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Government 4.0 in Public Administration

Analysis of current practices and policy recommendations for the Republic of Azerbaijan.

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STATEMENT OF AUTHENTICITY

I have read ADA's policy on plagiarism and certify that, to the best of my knowledge, the content of this paper, entitled *Government 4.0 in Public Administration***,** is all my own work and does not contain any unacknowledged work.

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Abstract

Recently, digitalization and technological transformation is an emerging trend among countries. Different countries apply various concepts and principles to adjust their administration system to technological advancements. Although some people do not support, the benefits and expected outcomes through digitalization is an active discussion. Azerbaijan is also one of those countries shifting towards e-governance. After the implementation of Government 1, 2, and 3 principles, the Azerbaijani Government is now strongly focused on Government 4.0 initiatives which aims to bring digital and technological advancements to Public Administration. It is believed that through various initiatives in different fields, the government will be able to achieve its ultimate goals in administration which are transparency, accountability equality, equity, quality of services delivered and so on. This research paper analyses the current situation in Azerbaijan, in the implementation of Government 4.0 and reflects different aspects for exploring the realities within the concept. It highlights the main constraints and possible negative consequences that may occur during implementation. To have a better understanding, both primary and secondary data are used. A survey and multiple interviews with professionals to better understand and get first-hand experience. The research aims to determine and suggest effective policy alternatives after critically analyzing the current stage of implementation, increase citizen participation, and use of e-government tools.

Introduction

Both developed and developing countries highly appreciate achievements in e-government, citizen-centered e-government, e-services, and the development of effective administrative systems via ICT application. The contemporary economy is defined by two tendencies.

The idea of e-services reveals the following: the shift from goods to services, the rapid expansion of electronic systems, and the information economy (Ostašius & Petravičiūtė, 2010). E-services are often defined as prompt, transparent, and ICT-based electronic service arrangements across several disciplines. E-services are developing to better fulfill the expectations of users, who are becoming more and more dependent on these services. E-services must be simple to use and accessible to a wide variety of users.

In this regard, one of the most important things to consider is the evaluation of electronic services. Based on past experiences, these systems usually face comparable typical challenges. As such, it is not very sensible to develop initiatives with the e-services sector in mind. It may be argued that it makes more sense to reach a consensus and collaborate to find solutions that can be implemented by all parties. According to Lindgren and Jansson (2013), cooperation and the use of a common e-services paradigm facilitate the identification of more efficient solutions by accounting for the skill sets of all service providers.

Deliberate attempts were being made globally to coordinate various e-services and establish e-government throughout the present ICT-driven periods of quick expansion.

E-government has already gained traction in Azerbaijan, where a national strategy has been developed and put into action since 2003 under the "Electronic Azerbaijan" Program (E-Azerbaijan, 2003-2012). According to the "one window" concept, the main objective of the project's implementation is to employ continuously developing ICT to provide citizens high-

quality, timely, transparent, efficient, and accessible services in government and other government institutions. E-services are being developed using new technology, innovations, standards, and best practices from the past in an effort to increase the efficiency of e-government. This evaluation and its multi-pronged metrics are encouraged by the rapidly growing number of innovative e-services. E-service evaluation models allow e-services and related systems to be assessed in a number of ways and dimensions. This article looks at Azerbaijan's experience using an international standard for e-service evaluation.

Government 4.0 is a paradigm change in public administration that aims to increase governance, transparency, and the efficacy of public services via the use of cutting-edge digital technology. In addition to Government 3.0's digitalization initiatives, this new paradigm is distinguished by the incorporation of technologies such as big data analytics, blockchain, artificial intelligence, and the Internet of Things (IoT) to establish a more responsive, intelligent, and networked government ecosystem. Adopting Government 4.0 principles is in line with Azerbaijan's broader national objective to advance inclusive, transparent, and efficient government by modernizing public administration. Azerbaijan's substantial reforms and efforts to introduce this cutting-edge technology into its public sector aim to increase economic development, transform public service delivery, and enhance citizen engagement. Azerbaijan's path towards Government 4.0 is defined by a number of important programs and tactics. These include the creation of e-government platforms to enable online public services, the development of digital infrastructure to support high-speed internet access across the nation, and the execution of national initiatives to increase digital literacy and skills among the general public and public sector workers. Azerbaijan's adoption of Government 4.0 also involves the country fostering partnerships with businesses and international organizations in order to combine resources and expertise. This collaborative

approach is essential for promoting innovation, safeguarding digital systems, and keeping up with the rapidly evolving technological landscape. Government 4.0 is not yet widely used in Azerbaijan, thus there are challenges in putting it into practice. All things considered, Azerbaijan is in a strong position to transform its public administration system into a more efficient, transparent, and citizen-centric governance model if it continues to invest in technology, establishes clear laws, and prioritizes participatory policymaking.

Prior to delving into the specifics of Government 4.0, it is important to note a few crucial points that should be emphasized from that viewpoint in this study, since this system was developed beyond Government 2.0 and 3.0. Due to the implementation of successful e-government programs, e-government has become an international phenomenon. Governments use a range of state initiatives and strategies to implement e-government development strategies. Notwithstanding all of these efforts, the expansion of ICT and new services, the demands made on the availability of Issues and barriers pertaining to citizen-oriented services, etc., are local and regional in nature. For example, the evolving demands on e-services throughout time need the development of e-government strategies and models. Following reform efforts, a paradigm of better government services than before arose in Azerbaijan after the nation broke from the USSR in 1991. However, there was still room for improvement, particularly in terms of public participation in state activities. As a result, the term "clean and good governance" originated in Indonesia as a means of promoting a civilized lifestyle that was centered on the contemporary era of digitalization. Asmuni (2019) defines good governance as being built on the principles of accountability, openness, obeying the law, and permitting public participation. It is also described as being authoritative and free from nepotism, collusion, and corruption. Laws that alter institutional structures and management, including Electronic Government, are required to ensure clean and good governance,

especially in terms of public accountability and transparency. Thus, implementing electronic governance aims to increase community involvement (Dwiyanto, 2018).

