestigious 'paper-tiger'. The literature generally defines the term 'smart city' as applications and technologies applied in cities and communities, to improve the quality of life and work in the region, ease the spread of information and communication technologies (ICT) and, most importantly, help in making the cities 'inclusive, safe, sustainable and resilient' envisioned in the UN's 11th Sustainable Development Goal.

The recent Covid-19 pandemic and re-establishment of control over territories in the Karabakh region accelerated the need to restore the cities and villages affected by these emergencies. For this reason, the government of Azerbaijan has launched the process of smart city/village development as a means of achieving its development goals. Therefore, there is an urgent need to change the status quo and design a model that will improve all cities in Azerbaijan in an efficient and effective way and concomitantly accelerate economic growth. The following issue of the Caucasus Analytical Digest sheds light on the current situation and documents starting conditions in Azerbaijan in terms of future smart-city development, challenges in implementing this concept, areas that need to be developed further, and finally, how the smart city concept can help to redevelop the Karabakh region.

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Building Smart Cities in Azerbaijan: Hard to Conceptualise, Difficult to Build

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Abstract
This article opens a general discussion about the concept of the 'smart city' and how it can be understood in the context of urban affairs. Furthermore, it discusses the problems of conceptualisation and operationalisation of smart city projects in Azerbaijan and elsewhere, and the ways in which they can lead to project failure. The article also addresses the problems of implementation of the smart city concept in the country and discusses how to adapt general visions and global aspirations for smart and sustainable cities to the Azerbaijani context. Furthermore, the author suggests which metrics and policy domains the authorities should consider when translating the smart city visions into policy. He discusses the preconditions for success, and whether Azerbaijan has the necessary infrastructure and specialists for its implementation.

What is the 'Smart City'? Conceptual Framework

In today's world, cities are the main drivers of development and innovations that shape the future of countries. According to United Nations Population Fund (UNFPA) statistics, more than half of the world's population lives in cities. However, this proportion is rapidly increasing and is expected to reach 70% by the year 2050 (UNFPA, 2007). This ongoing massive urbanisation process leads to enormous resource consumption, which results in negative consequences for the environment (Deuskar, 2015).

This rapid growth in urban populations leads to a variety of technical and infrastructure-oriented problems, such as difficulties in waste management, scarcity of resources, air pollution, human health concerns, traffic congestion, and deteriorating infrastructure. Urbanisation also creates new, complex social issues, and combatting the drawbacks of urbanisation requires the collaboration of government, community, city agencies, non-profit organisations, etc. Cities urgently need innovative organisational and institutional arrangements to solve a great variety of emerging technical, physical, and social problems, for example, lack of citizen engagement in city planning decision-making processes.

Since the mid-2000s, a global interest in smart cities has surged due to technological advancement, as well as an increasing number of people living in urban areas. It is an ever-growing challenge to supply urban populations with basic resources such as clean water, secure food supply, and sufficient energy, while also ensuring overall economic, social and environmental sustainability. In this case there is a need for 'smart city' concepts to leave a better world to future generations. The literature generally defines the term 'smart city' as applications and technologies directed at cities and communities, to improve the quality of life and work in the region, ease the spread of information and communication technologies (ICT), and, most importantly, achieve sustainability.

Azerbaijan is among the many countries currently facing the challenges of rapid urbanisation and management of growing cities. Over the past 25 years, the population of Azerbaijan has grown almost by 2 million, reaching 10 million people.[1] Meanwhile, massive migration of the country's rural population to urban centres has led to further challenges. Thus, for example, Baku now has around 2.4 million inhabitants, while the Area (the territory encompassing Baku, Khirdalan, Absheron and surrounding rural areas in which populations move into the city for work, study and leisure) may have a population of more than 4 million. Currently, 35% of the metropolitan area's labour force, or around 1.5 million people, live in rural areas. Meanwhile, the country may only be able to support a much smaller population through sustainable agriculture.

The rural population's migration to urban areas is expected to accelerate due to increased technological innovation in agriculture. With the high cost of the Covid-19 pandemic, it is expected that within a few years more than one million people will migrate to urban areas, and primarily to Baku. Furthermore, massive car ownership in the Baku area constitutes one of the most rapidly worsening problems in the region's urban development. Since the beginning of 2000, car ownership has increased from 55 to 143 cars per 1,000 residents.[2] Finally, the absence of new approaches to governance and reliance on the old Soviet system of city management in Azerbaijan make the situation worse (Baku is the only European capital that does not elect its mayor, but rather has one appointed by the president).

In this context, the government of Azerbaijan and local urban administrations believe that the smart city concept and technological innovations can solve the society's endemic problems. However, the local authorities forget that issues with incorrect/insufficient conceptualisation have led to many problems, including the failure of several smart city projects. Lavasa (India), Ordos (China) and Santander (Spain) serve as examples of cities which had great plans, but failed to grow organically as needed by citizens due to overly idealistic implementation. The following article examines Azerbaijan's attempts at implementing the smart city concept the problems the republic may face in their implementation, and recommendations for avoiding said problems.

'Lost in Translation' Problem

The recent Covid-19 pandemic and the Forty-Four Day War between Azerbaijan and Armenia over the Karabakh region accelerated the need to restore the cities and villages affected by both pandemic and war. Hence, Azerbaijan's government launched the process of smart city/village development as a solution for tough-to-crack developmental challenges. Therefore, there is an urgent need to change the status quo and design a model which will improve all of Azerbaijan's cities in an efficient and effective way while accelerating economic growth at the same time. The emergence of the Covid-19 pandemic forced rapid digitalisation in both the public and private sectors. The recent situation has forced the government and citizens to adapt to rapid change with the help of technology.

Hence, the smart city/village concept is a primary agenda item in terms of plans for sustainable development in the Karabakh region. Azerbaijan is in the beginning of the process; in April 2021, President Ilham Aliyev signed an order to develop smart city/smart village projects 'to improve the quality, safety and efficiency of services provided in urban and rural areas, utilising information technology and ensuring the effective use

1   See State Statistical Committee of the Republic of Azerbaijan (2020) 'Information Society', https://www.stat.gov.az/source/information_society/?lang=en (accessed 18 July 2021).
2   See State Statistical Committee of the Republic of Azerbaijan (2020) 'Information Society', https://www.stat.gov.az/source/information_society/?lang=en (accessed 18 July 2021).

and management of available resources'.[3] Furthermore, the government assigned the Ministry of Technology to come up with a concept paper (i.e., recommended policy actions) for smart city implementation. However, the biggest challenge for the government would be in the proper conceptualisation and operationalisation of the smart city approach. If the government would think of the smart city approach only as a group of cost-optimising technological breakthroughs, then the project of smart cities in Azerbaijan, and especially in the Karabakh region, would fail.