E-government is an IT platform developed by the government that makes public services better and provides easy access to public information for citizens. To achieve good governance via successful and efficient public service improvement, electronic government policies and strategies must be developed. Since 2000, additional citizen-focused e-government services have been made accessible via the Gov. 2.0 platform. Web 2.0 technology is used in the implementation and provision of services for citizens and the government. It should be noted that the Gov 3.0 model, as it is now proposed, is a web-based semantic government incentive that provides intelligent services by customizing services to each citizen's needs and preferences. E-government models differ from one another based on several features of their evolution phases (E-Gov. concepts, 2008; Government 3.0, 2016). The e-government 2020 plan, which aims to use cutting-edge technology to offer citizen-centered e-government services, has been accepted by South Korea, one of the top countries in the UN's government development index (E-Government Survey 2014, 2016; Government 3.0, 2016). The Gov. 3.0 concept is a citizen-centered government service that draws inspiration from South Korea's experience. Its objectives are to enhance people's lives, encourage cooperation and communication amongst government institutions, and create new job possibilities by using public data. The goal of Gov. 3.0 is to increase public satisfaction via the enhancement of government through increased competence, transparency, and service orientation (Government 3.0, 2016). Ray & Rao (2005) have proposed a method for precisely determining the level of service efficiency resulting from the implementation of the e-government project. For evaluating the provided e-services, the analytical hierarchy approach is recommended.

Ostašius & Petravičiūtė (2010) focus heavily on e-government service modeling in their study. A reference model for service-oriented architecture served as the foundation for this approach. Through the development of joint services, the strategy aimed to increase operational effectiveness by promoting cooperation amongst the entities engaged in the e-service delivery process. Once proven in transport vehicle registration e-services, the proposed model might be applied to other e-government services. Ostašius and Petravičiūtė (2010) claim that the proposed e-service model allows evaluation of the maturity and completeness of an e-service system as well as comparison with other comparable e-services. Lindgren & Jansson (2013) examined the terminology used in the research of e-services issues related to the employment and expansion of e-government services. Three perspectives are used to analyze e-government services: public, electronic, and service. Also looked at are the theoretical foundations of e-services (Lindgren & Jansson, 2013). Zaidi et al. (2013) look at many aspects of e-government service delivery and provide a way for citizens to rate the reliability and effectiveness of these services.

A new conceptual model was proposed after a detailed examination of the models already in use for efficiency assessment, such as SERVQAUAL, E-S-Qual, D&M, etc (Zaidi, et al. 2013). Butt (2014) investigates the ways in which public interests have been included in the evaluation of result-oriented e-government. The research claims that the evaluation of e-government is reflected in the rating of e-government websites. The literature review states that this kind of study is usually done to evaluate the effectiveness of government institutions. Three stages comprise the assessment of e-government in this research. The first stage covers the indicators for the e-government evaluation. The second phase involves getting public feedback on each signal in order to conduct an experiment. The strategy is experimentally tested in a selected government agency in the third stage. Reports created from the data are sent to relevant parties since this approach is

outcome-focused. The results of the research show that evaluations conducted in government institutions allow for critical review and in-depth examination of the institution's procedures at certain levels (Butt, 2014). Hasan (2015) conducted a literature review of research in the subject of e-government. The analysis of the studies is done with the intention of enhancing research by taking into account the geographical context, the viewpoints of the studies, the data analysis technique, and the analysis of research methods. The study's result is important for analyzing e-government offerings and pinpointing areas that need further research. The study's conclusions include research projects related to e-government services, service improvement, evaluation, and mutual communication. The research initiatives, which looked at the topic from the viewpoints of industrialized and developing countries, used empirical data analysis methodologies (Hasan, 2015).

1.1 Methodology

The qualitative research method will be used in this study to gather sufficient data for a thorough examination and analysis of the present problem. The sample group will consist of representatives from the ASAN service and the government. The essay will give a thorough study of the problem by fusing primary data from interviews and semi-structured surveys with secondary data. The interviews were recorded with the participants' permission in order to code the interviewers' replies, transcribe the interviews, and compare the material gathered with secondary sources and survey findings in order to look at all points of view on the topic. Due to the certain causes were mentioned that were a reason for the development of Government 4.0. First interview was conducted with Mehdi Javadzade (IT head of the department in State Agency for Public Service

and Social Innovations under the President of the Republic of Azerbaijan). The second interview was conducted with Ilkin Iskandarli a business analyst. The third interview was conducted with Nijat Rasulov. He is currently working at Pasha Holding Group Strategy Manager. The following interview questions were posed to each interviewee:

What part does digital inclusion play in the successful implementation of Government 4.0 initiatives, and how may the digital gap be closed?

In light of the increasing reliance on data, how can governments strike a balance between the need for data-driven decision-making and the need to protect cybersecurity and protect people's privacy?

Implementing Government 4.0 sometimes necessitates a culture shift for public agencies. How can governments effectively deal with resistance to change and cultivate a culture that embraces digital transformation?

What steps may be taken to overcome outdated technology, poor internet connectivity, and other technological obstacles so that Government 4.0 can be successfully implemented in places with poor technical infrastructure?

Government 4.0's effectiveness depends on maintaining reliable, consistent data sources. How can governments address the problems of uniformity across departments and systems, interoperability, and data quality?

What policies and strategies may be implemented by governments to assist public sector employees in acquiring the knowledge and skills necessary to operate and oversee state-of-the-art digital technologies?

How can governments ensure that their legal and regulatory frameworks keep pace with the rapid advancements in technology, while also ensuring that laws encourage and guide the appropriate use of digital technologies in public administration?

The implementation of Government 4.0 may need large upfront costs. How can governments strike a compromise between the long-term benefits of adopting cutting-edge digital technology and any possible budgetary hardships?

When governments collect and analyze vast quantities of data, which ethical concerns should take precedence, and how can they ensure that the data is used in a way that aligns with the principles of transparency, accountability, and equity?

To effectively address the multifaceted challenges posed by Government 4.0, collaboration between the private sector, civil society, and government agencies is vital. In what ways can governments foster successful cooperation to guarantee the ethical and successful implementation of digital projects?

2. Problem Description

As was said in this research paper's introduction, e-government techniques have grown in popularity recently all over the world. It is one of the most important instruments that governments can use to take advantage of technology advancements and respond quickly to new, vibrant trends. Proitorized factor by the government is the development and updates in high-quality services and updating digital environment for fulfilling their needs. The objective is to sustain government services by offering high-quality platforms that are up-to-date, citizen satisfaction and increasing

effectiveness. Improving transparency, flexibility, and accountability in government operations is not simple, it's also a component of a large strategy.

Efficiency concerns is the main driving force for having securitized e-services. Offering online interfaces that are generalized by digitizing administrative processes, governments may save the time, cost, and bureaucratic impediments that are often involved in needing public services. Merely including everything registering online permits or licenses, from filing tax returns, civils may complete tasks quickly compared to previous and simply, saving a lot of time for both party (individuals and government officials). Moreover, it is difficult to find a reason whatever for e-services are priced. By moving from paper-based to digital systems governments may save a great deal of money, environmentally friendly (by saving paper waste), which can save paperwork, streamline processes, and improve the allocation of resources. These savings are benefitial for taxpayers, and governments may use the money saved to husband their finance other core parts like infrastructure development, healthcare, education etc.

Essential element of efficient e-services is accessability. By providing online platforms that are useable by individuals with a range of competencies and experiences, governments guarantee that no individual is left behind from the viable offer. Whether they reside in far-off rural areas or big cities, people may easily get interested in services from the comfort of their homes or mobile devices in other word blueflex project, doing away with the need to physically visit government offices (Aliyeva, 2020). Ascended accountability and transparency in government procedures contribute better e-services. For improving social justice inclusivity defines that all individuals have equal access. Through online platforms, civils have undoubtedly immediate access to one-

time data on government policy, expenditure, performance metrics and some other platforms. Public trust in government agencies is being boost by this strategy.

To put it simply, governments essentialize providing high-quality e-services to meet people' evolving needs, enhance operational efficiency, promote accountability and transparency, ensure social inclusion, foster innovation, and increase economic competitiveness. In the digital age, governments may help people and advance society by making investments in the innovation and maintenance of robust digital systems and user-friendly online platforms.

Azerbaijan is one of the well-known nations using e-governance techniques in this regard among the post-soviet countries. The government plans to priotirize a progressive style of governance that progressive innovation, digital transformation, and the delivery of services that are in the limelight on the demands of citizens by implementing Government 4.0. With this aim in mind, the Azerbaijani government has been digitalizing public administration, boosting efficiency, promoting transparency, and encouraging public engagement in government processes via the use of cutting-edge technology and digital platforms.

The "E-Government Portal" might be brought up as an illustration of the developments and ideas made in Azerbaijan's e-government system and year by year by adding new offerings is totally considerable. This "E-Government Portal" serves as a single, comfortabke location for civilians to access a variety of e-services, such as paying taxes, obtaining licenses, renewing permits, and more, all from the comfort of their homes or places of business. The primary benefit is having all of these services in a single, central system. Azerbaijan has also been investing in the development of digital infrastructure to make it easier to provide services in line with Government 4.0. This

includes initiatives to raise internet connection, strengthen cybersecurity, and promote digital literacy among the populace (Aliyeva, 2020).

Regretfully, difficulties persist, nevertheless Government 4.0's achievements. The threats mostly obstacle 1. Risks about cybersecurity and privacy concerns, 2. Digital Gap, 3. Training employees and capacity development, and 4. Services quality. The difficulties that arise in these will be examined profoundly and backed up by the facts below in this article.

2.1. Cybersecurity Risks and Privacy Concerns

Government 4.0 is a strong tool to which may bring development and new phase to administration, however it may encounter cybersecurity concerns and privacy risks.

The main consequence that exists is about it bringing serious security risks while implementation. It is a risk for governmental infrastructure and services delivered. Hackers may steal For instance, hackers may target government networks that store personal information about citizens or use ransomware to extort money from government agencies.

Azerbaijan, like many other countries, is susceptible to cyberattacks due to its reliance on digital platforms for public services (Aliyeva, 2020). In addition, the development of adequate cybersecurity defenses sometimes lags behind the rapid pace of technical advancement, leaving government systems open to fresh intrusions. Ensuring the security and reliability of Government 4.0 infrastructure is critical to maintaining national security and preventing hostile exploitation of citizen data.

Government 4.0 acceptance carries significant security problems due to the vulnerabilities it creates that might be exploited by hostile individuals. The availablity of cyberattacks intended to interfere with vital government system and services is one of these worries. For instance, hackers may attack government networks that house individuals' personal data or use ransomware to demand money from government agencies. Like many other nations, Azerbaijan is vulnerable to cyberattacks because it relies on digital platforms for citizen services (Aliyeva, 2020).

A report titled "Azerbaijan Cybersecurity Governance Assessment" by Natalia Spinu is a useful example to better grasp the issue with cybersecurity threats. Information security and cybercrime-related dangers and crimes have progressively increased in Azerbaijan during the last three years. For example, 42% of Azerbaijani PC users reported encountering cyberthreats between January and September 2019, and many of them were vulnerable to malware (software) spreading to memory cards and hard drives. Threat and encryption systems have both strengthened during the last several months. Internet security software Kaspersky discovered over 7,500 potentially harmful malwares in the second quarter of 2019 and prevented 388,000 attempts to direct Azerbaijani internet users to phishing websites (Spinu, 2020). One reason that many other developing countries share with Azerbaijan is the country's increasing dependence on information and communication technology (ICT) for services and applications. Unfortunately, the nation lacks the resources required to defend people' rights resulting from their use of ICT.

Second, because of the Nagorno-Karabakh conflict, which intensified into a major geopolitical problem in the latter part of 2020, cybersecurity in Azerbaijan has grown increasingly vulnerable. Between January and March 2020, Azerbaijan identified 1.21% of attacks connected to mining software, 6.49% of attacks utilizing web-malicious software, and 33.88% of attempts at local infection. During the reported period, 0.06% of activities included mobile bank threats, 0.01%

involved mobile invader Trojan threats, and 2.68% involved countrywide attempts to infect mobile devices with harmful software. 1.4% of user devices also suffered from malicious bank software attacks during this period. Most of the assaults since spring 2020 have been carried out using a novel kind of remote access Trojan (RAT), which has been directed against both government and commercial entities. Talos asserts that the hackers seemed interested in the energy sector and industrial control systems (ICS). According to a recent investigation by Cisco's threat intelligence team Talos, anonymous spies have been sneaking into Azerbaijani government IT networks since the autumn of 2020 and obtaining diplomatic passports belonging to particular officials (Spinu, 2020).