The smart city concept in Karabakh thus needs to take a different approach to that in Baku. If in Baku this concept should be operationalised as an optimisation tool for facilitating and easing of transactions, traffic, utility management and other services, in Karabakh the concept should serve the purposes of attracting the population back to the region and making their lives comfortable. Meanwhile, smart city concepts in other Azerbaijani cities would serve different purposes. The concept paper would also need to make this fuzzy term more applicable and understandable at all administrative levels and for all groups of stakeholders. Moreover, the concept should be applicable to the realities of Azerbaijan and its existing system of governance and local conditions. The failure of such projects in India or China were a result of using a 'copy-and-paste' approach to smart city concept Absence of understanding of how to handle and manage the data, open and transparent data exchange, and inclusive decision-making as well as high-level coordination were common problems that also apply to the situation in Azerbaijan. Thus, the Azerbaijani government should as a first step make the concept of 'smart cities' applicable to local realities; easy to understand at each level; and operational and relying on human capital (i.e., the people) rather than on technologies.

What Is Needed to Succeed? Infrastructure

To be successful in implementing the smart city concept, the country needs to possess certain infrastructure allowing the cities to capture data and use it in order to make rapid decisions. From this perspective, the situation in Azerbaijan is problematic. Certain districts do already enjoy high-speed internet, the latest innovations, and technologies, while whole regions of the country are hold back by the slowest internet speeds in Europe. Azerbaijan also has a particularly high digital divide between urban and rural areas. There is a 20-percentage point gap between rural and urban households in fixed inter-

net penetration. This digital divide exists mainly due to insufficient fixed infrastructure and lower levels of digital literacy in rural areas (ADB, 2018). The country also needs to make broadband internet faster, cheaper, and more accessible. Based on data from UK internet company Cable for 2021, Azerbaijan ranks 167th globally in terms of broadband internet speed with its 6.63 Megabits per second download speed, while neighbours Armenia and Georgia boast speeds two to three times as fast.[4] The reason for this regrettable situation is that Azerbaijan's internet market is monopolized by Delta Telecom, the only internet provider in the country. The government does not regulate the market properly, and Delta Telecom, being a monopolist, is not interested in additional investments due to its constant revenue flow and the absence of competition.

From another perspective, there exists a great variety of housing in Azerbaijan, having correspondingly varied levels of adaptability in terms of potential 'smart' programmes. Some of them use smart meters (for electricity, gas and water) while other still have traditional mechanical meters which make it difficult to implement smart city concepts. The same situation is observed with waste management, which has to this point not applied any modern innovations to its trash collection and recycling programmes. In addition, cities in Azerbaijan would need to invest huge sums in data meters including new 'smart' traffic lights, various detectors, smart meters, etc. The central government would be unlikely to spend the billions of dollars necessary to install these meters as the benefits would not be immediately visible, while citizens would be uninterested in higher household bills and/or taxes.

What Is Needed to Succeed? Governance and Innovation

While all of the mentioned problems can be fixed with technological advances and technical solutions, the main hurdle is the issue of governance. In all cities where the smart city concept has been successfully implemented, public participation and involvement in decision-making has proved essential. Without involvement of the population and considering their positions when making decisions, no smart city concept can work. One of the main problems in Azerbaijan is that it follows a monocentric model in its administration and urbanisation processes. In other words, Azerbaijan's highly centralised system of governance prevents or discourages involvement of the public and representatives of civil society, making it nearly impossible for them to impact deci-

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3   '"Ağıllı şəhər" (Smart City) və "Ağıllı kənd" (Smart Village) konsepsiyasının hazırlanması haqqında', Decree No. 2584, 19 April 2021. Available at: http://e-qanun.az/framework/47263 (accessed 17 August 2021).

4   'Worldwide Broadband Speed 2021', Cable.co.uk. Available at: https://www.cable.co.uk/broadband/worldwide-speed-league/2021/worldwide_speed_league_data.xlsx (accessed 10 December 2021).

sion-making process. The current situation specifically shows that it becomes very difficult to manage large cities through traditional means, and there is a great need for new innovative (perhaps e-)governance and management to help solve worsening traffic woes as well as environmental challenges, waste and utility management issues, education reform health/pandemic management, and other matters of public concern. Meanwhile, lack of administrative, political, and financial powers by local municipalities (the only elected local bodies) makes them a nearly completely useless tier of governance. Thus, the government of Azerbaijan should think about empowering municipalities in order to help reach these ambitious goals. Bringing municipalities and local communities into the decision-making process could be one of the solutions in laying the groundwork for Azerbaijani 'smart cities'. Moreover, if the central government tries to entice its population back to de-occupied territories, it should think about not only technological innovations, but also about new modes of governance with higher levels of empowerment of local authorities and more participation of local populations.

From another perspective, the country and its cities need strong innovation potential and education. The most recent edition of the Global Innovation Index ranked Azerbaijan 82nd among 131 countries in terms of innovation potential. Azerbaijan's weakest sub-category? Knowledge and technology output. High-tech exports account for less than 0.1% of Azerbaijan's gross domestic product, thus knowledge impact and knowledge creation are negligible (Dutta et al., 2021).

What Is Needed to Succeed? People

According to household survey data on ICT use reported by Azerbaijan's State Statistical Committee, in 2018 only 15% of individuals used the internet to interact with authorities and avail themselves of public services, and 7% for education or learning activities. The technology and user knowledge of e-commerce and e-payment systems is limited, and trust in such systems is low. Only one in 20 people in Azerbaijan purchased something online in 2017, compared to a worldwide average of almost one in four people.[5] Azerbaijan ranks 68th out of 144 countries on the B2C e-Commerce Index due to low penetration of e-payments, including credit and debit cards, a shortage of domestic online shops, underdeveloped logistics, a lack of trust on the part of both buyers and sellers, and low digital literacy among the population (ADB, 2018). The use of digital payments and financial services is also low in Azerbaijan. Less

than one-third of the population has a bank account, and only one quarter has a debit card, many of which are social insurance and salary cards. Mobile and internet-based digital payment tools are rarely used due to limits on transaction amounts and other restrictions. Another barrier is the high transaction fees associated with international credit card payment networks as well as not developed banking system. The Covid-19 pandemic may have spurred change in this area, but nevertheless not evenly. While Baku and other large cities switched largely to online transactions, rural areas and most of the smaller cities continued to rely on traditional methods.

Conclusion and Recommendation

Despite all the challenges, establishing smart cities or smart villages in Azerbaijan is doable. There are, however, several important issues to be addressed before any major step forward can occur, one of which is financing. Building smart cities or implementing this concept would require massive investments into city infrastructure. Government can take on partial responsibility, but for the smart cities projects to succeed, the private sector must also be involved. Private business would need to be encouraged and incentivised to invest. This would require changing the current business environment, including protection of investments, ensuring a fair and just court system, etc. This can be easily done with the government initiatives. What cannot be done within a short period of time is to train and give birth to new clusters of creative and smart people working in various creative industries. The government of Azerbaijan first should understand why they need smart cities, what purposes they would serve. Next, the political establishment would need to come up with its own strategy and actions, not merely copying examples from other countries, a path which has led smart city project in other countries to failure. The government should pay particular attention to educating, nurturing, and developing its own experts and specialists to make future smart cities sustainable and stable. Finally, the government should pay great attention to governance issues as well as involving citizens/civil society into decision-making processes. Otherwise, billions of US dollars spent on technologies, foreign consultancies as well as construction projects would go to waste, adding additional pressure on the government to solve Azerbaijan's growing urbanisation problems.

Please see overleaf for information about the author and references.

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[5]   See State Statistical Committee of the Republic of Azerbaijan (2020) 'Information Society', https://www.stat.gov.az/source/information_society/?lang=en (accessed 18 July 2021).

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The Beginning of a 'Smart Development Era' in Azerbaijan: Smart Technologies and/vs Smart Decision-Making

Bairam Akhundov

Abstract
The past few years in Azerbaijan have been marked by growing government interest in using 'smart' solutions in urban and rural planning. The results of the Karabakh conflict pushed these aspirations even further, with 'smart' technologies being seen as the key instruments in the redevelopment of the de-occupied territories. Since cities are vital mechanisms for economic growth, it is generally believed that applying modern technologies in urban and regional planning can increase the economic performance of a nation while ensuring sustainability. This article will discuss Azerbaijan's existing experience in 'smart' development and examine the extent to which the wider public participates (or will have an opportunity to participate) in the ongoing and future reforms.

Why Aim at Growing 'Smartly'?

Apart from being the greatest contributors to economic growth, Azerbaijan's cities account for 70% of its greenhouse gas emissions and 60% of resource use.[1] In view of the looming problem of climate change, it is vital to rethink our cities according to the key principles of sustainable development. Recent years have demonstrated an increased interest in applying sustainable solutions in urban planning. Today, the concept of 'smart cities' is widely cited in the media and research as a potential solution to the 'economic growth vs climate change mitigation' dilemma and is seen as a panacea for the sustainable development of cities. The recent months demonstrate that the government of Azerbaijan appreciates the potential of smart technologies as promising and efficient tools for the redevelopment of the de-occupied districts of the Karabakh region, a result of the recent war between Azerbaijan and Armenia. As a developing

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[1] See the United Nations' Sustainable Development Goals for Cities. Available at: https://www.un.org/sustainabledevelopment/cities/ (accessed 24 July 2021).

economy aiming at steady economic growth, Azerbaijan needs to modernise its industrial and technological capacity by utilising 'green' or 'smart' solutions in order to meet its ambitious climate goals within the framework of Paris Agreement (e.g., decreasing greenhouse gas emissions by 35% by the year 2035) (World Bank, 2018). As it is seen from the Azerbaijani media today, there is a belief that the redevelopment of the districts will increase Azerbaijan's access to smart technologies, making the whole region an innovation hub that can transfer its expertise to the rest of the country (Hacıyev, 2021).

Azerbaijan's Quest for Smart Development
Recent years have witnessed growing rates of urbanisation in Azerbaijan. The urban share of Azerbaijan's population has increased from 53.7% in 1990 to 56.4% in 2020,[2] which shows an increased interest among Azerbaijanis in cities as destinations for employment, education, social service provision and cultural participation. The growth of the urban population is strongly related to rising demand for natural resources (fossil fuels, water, land), consumer goods, and services, making the concerns over resource management more critical compared to the previous century. Based on this, on 19 April 2021, the President of Azerbaijan, Ilham Aliyev, adopted a decree on the development of the 'smart city' and 'smart village' concepts aiming at the effective use and management of available resources for sustainable development in urban and rural areas. The fact that this measure was taken by the head of the state months after the war's conclusion is not just a coincidence. Today, the post-war period in Azerbaijan is seen as a starting point of a new era, in which the redevelopment of the de-occupied territories stands as a national strategy for the coming decades. It is not surprising that the first 'smart village' project was announced in the village of Aghaly in the Zangilan district of Azerbaijan (one of the de-occupied districts in Nagorno-Karabakh) on 26 April 2021—just one week after the adoption of the decree. The project is being developed based on the five 'smart' pillars (housing, production, social services, agriculture, and sustainable energy), and envisions the use of modern technologies and practices brought in by specialists from China, Turkey, Italy, and Israel.[3]

It is worth mentioning that the government has yet to make firm steps towards involving the wider parts of civil society in the redevelopment process of the de-occupied lands. From an outsider's perspective, it is quite noticeable that the decision-making processes are centralised and delegated to the governmental bodies that are accountable to the head of the state. The interests of internally displaced persons (IDPs) are seen to be generalised and distilled into the idea of repatriation only, while the government itself is portrayed as guarantor of a successful implementation of this process. Despite this, groups of IDPs are quite frequently taken to the de-occupied districts to see their homeland and witness the recent changes. Also, it is seen that the governmental bodies are making the initial steps to involve wider civilian groups into the redevelopment process. For instance, on 1 July 2021 the State Committee on Urban Planning and Architecture (or Arxkom) announced a competition entitled 'The Renewed Image of Ancient Karabakh' that aimed at giving independent professionals and architectural firms an opportunity to make their impact on the ongoing development process by designing conceptual visions for the development of five villages and the town of Khudafarin. According to the resource, the competition involved 21 projects, while the top three projects for each settlement got cash rewards. According to the press release by the Committee, the contestants demonstrated ways of utilising smart solutions in the planning and development processes, and the best suggestions are promised to be considered in the final decision-making process.[4] Unfortunately, it is still unknown whether IDPs will have the opportunity to express their visions in the development process or not.