Due to the lack of a cyber/information security authority within the government with the requisite knowledge to supervise the implementation of information security regulations by both public and private digital service providers, these statistics demonstrate that Azerbaijan is vulnerable to cyberattacks and that digital web providers do not hold themselves accountable for cybersecurity. Because of cybersecurity risks, the implementation of Government 4.0 raises significant privacy concerns, especially with respect to the collection and use of personal data. Government agencies collect vast amounts of citizen data to enhance decision-making and service delivery. However, the negligent collection and storage of personal information without appropriate security safeguards may infringe against individuals' right to privacy.

Azerbaijan is concerned about the absence of proper data privacy laws and mechanisms to regulate how public entities handle citizen data (Aliyeva, 2020). Without the proper security measures in place, there's a possibility that personal data might be hacked and used for surveillance or discriminatory purposes.

Furthermore, the employment of cutting-edge technology in Government 4.0 programs like biometric identification and facial recognition raises significant privacy concerns. These technologies threaten people's right to privacy since they enable extensive monitoring and the ability to monitor people's actions without their consent. To ensure that the use of these technologies respects individual privacy rights and promotes responsibility, strong regulatory frameworks and supervisory mechanisms are necessary in Azerbaijan and other countries (Mehdiyev & Shahbazova, 2019).

Azerbaijan's approach to managing cybersecurity risks and privacy concerns throughout the rollout of Government 4.0 might be compared to other countries' approaches. In countries like the US and Europe with more advanced frameworks for digital governance, cybersecurity standards, data protection laws, and regulatory oversight are prioritized.

For instance, the General Data Protection Regulation (GDPR) of the European Union sets severe guidelines for the handling and preservation of personal data and levies severe penalties for violations (European Commission, 2016). The US has also enacted many cybersecurity laws and regulations, such as the Federal Information Security Modernization Act (FISMA) and the Cybersecurity Information Sharing Act (CISA), to strengthen cybersecurity resilience and protect sensitive data (U.S. Congress, 2015).

However, in the context of Government 4.0, Azerbaijan is currently developing thorough legal and regulatory frameworks to effectively address the many challenges brought up by privacy and cybersecurity concerns. Even although the government has made the effort to recognize the importance of preserving digital infrastructure and citizen data, there is still a big gap between the development of rules and their practical implementation. Even with ongoing attempts to draft data protection regulations, the current legal framework is neither specific or enforced enough to

adequately fight against evolving cyber dangers and privacy breaches. Further financing is vitally required to ensure that enforcement actions and capacity development initiatives are carried out effectively and that organizations in the public and private sectors adhere to these regulations. Without robust enforcement mechanisms, the ability of any regulatory system to function effectively is severely limited, leaving citizens' data and critical infrastructure vulnerable to misuse by unscrupulous individuals.

In this sense, Azerbaijan has made progress, but more time and resources will be required to bridge the gap between policy intentions and operational realities in order to strengthen cybersecurity resilience and safeguard citizens' right to privacy in the digital age.

2.2. Digital Divide in Azerbaijan

The digital gap may be another issue brought on by the adoption of Government 4.0. In essence, the "digital divide" refers to the disparity in access to digital technology that exists between some persons or groups and others. This divide includes disparities in digital technology, such as computers and cellphones, as well as in digital literacy and skill sets. Essentially, it represents the limitations and unequal possibilities that one encounters while attempting to get and effectively use information and communication technologies (ICTs). It may be divided into four categories: skills, use, cultural/social, and access. These are all significant contributing factors to the unequal availability and distribution of e-services in local areas.

Regretfully, Azerbaijan is among the nations facing this issue. Even though Azerbaijan has made significant strides in digitizing public services and improving citizen accessible online, the nation's e-governance plans are impeded by the existence of a digital divide. The uneven distribution of internet connection between urban and rural regions is one illustration of this gap. Residents in

rural regions often lack dependable internet infrastructure, which limits their access to e-governance platforms and services. In contrast, Baku and other metropolitan centers have relatively fast internet connection (Aliyeva & Ismayilova, 2020).

Additionally, disparities in digital literacy exacerbate the digital divide by making it more difficult for older people and members of disadvantaged communities to access and utilize online services and e-governance platforms. Since they may not have had much exposure to digital technology in their early years, older people may find it difficult to transition to the more digitalized environment of modern administration. People may get overwhelmed by complex interfaces and foreign languages due to inadequate training and individualized support, which may hinder their ability to navigate e-governance platforms and obtain essential services.

Analogously, disparities in digital literacy unfairly impact vulnerable populations, including low-income individuals, those residing in rural regions, and ethnic minority members. This causes a gap between these people and the more digitally savvy members of society since they often do not have access to educational resources or opportunities to learn essential digital skills. They may consequently have significant challenges in understanding and using e-governance technologies, which would further prohibit them from benefiting from digital governance initiatives.

To have a better understanding of Azerbaijan's digital divide in e-governance, it might be useful to contrast its experiences with those of other nations dealing with similar problems.

In Georgia, a neighbor, efforts to close the digital divide have showed improvement. Georgia has implemented wide-ranging initiatives to provide access to technology for impoverished and rural people, build internet infrastructure, and raise digital literacy. For instance, Georgia has started a program called "Connect to Learn" to provide internet access and digital skills instruction to

remote schools, allowing communities and students to participate in e-governance initiatives (UNDP, 2019).

By focusing on digital literacy and connection among marginalized populations via initiatives like "Connect to Learn," Georgia has made significant strides in addressing the digital divide. Georgia's efforts, which provide internet connection and equip residents with e-governance platform capabilities, have made it possible for citizens to engage more actively in government operations and receive essential services online.

As Georgia's proven exposures show, comprehensive approaches and effective partnerships are essential to closing the digital divide and advancing digital inclusion. With regard to addressing similar issues and leveraging e-governance's potential to improve public service delivery and citizen inclusivity, Azerbaijan can learn a lot from Georgia's exceptional and fortunate experiences in ensuring equitable access to the benefits of the digital revolution and promoting digital inclusion.