Previous Experience
It is worth mentioning that several smart projects in Azerbaijan were adopted before the adoption of the new governmental strategy. For instance, in 2011, to address the growing problems in Baku's transportation system, the government established an Intelligent Management System for Transportation. Unfortunately, the project failed to design an adequate scheduling system for Baku's public bus transportation system—a problem that is still not solved. Designing a 'smart bus terminal' for the Baku International Bus Terminal Complex (BBAK) and an intelligent elevator management system (centralised dispatcher service—CDS) for the city of Sumgait count among the recent examples of applying smart technologies in Azerbaijan. More precisely, BBAK, in cooperation with Cisco, plans to establish a smart management system built upon the use of several innovative technologies including smart lightning, smart parking, envi-

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2   See World Bank Data, 'Urban population (% of total population)', https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS (accessed 20 July 2021).

3   '"Smart Village" – Dünyanın ən "ağıllı" layihəsi Qarabağda', AzVision.az, 28 April 2021, https://azvision.az/news/258574/--smart-village--dunyanin-en-agilli-layihesi-qarabagda-.html (accessed 18 July 2021).

4   '"Qədim Qarabağın yenilənən siması" memarlıq müsabiqəsinə yekun vuruldu', Bizimqarabagh.az, 19 August 2021, https://bizimqarabagh.az/tpost/c2sz5bhhc1-qdim-qaraban-yenilnn-simas-memarlq-msabi (accessed 21 September 2021).

ronmental monitoring, face recognition, licence plate recognition, accessible public Wi-Fi (Bakı Beynəlxalq Avtovağzal Kompleksi, 2019). The project in Sumgait in 2018 included replacement of the outdated Soviet-period elevators to modern analogues, which allowed the creation of a CDS under supervision of a new managerial body called 'Lift Servis'. The brand-new system helps with monitoring elevators remotely and providing maintenance and security services if necessary.[5] Another smart project was announced on 22 May 2020 through a video conference between Ilham Aliyev and Eric Rondolat, the CEO of Signify (former Phillips Lightning), a world-class lightning technologies company. According to the bilateral agreement, some 33,000 energy-efficient LED lamps will be installed in the city of Baku. It is believed that this lightning technology will allow up to a 50% reduction in the amount of electricity consumed for city lighting.[6] Since the city of Baku and its vicinity is the largest metropolitan area in Azerbaijan, with a share of over 90% of the national economy (Jafarli, 2018), using energy-efficient technologies in Baku can be seen as a significant budget-saving measure.

Time to Be 'Smarter'

As seen from the Azerbaijani media today (İsmayılzadə, 2021),[7] the concept of smart cities is being related to the use of advanced technologies, and it is generally believed they have the power to make qualitative changes in governance while improving the access of citizens to services provided by the state. Despite this, studies show that the smart approach to city planning should not be seen only through the lens of technologies, but also consider the importance of community and stakeholder participation in decision-making. For instance, according to Monzon (2015), smart strategies should be based on the inclusive participation of various stakeholders collaborating with government institutions. He adds that smart technologies should be used for achieving sustainable and resilient development and aim at improving quality of life (QoL). Also, Neirotti et al. (2014) state that the focal point of smart city projects should be the improvement of QoL that can be reached through optimisation of tangible resources (e.g., environment, infrastructure, natural resources) as well as intangible ones (e.g., knowledge capital, human capital).

In the context of Azerbaijan, ensuring public participation in decision-making remains an issue. It is impor-

tant to state that the city of Baku remains the only capital city of a Council of Europe member state in which 'mayor' is a non-elected position. Consequently, the last 30 years Baku urban planning has been characterised by a top-down decision-making model, in which stakeholder involvement as a process has more resembled a meeting of government officials with the representatives of large rent-seeking parties. The same pattern was seen throughout the recent development of a master plan for the city of Baku, as the meetings and workshops that were purportedly organised for all stakeholders did not involve the wider community and grassroots organisations. According to Albrechts (2006) and Albrechts & Balducci (2013), in the modern world, the main merit that makes an urban development plan stand out is its strategic nature—a principle that has its roots in the corporate world. It is believed that ensuring inclusiveness in the development process of an urban or a regional development plan is one of the five key factors (alongside selectivity, integration, visioning, and action orientation) that distinguish a strategic plan (the contemporary approach) from a comprehensive master plan (an outdated approach). The only attempt to more or less meet the standard for 'inclusiveness' was taken by publishing a brief version of the city plan on the website of Arxkom for public discussions.[8] Only three months (from September to December 2020) were given to the public for reflecting upon the introduced plans; half of that period (44 days) coincided with the war in Karabakh.[9] Eventually, the master plan discussions did not get the desired attention from the broader public, and Arxkom did not extend the given time frame.

Still a Ways to Go

The final master plan document is still not published, and so, Baku continues being a city without a new master plan since the independence of Azerbaijan. All the aforementioned factors demonstrate that there is still room for positive changes in terms of public participation in city planning, which is among the key pillars of smart development. Despite the lack of inclusiveness provided in the previous projects, some good news has arrived recently. On 9 July 2021, Arxkom announced a selection of potential members of a Public Council that will involve 11 members representing civil society institutions (one member per chosen institution). According to the introduced guidelines, the potential candidates

5   'Sumqayıt "Ağıllı şəhər"ə çevrilir', SumqayitXeber.com, 3 June 2020, https://sumqayitxeber.com/sumqayit-agilli-sehere-cevrilir/ (accessed 18 July 2021).

6   'Bakıda yeni layihə – 33 MİN LED İŞIQ QURAŞDIRILACAQ', FED.az. 23 May 2020, https://fed.az/az/energetika/bakida-33-min-led-isiq-qurasdirilacaq-81168 (accessed 20 July 2021).

7   'Qarabağ "smart region"a çevriləcək', Vergilər Qəzeti, 1 February 2021, https://vergiler.az/news/economy/11706.html (accessed 11 July 2021).

8   'Bakı şəhərinin Baş planı 2040', https://arxkom.gov.az/bakinin-bas-plani (accessed 22 July 2021).

9   'Bakı şəhərinin Baş planının ilkin layihəsi virtual sərgi formatında ictimaiyyətə təqdim olunur', https://arxkom.gov.az/bakinin-bas-plani/xeberler/baki-seherinin-bas-planinin-ilkin-layihesi-virtual-sergi-formatinda-ictimaiyyete-teqdim-olunur (accessed 23 July 2021).

were given 20 working days to send in their applications and should possess knowledge in architecture and urban planning.[10] On 11 September 2021, the 11 representatives[11] of the Public Council were elected from a pool of 18 candidates by the members of 112 civil society organisations[12] via secret ballot elections. The role of the Public Council is specified by Arxkom as a body that, while representing civil society institutions, would 'participate in the adoption of legal acts governing the activities of the Committee' and would 'organise public control in relevant areas'. Regarding the amount of authority and power given to the members of the Public Council, Arxkom refers to the Law of the Republic of Azerbaijan on Public Participation from 1 June 2014,[13] which they published among other legal documents on their website.[14]

Unfortunately, it is too early to make adequate conclusions at this point, but this can be considered as the first serious step towards assuring stakeholder participation in urban planning in Azerbaijan. It is worth mentioning that despite Arxkom's critical reform, ensuring broader participation remains another vital step to take. In practice, there are various methods for enhancing inclusiveness in city planning decision-making. For instance, while designing a development plan for the city of Istanbul, the responsible institution, Istanbul Development Agency, organised a six-month social media campaign with a particular user-friendly hashtag that allowed everyday citizens to share their visions on the future of their city (Istanbul Development Agency, 2016).

Despite the recent attempts to make changes in its decision-making model, Arxkom still has a ways to go in terms of improving inclusiveness. Giving voice to wider social groups at least on the level demonstrated in Turkey, which is close to Azerbaijan both culturally and politically, would be a more promising model for improving public participation in urban planning. To reach these goals, Azerbaijan still requires adequate reforms in its territorial organisation. In the existing system, the municipalities have limited political and economic power, while the executive chiefs are not elected but rather appointed directly by the head of the state.[15] Despite this, it seems that the war itself and the existing economic situation in Azerbaijan are pushing the state authorities to make some changes in the current decision-making models. Not to put the following on the level of the suggested earlier reforms, but the fact of the involvement of young professionals in the redevelopment of settlements in Nagorno-Karabakh as well as the creation of the Public Council itself demonstrate that there is a new decision-making culture emerging in Azerbaijan. State authorities are putting noticeably more trust in the country's human capital, and are ready to gradually share their responsibilities with a broader constellation of actors than before.

Conclusion

It is evident that the government of Azerbaijan sees smart technologies as a tool for enhancing the quality of state services and ensuring efficient use of resources. The first steps to applying smart solutions in urban development were taken prior to the recent war in Nagorno-Karabakh, but it is noticeable that the results of the conflict accelerated the process of adopting smart strategies in the development of urban and rural areas. The fact that the President of Azerbaijan decided to institutionalise the state's desire to be 'smart' gives the feeling that the next decades could witness noticeable changes in urban and rural development policies. Without the state leadership's firm steps towards improving accountability and ensuring inclusiveness in urban planning decision-making, Azerbaijan's quest for smart development runs the risk of becoming a paper tiger.

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Smart Transportation in Azerbaijan: What Can Be Done?

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Abstract

The following article looks at existing models of smart transportation and which of their components could be applied in Azerbaijan. The paper discusses the current possibilities, some applied policies, and challenges of implementation of smart transportation in the country. The main notion of the article is that smart technologies, such as the Internet of Things and big data, can fix certain socio-economic problems, while the process and human capital are the main determiners of success of a given initiative. Furthermore, the article suggests some recommendations on the effectiveness and efficiency of the implementation of smart transportation and analyse what can be done in the urban context of Baku.

Introduction

The growing urbanisation of the past years has led to increased vehicle traffic in Azerbaijan's cities, resulting in extra focus on traffic management and its improvement as a part of city planning. In this case, the improvement and efficiency of smart transportation or mobility has become one of the priorities of the Baku's 'smart city' plan. The question is what exactly 'smart transportation' is, and how it can make movement through cities more efficient. The 'Internet of Things (IoT) manages, evaluates, and monitors transportation systems to be effective, efficient and safe' (Mazur, 2020). The idea: smart sensors and controllers handle all the traffic management, only interfering when necessary. Thus, the importance of new technologies and their management is paramount in the implementation of a smart transportation system. Moreover, it is safer than traditional transportation system, as it involves machine learning and IoT;

'human factor' accidents tend to be very low (Mazur, 2020). Another crucial point is its cost-efficiency. Since smart transportation is managed by IoT, it uses resources in the most efficient way and avoids waste. Also, the transition from private car ownership to public transportation has a significant influence on everyday citizens in terms of transportation expenses. The decrease in CO_2 emissions, less noise and cleaner air are worthy factors to mention because fewer private cars are used when public transportation is sufficient. Having an inclusive character is also one big advantage of smart transportation: low-quality transportation segregates people and presents challenges to accessing better job opportunities and other public services, while the implementation of smart transportation will maintain equal access to high quality public transportation, paying dividends in terms of citizens' job perspectives.[1]

Defining the Problem of Transportation in Azerbaijan

Before proposing any smart transportation methods for Azerbaijan, it would be wise to look at the current situation of the transport system, the implemented policies, and the challenges that have occurred. Urban transport plays a crucial role in the economy of Azerbaijan. An effective transportation system leads to efficiency in economic costs (such as commuting time) and brings positive impacts (such as employment opportunities and better services). Urban transport grew by 5% annually in the period 2009–18 (International Transport Forum, 2020) which resulted an increase in car ownership. Wide-scale private car ownership in the Baku area is one of the crucial problems of the region's urban development. In the last 25 years, car ownership has increased from 55 to 143 cars per 1,000 residents (State Statistical Committee, 2020). We can guess that out of the 1.4 million cars registered in Azerbaijan in 2019, at least 1 million regularly enter and operate in Baku, presenting environmental, traffic, and safety problems.