To assess the situation more effectively, the dejavu example in Estonia, one of the post-Soviet nations, might be compared to Azerbaijan. The nation—which is often commended for having excellent e-governance—has used innovative strategies to close the digital divide. The country's achievement may be ascribed to many intriguing factors that have enabled it to effectively eliminate barriers to digital inclusion. One of the main causes of the problem that Estonia has tackled is the lack of digital tools and services, particularly in remote and rural regions. Disparities in internet infrastructure and connectivity have hindered the execution of e-governance initiatives, making it harder for individuals to participate in digital government and access essential services (Estonian Ministry of Economic Affairs and Communications, 2021). Early awareness of this

problem prompted Estonia to make thoughtful investments in broadband infrastructure, opening up high-speed internet access to even the most remote locations.

A second element that has contributed to Estonia's digital divide is the poor digital literacy and skill levels among certain demographic groups. In many countries, including Estonia, the elderly, those with low incomes, and members of disadvantaged groups may lack the abilities or confidence to use digital technology effectively. Lack of understanding of digital literacy may be a significant barrier to accessing e-governance platforms and utilizing online services. To tackle this issue, Estonia has implemented wide-ranging digital literacy programs aimed at equipping individuals with the skills and knowledge required to utilize digital platforms, access online information, and interact with public services (Estonian Ministry of Education and Research, 2021).

The nation has also taken action to get over the financial barrier that usually widens the digital divide. Low-income individuals and disadvantaged groups may find it difficult to purchase digital devices and internet connections in many countries, including Azerbaijan. This limits their ability to participate in the digital world.

One of the nations addressing the issue of the digital divide is Turkey. The issue is made more difficult for them by the big population that lives in a variety of urban and rural settings and under varying circumstances. Nonetheless, the nation makes an attempt to address the problem. For example, Turkey's "FATIH Project" (The Movement of Enhancing Opportunities and Improving Technology) began in 2010 and aimed to equip students with digital skills and improve digital education by equipping schools with tablet computers, interactive whiteboards, and internet connectivity—basically, all the electronic devices that are necessary.

2.3. Capacity Building

In the era of Government 4.0, characterized by the integration of digital technology into governmental processes, capacity development becomes imperative for nations seeking to reap the benefits of digital transformation. Azerbaijan is attempting, like many other countries, to fully use Government 4.0 in order to enhance citizen services and increase the efficiency of administration. However, there are several barriers that prevent this field from successfully developing its capability, which has detrimental effects. The following are a few examples of the challenges preventing Azerbaijan from fully implementing a Government 4.0 strategy in terms of capacity building:

Having no effective comprehensive strategy: One of the key reasons Azerbaijan's Government 4.0 initiatives are not creating enough capacity is because there is no comprehensive plan in place. Despite attempts to integrate digital solutions, there is a lack of a comprehensive strategy that targets capacity development across many governmental sectors (Jafarova & Abbasov, 2020). Initiatives without a well-defined plan sometimes find themselves adrift in an uncertain sea, unable to effectively navigate the challenges posed by their intended goals. These endeavors often fail due to the absence of a well-defined roadmap delineating the intended course of action. These kinds of endeavors are devoid of coherence—the quality that brings disparate elements together to form a coherent whole. Without a defined plan to provide structure and direction, efforts often divide and diverge, leading to confusion and inefficiency. Like a jigsaw missing a piece, projects struggle to construct a clear picture of their goals and how to accomplish them.

Absence of Investment in Education and Training: Building capacity requires funding for the education and training of public servants and authorities. However, Azerbaijan has challenges in this sector due to inadequate financial investment in the development of human capital. Because

there aren't enough specialist training programs created to satisfy the requirements of Government 4.0, there is a skills gap among government employees (UNDP, 2019). Moreover, the existing training programs could not be relevant in real-world situations or might not keep up with the quick speed at which technology is developing, rendering them obsolete.

The limitation of technological infrastructure is that optimal utilization of digital technologies requires an effective technical infrastructure. Azerbaijan has challenges with infrastructure availability and reliability, particularly with regard to internet access and cybersecurity measures. Weak infrastructure makes it difficult to use contemporary digital solutions, which in turn hinders capacity development efforts (Asadov & Sadiqov, 2018). Furthermore, the problem is made worse and innovative solutions are less likely to be adopted when there is inadequate financing for the maintenance and upgrading of technological infrastructure.

Weak Collaboration Among Government Agencies: Information exchange and collaboration are beneficial for capacity development when working with both external and government stakeholders. However, communication and collaboration are not engrained in Azerbaijani culture. The Asian Development Bank claims that government organizations that use compartmentalized approaches hinder the spread of knowledge in Government 4.0 initiatives and hinder the sharing of best practices. Bureaucratic obstacles that impede effective collaboration and departmental rivalries also impede innovation and progress. These elements highlight the significance of the issues brought up by subpar state-level capacity development procedures.

Ultimately, one of the main causes of the gaps in capacity development throughout the implementation of the Government 4.0 strategy is people's reluctance to adapt to new innovations and technology. It is also important to take into account how government representatives handle these issues. Generally speaking, concerns of job displacement from automation and the traditional

bureaucratic culture impede new ideas. The World Bank claims that without a proactive change management plan, capacity development projects often face resistance and come to a standstill. To solve this issue, effective stakeholder participation, communication, and offering incentives to promote the adoption of new practices and technologies are all required.

In order to effectively implement Government 4.0 and live up to expectations, it will be easier to comprehend the problem's criticality and the value of government institutions' capacity development when successful and failing worldwide methods are shown.

As previously said, Estonia might be considered the nation with the greatest success in Government 4.0 and e-government projects. The key to the success of this nation's capacity building initiatives is the strategic planning and execution that gives digital literacy and skill development a high priority. The government collaborates closely with academic institutions and industry partners to provide specialized training programs to public officials (Kitsing & Lember, 2019). Estonia's flexible legislative structure and unwavering commitment to innovation also provide a favorable environment for capacity development and digital transformation. By embracing an open and experimental culture, Estonia has built a highly skilled labor force capable of driving Government 4.0 initiatives forward. In a similar vein, Singapore is among the nations establishing efficient regulatory frameworks and government structures. In this sense, Singapore's outstanding success in Government 4.0 is attributed to its proactive approach to capacity development. The government invests heavily in the continuing education and skill development of public sector employees. Thanks to initiatives like the Singapore Digital Academy, civil servants now possess the know-how to handle modern technology (Ng & Wee, 2021). Singapore fosters an innovative and experimental culture that facilitates cross-agency interaction and knowledge sharing. Because of its emphasis on talent development and creation of an innovative

environment, Singapore has emerged as a leading hub for Government 4.0 initiatives in the Asia-Pacific area.