Meanwhile, the low quality of the transportation sector in Baku has become one of the most visible issues in its continued urbanisation. The urban sprawl process and the new settlements on the outskirts of the city have greatly increased car usage in and around the area, leading to a 'domino effect' (Jafarli, 2018) since the residents in this area prefer to use cars over public transportation to commute to work, schools, and other places which are mostly based in the metropolitan area of Baku. As an administrative body, the Baku Transport Agency (BNA) is the responsible authority in terms of managing transportation issues in the city. However, lacking

a national transport strategy restricts further development in the area. Since Baku is the capital city and the country's main tourist destination, the urbanisation process has occurred faster than in the other cities of Azerbaijan. According to the Asian Development Bank's (ADB) report, Baku, and its surroundings account for 92% of the national industrial output. Due to its high population density, Baku experiences many urban transport problems. Traffic congestion, unorganised street parking, overcrowded public transport, lack of walkable pedestrian roads, and poor conditions for cycling are among the major challenges in the capital city (ADB, 2018). In addition, there is a lack of coordination in decision-making processes between government authorities and the main stakeholders, such as financial investors, policymakers, and the citizens (World Bank, 2020). The lack of coordination also results in gaps in vital data as well as data availability; data on transportation emissions and traffic volume, for example, are not adequately collected, and are not made available to the public.

The increased usage of cars for private transportation has led to various problems including air quality deterioration, increased deaths on the roads and losses in terms of time and money. The massive use of cars has impacted the city environment for the worse, increasing CO_2 emission, causing noise and pollution, and decreasing the air quality. At the same time, 1711 road traffic accidents have been recorded in 2018 alone, despite the road safety programme (UNECE, 2021). The reasons behind those mentioned issues are the lack of a national strategy and the updated data. The integrated urban management system would be a much better fit for Baku's current transportation model rather than having separate bodies responsible for each public transportation modes as observed in current model (Jafarli, 2018). Spotty enforcement of road safety programmes as well as low public awareness of them are also major issues (International Transport Forum, 2020). Yet another significant problem in the sector is the aging public transportation infrastructure. Official statistics indicate that the profit from public transportation is increasing (44% from 2013 to 2017); nevertheless, spending on passenger transport is increasing even more quickly (77% from 2013 to 2017) (International Transport Forum 2020). Apparently, there is a positive link between the size of the population and public transportation usage by city dwellers. According to AzStat 2019, the population in Azerbaijan was 10.047 million people in 2019, up from 9.949 million in 2018, and the annually number of bus passengers was 1.8 million people in 2019, who rode the bus once or more, and 1.7 million in 2018 (State Statistical Com-

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1 'What Is Smart Transportation?', *NEC*, 26 January 2021, https://www.nec.co.nz/market-leadership/publications-media/what-is-smart-transportation/ (accessed 30 August 2021).

mittee, 2020). Moreover, the removal of trams and trolleybuses reduced the effectiveness of public transportation and negatively affected the environment.

Looking for Examples

To gain a more concrete idea of what 'smart transportation' entails, it is wise to look at some successful existing smart city models. Among these, the 'Smart Nation' policy of Singapore has enjoyed great success and contains measures that can be used in Azerbaijan. Its Intelligent Transport System (ITS) focuses on easing traffic congestion in the city in the most effective and efficient way. With the help of ITS, they introduced the Electronic Road Pricing System, which charges vehicles varying on time of day and congestion levels. Drivers can thus decide which route to take based on the traffic and the hour. The appropriate charge is then deducted from a smart card. Thus, it is a great economic tool to prevent traffic congestion. Thanks to ITS, average vehicle speed in Singapore has climbed to 27km/h, even faster than other world cities which have implemented smart city models. Furthermore, the introduction of the Expressway Monitoring and Advisory System (EMAS) monitors the road and, with the help of data acquired by cameras, sends the information to the control centre. In turn, this information is sent to the drivers via electronic signboards placed on the roads and/or radio and online tools (Cheang and Kim, 2016). This has proved quite an effective method to prevent congestion, especially congestion resulting from accidents and breakdowns.

Another smart transportation model has emerged from South Korea. Digitalisation and 'smart' infrastructure are the foundation of the Seoul Metropolitan Government. In the subway, they use smart cameras to monitor the number of passengers, peak periods, how frequently people use the subway, how many minutes are required for boarding, etc. This data is used to avoid bottlenecks and to provide assistance when needed. Additionally, digitalisation can be seen almost in every detail of Seoul's subway, such as digital supermarkets, which are quite effective in terms of timesaving. Seoul has also installed digital terminals that provides detailed navigation and provide traffic updates, making it easier for commuters to choose the most suitable road. Moreover, the transport office gathers live data on congestion and accidents and immediately shares the information on Twitter so that people can choose a provided alternate route (Rahmat, 2017).

Finally, Barcelona is another example of a city which has enjoyed great success in its smart mobility/transportation model. Every day around one million vehicles enter Barcelona, resulting in air pollution, noise, and traffic congestion. Thus, in its smart city model, one of Barcelona's main aims were to reduce CO_2 emissions. Therefore, in 2017 they restricted the entrance of most combustion-engine cars to the metropolitan area of the city. According to the Barcelona City Council, this reduction in pollution levels have prevented 659 premature deaths per year and increased life expectancy in the city by 52 days. Barcelona's plans have also focused heavily on ridesharing, including car- and bike-sharing initiatives as well as a broadening of the availability of e-scooters. According to simulations, ridesharing along with massive usage of e-scooters would decrease private car ownership in Barcelona significantly (Or, 2019). Along with that, the city has instituted a 'green light' policy that allows ambulances and other emergency vehicles to move easily and faster in the emergency conditions. Due to these smart facilities and techniques, Barcelona has been named one of the "smartest" cities in the world.

What Can Be Done in Azerbaijan?

As mentioned above, though the lack of strategic planning forms the foundation of all of Azerbaijan's transport problems, the ADB has provided some basic recommendations for improving urban transportation. These include bus prioritisation, improvement in the bus terminals, and pedestrianisation, as well as traffic management (ADB, 2018). According to the World Bank's expert, the managerial problem is at the core of Azerbaijan's transportation woes. The suggestion as part of a World Bank project aimed at improving urban transportation in Baku to establish a unified model was ignored by state officials. As a result, due to the disagreements between sides, the World Bank refused to finance the project (BBC, 2015). Particularly, one step in this aim would be developing an online information platform that delivers the departure and arrival times of all public transportation. This would reduce decision times and would give commuters more options in terms of routes, as observed in Seoul and other smart city models. Attempts by the city to bring these initiatives to fruition, such as setting up information boards at bus stops, these efforts proved ineffective. Low input quality, resulting from incorrect information and failure to update data, was among the reasons for failure. Moreover, according to the BBC (2015), people also complained about the unhygienic conditions in public transportation, likely yet another cause for the increase in private car usage. Another effective suggestion for preventing traffic congestion in the central areas is to improve the parking system.

A sensor-controlled system that shows drivers the location and number of free parking slots in the city would decrease both traffic congestion and time spent on searching for a spot. One more smart transportation tool which can be applied to Baku is the 'green light' approach which we have seen in the Barcelona model. It is a useful function to facilitate the movement of emergency vehicles and to prevent traffic jams during

breakdowns, because those unexpected incidents cause large amounts traffic congestion on the roads, adding to Baku's already-significant transit problems.

Furthermore, new ways should be found to manage institutional problems. As is evident in Singapore's Smart Nation and other smart transportation models, public opinion, and the other stakeholders, such as public entities, and private companies play a crucial role in smart city planning and implementation. Thus, the public should be given a voice in the decision-making process, which is open to everyone to increase the buy-in of the population. As of November 2019, BNA has announced the creation of an urban transport model in conjunction with the State Committee on Urban Planning and Architecture.[2] Among the objectives are many environmentally friendly projects, such as improving bike lanes and increasing pedestrianisation. In this sense, we can follow the Barcelona city model, which prioritises bike usage as the preferred form of daily personal transit. By pursuing this strategy, motorised transportation would decrease, itself resulting in a decrease in CO2 emissions. Although cycling is not a very popular mode of transportation in Azerbaijan, according to the Chairman of the Baku Transport Agency, Vusal Karimli, development of bicycle lanes is on the agenda of Baku's general urban planning (Azerforum.com, 2021). He notes that they aim to encourage people to start cycling and plan to extend the city's bicycle lanes to 251 km by 2040.[3] Road safety and urban mobility also count among the focus areas of the new model. The first phase of the plan is intended to continue until 2027, the improvement of public transportation at its core.

The achievement of smart transportation in Baku is an opportunity rather than a challenge. As mentioned above, the main challenges in smart transportation implementation are the managerial problems in the urban planning departments and the inertia of citizens' desires for personal motorized transportation. Considering the current challenges presented by climate change, in the context of Baku, we should focus primarily on these two problems. This process starts with the normalising of public transportation usage among city dwellers. In this case, the optimisation of the public transportation systems is the priority in implementing 'smart' approaches in Baku. Additionally, the managerial issues can be handled at least in part through increased participation of citizens in the urban planning process: since they are one of the main stakeholders in this task, they should be part of decision-making process and kept informed at every stage. The implementation of 'smart' urban planning solutions can be maintained successfully in the upcoming years if it is done efficiently while considering both the current resources and the people's needs and opinions. After all, the aim is to improve citizens' living conditions, rather than to comply with any existing smart city model.

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3   'Bəlkə 2040-Cı Ildə Bakıda Rahat Velosipeddən istifadə Mümkün Olacaq', Azerforum.com, 17 May 2021, https://azerforum.com/az/belke-2040-ci-ilde-bakida-rahat-velosipedden-istifade-mumkun-olacaq (accessed 3 October 2021).

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The Smart Village Concept and Its Applicability in the Karabakh Region: Can It Succeed?

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Abstract

The end of the Karabakh conflict brought new problems for the Azerbaijani government, the most important of which being the reconstruction and development of de-occupied territories. With thousands of hectares of agricultural lands undeveloped and abandoned for 30 years, the Azerbaijani government has adopted a 'smart village' approach. The political establishment hopes that the implementation of this concept in these territories will boost redevelopment as well as lead to a return of population. The following article discusses the possibilities of implementing 'smart village' concepts in the Karabakh region, and offers suggestions based on the past experience of various countries.

Introduction

The Covid-19 pandemic forced both the public and private sector to rapidly digitalise. The recent situation has forced the government and citizens to adapt to the changes with the help of technology. Additionally, after 44 days of war with Armenia, Azerbaijan needs to restore the cities and villages in the de-occupied region of Nagorno Karabakh. Hence, to develop the Karabakh region in a sustainable way, the 'smart city/village' concept is a primary point on the agenda. The Armenian period was marked by a general lack of development activities in the region. Thus, the implementation of smart village concepts is necessary to identify solutions based on demands. Consequently, economic development and increased living standards can be achieved in the Nagorno Karabakh region with the right smart solutions.

The advantages of smart villages would have an enormous impact on the development of the region in several aspects. This concept allows for the building of empowered, resilient, and independent communities and also contributes to the more efficient use of available resources. Taking into consideration that the Karabakh region is rich in natural resources and requires redevelopment after being destroyed during the war, smart village implementation and utilisation of previous experience seems more appropriate for the situation. Therefore, there is an urgent need to change the status quo and design a model which will improve all villages in an efficient and effective way and accelerate economic growth at the same time.[1] The village of Aghali in Zangilan district was chosen to be the first municipality to implement the smart village project. This article presents various countries' experiences with smart village implementation in the hopes of helping solve the urbanisation problems mentioned in the previous articles of this special issue, and examines its suitability to Azerbaijani cities and villages.

The Smart Village Concept in Azerbaijan: Why Do We Need It Now?

After de-occupation of Karabakh and surrounding territories, Azerbaijan now faces a major repopulation problem. After almost 30 years of living in another part of Azerbaijan, it would be difficult to persuade a majority of internally displaced persons to return to Karabakh. Moreover, there exists an entire generation that was born outside of Karabakh and does not have attachment to

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1 '"Ağıllı şəhər" (Smart City) və "Ağıllı kənd" (Smart Village) konsepsiyasının hazırlanması haqqında', Decree No. 2584, 19 April 2021. Available at: http://e-qanun.az/framework/47263 (accessed 30 August 2021).

these territories. Thus, in April of 2021, the President of Azerbaijan launched the process of developing the smart village and smart city[2] concepts, sending a signal to the population that their lives in the new territories would be completely different, technologically driven and much easier compared to life in Soviet times or the period thereafter. The importance of young and fresh minds is paramount; thus, through technological innovations and smart policy applications, the population, especially young Azerbaijanis, can be motivated to come back.