However, the experiences of nations who were unable to execute Government 4.0 programs due to a lack of qualified workers and strong ability may be evaluated. The majority of African nations, which lack expertise, infrastructure, and robust regulatory frameworks, might serve as an example of such nations. Nigeria is one of those nations where, despite its enormous potential, the effective adoption of digital solutions is hampered by capacity constraints (Okoli et al., 2018). Due to a lack of funding for education and training, Nigeria lacks skilled individuals who can drive digital transformation. Corrupt officials and bureaucratic inefficiencies exacerbate the issues and impede the progress of Government 4.0 by stifling innovation. Nigeria faces the danger of falling farther behind in the digital era if these underlying issues are not addressed and human capital development is not given enough funding. Even with such dissimilar circumstances, Azerbaijan has challenges in addressing the problems associated with and effectively putting into practice e-governance methods. Azerbaijan has difficulties with insufficient finance for growth and closing all gaps in appropriate capacity building, which leads to a lack of qualified professionals capable of advancing digital transformation. Lack of highly qualified individuals prevents the government sector from establishing new technologies and implementing them (Jafarova and Abbasov, 2020).

2.4. Service Quality

The last and most crucial factor is service quality. The broad phrase "service quality" refers to a variety of e-governance topics. The quality of services provided online must be sufficiently good to satisfy residents in light of the changing wants and preferences of individuals. Negative

experiences and comments might make the public less interested in using such platforms, which could lead to the failure of e-governance projects.

As was already noted, Azerbaijan is among the nations that has worked very hard to build Government 4.0 projects and e-governance practices. It undoubtedly has a lot of benefits as well as cons. E-governance is a beneficial approach for modern governments in many respects. Residents no longer need to physically attend the center since e-governance makes it easier for them to examine their debts, declaration information, and paperwork from anywhere at any time. Citizens are able to keep accurate records for themselves as a result. Staff and service clients will both gain from time and effort savings. By minimizing dependency on working hours for wait times and deadlines that occur within normal periods, the integration of governmental institutions reduces density. Minimizing the drawbacks of repeating the process will increase productivity by getting rid of any resource waste. The foundation of these shortcomings is the lack of highly developed technology and infrastructural deficiencies. In Azerbaijan, infrastructural deficiencies persist, particularly in rural and isolated areas, which poses challenges to the effective provision of e-governance services. Internet connection is uneven in Qakh and Lerik, two places where people's access to government-provided key digital services is hindered. Having access to all the data needed for project planning across several domains would lead to equitable, efficient, and rational planning and management services. Residents will have access to governmental services in a contemporary, trustworthy, efficient, and wholesome manner since it is assured that they will be automated. The most significant contributions to the budget will come from investigating potential resources for meeting personnel, current, and investment costs as well as calculating, monitoring, and managing municipal property and real estate revenues. In these areas, where infrastructure development is challenging due to challenging natural conditions and lower

population densities, web access is still seen as a luxury rather than a need. The plight of rural Azerbaijanis is comparable to that of their counterparts in countries like India, where issues related to rural internet access persist in impeding the widespread adoption of digital government initiatives. The unstable internet connection in remote and rural areas of Azerbaijan exacerbates the country's already severe socioeconomic divide by depriving residents of opportunities for civic engagement, education, healthcare, and economic empowerment. Children in these places, for example, could find it challenging to participate in online learning environments or access educational resources, which would impair their capacity to learn and their prospects for the future. Similar barriers restrict small businesses and entrepreneurs from using online marketplaces or government procurement opportunities, which stifles innovation and slows down economic development in these impoverished regions. Additionally, the government's efforts to make e-governance services available to all citizens are hampered by inconsistent internet connectivity, which exacerbates inequality by maintaining a digital divide that isolates and marginalizes underprivileged populations. Lack of infrastructure prevents many rural Azerbaijanis from taking advantage of programs like online tax filing, digital healthcare consultations, and electronic voting, depriving them of the benefits of open and efficient government.

The effectiveness of Azerbaijan's e-governance systems also greatly restricts public participation and effective service delivery. Even in the face of efforts to digitize government services and enhance online accessibility, a number of problems persist that compromise the general user experience and erode trust in digital governance initiatives. Nonetheless, proponents of e-government claim that almost all tasks will be able to be carried out online in the future as planned and discussed. Even if they may do it online, local governments continue to provide public services using both traditional and non-conventional methods. Since not everyone would consider e-

government to be a suitable way to get services. For instance, an elderly person may not be able to execute transactions using e-government on their own.

If this citizen is compelled to complete the purchase online, they will become more dependent on others than they were before. These conditions will make such people think negatively about local governments and e-government. The functioning of e-governance systems is a significant issue because of their usually clunky user interfaces and confusing designs. Users of these platforms find it difficult to locate relevant information, work their way through challenging menus, and finish transactions. When using online services, users may experience frustration and discouragement due to challenging registration processes, complex menu designs, or unclear directions. Studies conducted in countries such as Australia and the United States have shown the significance of incorporating user-centric design principles in enhancing platform accessibility and usability. These usability issues are a reflection of global concerns over the e-government systems' user experience. Moreover, usability problems are exacerbated by the lack of multilingual support, particularly for non-native Azerbaijani speakers and speakers of minority languages. Although Azerbaijani is the official language of the country, Talysh, Russian, and Lezgian are spoken by sizable populations inside its borders. Poor language selections on e-government platforms discourage non-Azerbaijani speakers and undermine efforts to improve inclusiveness and accessibility in digital governance.

Chapter 3. Policy options

In the previous chapter, certain causes were mentioned that were a reason for the development of Government 4.0. In this particular chapter, policy options will be provided by the answers received from the conducted President of Azerbaijan. The second interview was conducted with Ilkin

Iskandarli a business analyst. The third interview was conducted with Nijat Rasulov. He is currently working at Pasha Holding Group Strategy Manager. Before moving forward to the policy options we commenced the interview with 1 core question “What are the essential issues while implementing Government 1.0, 2.0, and 3.0 (which is current), and what we can still face during the implementation of Government 4.0?” For this question, all experts have different approaches. Mehdi Javadzade mentioned that the first viable reason was the strategy, due to the fact that the strategy lacked, above mentioned potential issues (Mehdi Javadzade, 2024)

3.1 Cybersecurity Education Programs: Enabling People to Manage Online Threats

"Gov 4.0" refers to the concept of transforming government operations and service delivery through the strategic adoption of emerging technologies and digital innovation. It builds on previous iterations of e-government (Government 1.0, 2.0 and 3.0) but emphasizes a more comprehensive and integrated approach to using technology in governance. As it was mentioned on the above chapter the most observed difficulty while implementing Government 4.0 was the lack of cybersecurity awareness (Mehdi Javadov, 2024). According to the expert opinion even though our government is announcing almost daily basis that it’s strictly prohibited to use the card numbers, bank accounts in the websites that you are not sure how reliable sources they are it may cause potential issues. Moving forward he constituted for the fact that our government is trying to create a potential system that avoids cyberattacks. As an experienced person, he mentioned that there are particular groups that are always trying to invest high amounts of money in these types of cyberattacks and to get more from people’s personal data (Mehdi Javadov, 2024), he mentioned that for avoiding this our e-gov sector yearly basis is checking to find the most reliable system for

protecting the data, and insuring people's safety, and protecting their information at the base. Meanwhile, the second approach came from our second expert Mr. Ilkin Iskandarli. He accounted for the psychological factors in this case due to the fact that we have several kinds of generations, and while creating a new system implementation is the easiest part, however, its acceptance rate utterly matters. To begin with, he started the convenience of the webpages, older generations are not eager to get along with the new approaches, and are not open to innovation. The viable solution that came from Mehdi Javadov was the "one and only" principle. The "once only" principle is a concept in digital governance and data management that emphasizes collecting and reusing data from individuals or businesses only once. The main idea behind the one-time-only principle is to minimize the burden on citizens and businesses by reducing redundant data requests and simplifying administrative procedures. Instead of requiring individuals or businesses to repeatedly submit the same information to different government agencies, the one-time principle allows for the sharing and reuse of verified data already collected by an agency or service (Andersen, R. W. (1984)). Below are the characteristics of the "one and only" principle:

Information sharing and interoperability: Establishing mechanisms and standards for the secure sharing and exchange of information between government agencies, ensuring interoperability and compatibility of systems. (Roger W. Andersen, ed. 1981)

User consent and control: Enabling individuals to control their data and consent to its use for specific purposes, while respecting privacy rights and data protection regulations. (Bickerton, Derek. 1981)

Data quality and verification: Implementing measures to ensure the accuracy, reliability and integrity of shared data, including verification processes and data verification mechanisms.

Efficiency and cost savings: Reducing administrative costs and duplication of effort by eliminating redundant data collection processes and streamlining service delivery, resulting in cost savings for both government agencies and citizens. (Bloom, Lois, Karin, Lifter, and Jeremy Hafitz 1980)

Improved User Experience: Improving the user experience for citizens and businesses by simplifying administrative procedures, reducing paperwork, and minimizing the need for multiple interactions with government agencies. (Chen, Zhunmin. 1982)

Compliance and Legal Frameworks: Comply with relevant legal and regulatory frameworks, such as data protection laws, privacy regulations, and interoperability standards, to ensure compliance and protect the rights of individuals. (Comrie, Bernard. 1976)

3.2. Campaigns for Digital Literacy: Encouraging Every Azerbaijani to Take Advantage of Digital Opportunities

Before diving into the details of this point, the expert was asked, "What role does digital inclusion play in the effective execution of Government 4.0 efforts, and what approaches may be taken to bridge the digital divide?" Digital inclusion is critical to Government 4.0 as it ensures equal access to services and participation in governance. By subsidizing internet connection, improving digital literacy programs, and particular technological hubs can bridging the digital divide (Comrie, Bernard. 1976).

There are several effective strategies to support the implementation of the 4th industrial revolution that promote digital inclusion and address the digital divide.

Infrastructure development: Investing in infrastructure such as broadband internet access in rural and underserved areas to help bridge the digital divide and ensure equal access to digital services. (Al Khouli, R. M. S. (2020))

Digital literacy programs: Digital literacy training and education can be provided to individuals who do not have the necessary knowledge or resources to effectively use digital technologies. (Mehdi Javadov, 2024)

Making digital services and technologies more accessible to low-income individuals will lead to the affordable access.

Collaboration with the private sector: Collaborating with private sector companies to provide discounted or free access to digital services for underserved populations. (Astuti, Y. D., Attaymini, R., Dewi, M. S. R., & Zuhri, A. (2023))

Community engagement: Work closely with local communities to understand their specific needs and challenges related to digital inclusion and develop specific solutions to address them. After this, we moved forward and asked the second question for precise the idea for digitalization, and asked "Public administrations frequently require a cultural transition in order to implement Government 4.0. How can governments foster a culture that welcomes digital transformation and successfully handle opposition to change?" Governments can effectively manage resistance to change and promote a culture that embraces digital transformation by implementing the following strategies.

• Communication and transparency: Clearly explain the reasons for implementing Government 4.0 initiatives and the benefits they will bring to public administration.

For example: Automating repetitive tasks with AI can reduce the time and effort required to complete them. Data-driven technologies provide insights that can inform strategic decisions. Businesses can use big data and analytics to better understand customer preferences, market trends, and internal processes. Chat bots, recommendation systems, and AI-powered customer support can increase customer satisfaction and loyalty. Early technology adopters gain a competitive

advantage. Transparency in decision-making processes can help build trust and reduce resistance to change.

Training and education: Provide training and education programs to public administration employees to improve their digital skills and knowledge. This will help them feel more confident and comfortable using new technologies and tools.

Incentives and rewards: Offer incentives and rewards for employees who actively participate in digital transformation efforts and demonstrate a willingness to adapt to new technologies. Updating grading criteria, and bringing AI tools into the HRM system will be the greatest advantage for the workplaces (I.Iskandarli, 2024).

Collaboration and participation: Involve employees in the decision-making process and encourage them to provide feedback and suggestions to improve digital transformation initiatives. This can help create a sense of ownership and commitment among employees.