The second reason for relying on smart village and smart city approaches, although remaining unstated, is to stem the massive influx of Azerbaijan's rural population to Baku. Today, the unofficial population of Baku and its closest surroundings totals around 4 million people, constituting 40% to 50% of the country's population. Azerbaijan's second-largest city is home to around 300,000 people—almost ten times less than the Baku area. Thus, urban primacy, i.e., the concentration of the urban population in Baku, is detrimental to the balanced development of the country. Political, administrative, economic, and social power is concentrated in Baku, while other places remain small and insignificant. Thus, smart villages in Karabakh are also intended to serve to spur migration from urban areas back to rural villages of Karabakh, slow down urbanisation, and the rural population of other regions of Azerbaijan would benefit economically.

Finally, it is worth mentioning the situation in other rural areas of Azerbaijan, where poverty and access to services remains a significant problem. According to World Bank statistics, 'Over 60 percent of poor people reside in rural areas and about 57 percent of the population is vulnerable to falling into poverty should they experience unanticipated economic, health-related, or other shocks' (World Bank, 2021). Additionally, in comparison to Baku and the greater Absheron region (of which Baku is part), access rates to water and gas are lower in rural areas, where only 76% of households have access to water and 82% to gas (World Bank, 2021). Low access to services leads populations to migrate from rural to urban areas, strengthening the rural-urban divide.

How to Make Smart Villages Successful? Looking for Best Examples

To prevent these inequalities and to reduce service gaps, the importance of technology and use of smart solutions cannot be overstated. Information and Communication Technology (ICT) plays a critical role. The advantage of using ICTs in the Karabakh region include inexpensive connectivity and affordable implementation, leading to

the emergence of new models and new ways of providing information services (World Bank, 2011). Technology and innovation enable job creation and improve labour productivity, a win-win situation for the local population and the government. Applying this method in the Karabakh region would have an enormous positive effect on promoting local products and increased employment opportunities for the rural population while keeping existing jobs. In the following paragraphs, smart village experiences of various countries and their applicability to potential implementation in the Karabakh region will be discussed.

South Korea's smart village project focused on agriculture by targeting agro-food manufacturing, processing, distribution, and rural tourism in its villages according to a 2013 project concept (World Bank, 2021). In 2014, the Korean Ministry of Agriculture, Food and Rural Affairs (MAFRA) also began implementing the Smart Agriculture Project, which aimed to connect and modernise farms through ICT-driven solutions. This enabled producers, retailers, and ICT organisations to collaborate and encourages young people to settle in rural areas. MAFRA attracted youth to smart farming by providing training courses and supporting the development of large-scale 'smart farm' complexes. The smart farm innovation model incorporated three core elements: (1) educating and training rural youth and farmers; (2) enhancing production through smart farming practices (e.g., making 70% of the modern greenhouses 'smart') and diversification of agricultural exports; and (3) boosting the adoption of technology by encouraging academic-industrial-institutional joint research to build innovative ecosystems based on 'big data' (World Bank, 2021). Since the younger generations' role in development is unavoidable and modernisation is already underway in the Karabakh region, implementing the Korean model would help accelerate this process.

Harisal, a small village of less than 1,500 people located in the Melghat region of the Indian state of Maharashtra, has been historically characterised by low human development indicators because of poor public infrastructure and limited employment opportunities. The main purpose of developing Harisal as a smart village was to develop employable skills, access to healthcare, agricultural productivity, digital connectivity, work opportunities, and local governance, in the same goals Azerbaijan has for the Karabakh region. The government of Maharashtra (GoM) aimed to increase the gross domestic product of the village through both technological and social innovation. Being a model village, the nearby areas could also benefit from Harisal's experience and adopt the innovations that succeeded there (Ran-

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2   '"Ağıllı şəhər" (Smart City) və "Ağıllı kənd" (Smart Village) konsepsiyasının hazırlanması haqqında', Decree No. 2584, 19 April 2021. Available at: http://e-qanun.az/framework/47263 (accessed 17 August 2021).

vir, 2018). The project implemented innovative solutions to achieve rural transformation: (1) Digital connectivity; (2) Health (e-health centre with telemedicine facility); (3) Education and skills training; (4) Governance (citizen services centre); (5) Digital financial services; (6) Agriculture (farmer trainings by agricultural extension workers) and (7) Sustainable livelihood. In a public-private-partnership, the project was led by the GoM and implemented by Microsoft in partnership with various private and public sector enterprises. Being a part of the Digital India Initiative, project planning and ICT management were supported by the National Informatics Centre (World Bank, 2021). Taking the Harisal model as an example, we can say that there is a need for joint work between government and NGOs to make the smart village concept broadly implementable.

Can Azerbaijan Succeed?
These examples from abroad can be successfully implemented in Azerbaijan. First, we need to define the challenges of the region, and employ strategies/approaches from the above-mentioned projects accordingly. Additionally, cooperation among the villages to implement these programs is also crucial: we need to design the national strategic plan to ensure the municipalities are interconnected and share contributions equally. To achieve the above-mentioned objectives is not possible without human interaction; thus, investment in human capital is a must in terms of smart city/village implementation, because we need skilled professionals to design and implement technologies and innovations.

However, there are several factors that needs to be considered. The main problem, at least for the next several years, is the issue of land mines. The Azerbaijani Mine Action Agency (ANAMA) has already begun the demining process, but it will take around decade to fully demine Karabakh. Idris Ismayilova, who is head of the operation, stated that approximately 750 unexploded rockets as well as 4,500 anti-personnel and 2,000 anti-tank mines are have thus far been removed in only a small area of Karabakh.[3] The estimated price for the reconstruction process given by Azerbaijani experts amounts to more than US $20 billion (Crisis Group interviews, 2020). Meanwhile, some displaced people cannot wait to return to their homes, and are willing to invest in this rebuilding and demining process. Next, the government should understand what kind of population it wants in smart villages. While it is easy to predict the interested strata in urban populations, i.e., mostly the young, the potential makeup of the rural smart village population is at this point impossible to anticipate. Most of Azerbaijan's rural population is involved in traditional agriculture including cattle ranching, farming, etc. It would take great efforts to educate these people on how to properly utilise data and make data-driven decisions. In this regard, the Korean model of training young people in smart agricultural technologies seems more feasible. The government could already at this point begin preparing the relevant plans with academic institutions and think tanks. Finally, smart villages in Karabakh may be the first example in the world where such concept will be introduced from scratch, and not to an already-existing village. The success of smart villages in Karabakh can shift paradigms not only in Azerbaijan, but in the greater region as well, helping breathe new life into countless dying villages.

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