Change management strategies: Implement change management strategies aimed at addressing concerns and fears about digital transformation and provide support and resources to help employees manage change effectively. Expected potential changes would be better in the HRM system (I.Iskandarli 2024). Moving forward to another expert's opinion there should be particular motivational tactics for improving digital literacy starting with small enterprises (Nijat Rasulov, 2024). He based on his own experience mentioned that for HR department should be additional motivation for holding these pieces of training for their enterprises or those trainings can be provided by the organization that separately works with E-Systems. It's crystal clear that it won't be sufficient for the people who are unemployed, but arranging particular sessions with the enterprises for the info section will increase the literacy level. To sum up, as mentioned above, to address the digital divide and bring inclusion in provision of e-governance services, there are

various concepts to cover and develop. In this regard, holding public campaigns regularly to achieve the intended goal is very essential. For citizens to be clearly informed about the tools, ways to use those tools, as well as other advantages of e-services, public awareness is essential. Properly prepared and implemented campaigns to bridge the digital divide, will bring inclusivity, transparency, and collaboration.

3.3. Public-Private Partnerships for Capacity Development: Leveraging Expertise for National Growth

To begin with this part of the assessment, we commenced by asking "What programs and tactics can governments put in place to help the workers in the public sector develop the abilities and skills required to use and manage cutting-edge digital technologies?" we received below particular suggestions by Mehdi Javadov:

Training-Teaching Programs: Governments can create comprehensive training programs designed to introduce employees to the latest digital technologies relevant to their roles. These programs may include seminars, online courses, and hands-on training. In addition, such programs where experienced staff members provide guidelines on how to utilize less familiar digital technologies can improve knowledge, and skill improvement within and outside of the organization.

Regular skills assessment can be conducted by the government to define the exact areas where the employees are eager to develop their digital skills. The most appropriate, tailor-made pieces of training can be received to meet the core needs.

Becoming a partner with educational institutions can assist the government in developing specialized courses. Here creating partnerships is included, and it would be better to have such ventures with universities, online platforms, etc.

Digital Literacy Initiatives:

Among all public sector members, digital literacy can be implemented and improved by government support.

5. In incentive programs PQB bonuses, promotions, performance rewards, and some more ways recognitions can be received by the employees and here involved the activities demonstrating skills in using new technologies,

6. Cross training programs can be conducted by the government to encourage employees to have an advantage to test their knowledge in different fields, and last but not least this can help them to expand their skills, and adopt new changes, and trends.

7. Pilot Projects and Innovation Laboratories can bring the benefit for employees. These projects can be created by the government for emerging technologies and learn about lab experiments for expanding skills. This hands-on experience can foster creativity and innovation as well as develop technical expertise.

Examples of programs governments have implemented to help public sector employees develop digital skills:

1. Digital Skills Academies (UK)

2. Digital Literacy Initiatives (Singapore)

3. Cross Training Programs (United States)

4. Innovation labs and sandboxes (Estonia)

5. Cooperation with technology companies (Canada)

6. Domestic Mentoring Programs (Australia)

7. Online Learning Platforms (New Zealand)

After this clarification, we accounted for Government 1.0 and 2.0 implementations in Azerbaijan, according to the scholars' Government 1.0 and 2.0 were essentially focused on the e-municipality

system, changing and improving it, and according to the statistics in some cities (Khirdalan, Sumgait, etc.) they achieved their goal, and we asked this question during the interview why they couldn't implement the same strategy to everywhere. To be honest, all experts' answers were around the same range, Ilkin Iskandarli mentioned that while implementing any strategy in any country, any organization no matter what it is, the same structure won't have the same effect everywhere. However, Mehdi Javadov mentioned that he is not so close to the regulations of the e-municipality system, but a high level of centralization was the core reason why Government 1.0 and 2.0 failed, according to the expert opinion he mentioned that as in Estonia it would be better if there will be a separate group who is responsible for the governance, separating governance from management will be good for implementation of the new strategy, and controlling it (Mehdi Javadov, 2024). Another opinion from the third expert digitalization increase unemployment level (Nijat Rasulov, 2024). As we were a post-soviet country there were too many lack points that still remain in our country due to the organizational structure. And whatever is implemented in one country without questioning implementation to our can affect negatively. After all he mentioned that while using ASAN imza, and ASAN pay he faced several issues, however, both of these platforms were implemented by Poland, and Estonia. So it's evidence that applying 1 strategy to all departments won't be effective. Nevertheless, he touched on the topic that digitalization and centralization tactics can bring unemployment levels because assume that in Baku if there is a centralized system of the municipality, it means most of them will be closed, and it will increase the unemployment level. As Government 1.0 and 2.0 failed, more focus and expectations were high from Government 4.0.

In brief, after considering the interview answers we hold the view that creating a separate organization where private enterprises might be PR, sponsorship for this organization and they can

be responsible for capacity building. On one hand, it will minimally assist in separating governance and management structure, on the other hand, it won't lead the strategy to fail because it will be led by totally another organization.

In brief, after considering the interview answers and analyzing secondary data, we hold the view that having Public-Private Partnership will be a strong asset to achieve capacity building and develop highly trained professionals for implementation of Government 4.0 principles in administration. On one hand, it will minimally assist in separating governance and management structure, on the other hand, it won't lead strategy to fail because there will be a partnership which means the burden on public sector will be effectively shared with private sector.

3.4. Continuous Improvement Framework: Ensuring Excellence in Service Provision Across Sectors

For this particular problem about service quality, during the interview, we asked, "How can governments guarantee that laws promote and direct the proper use of digital technologies in public administration while also ensuring that their legal and regulatory frameworks keep up with the fast changes in technology?" We received the below comments:

Regular review and updating of laws: It is considered appropriate to establish mechanisms for regular review and updating of legal and regulatory frameworks to reflect changes in technology and to address emerging issues. Committees to monitor technological improvement, create task forces, and propose legislative updates by checking the necessity.

Having a collaboration with the industry experts, companies that drive into energy, and always developing the strategy and this gain will increase potential implications for public affairs. These efforts help policymakers to develop a specific design for the regulatory responses.

Flexible and Adaptable Regulations are proposed to open the doors for adoptable regulatory frameworks that enable innovative principles while ensuring accountability. Avoiding the technology that brings more threat that it was expected in this case can be supportive as well.

It's expected that creating a pilot project to experiment with new technologies controlling the environment where it can be implemented allows the government to implement the strategy. It directly dives into the details of the responsive strategies by stakeholders, users etc.

Public Consultation and Stakeholder effective by the engagement including citizens, managers, CEOs whoever are purposed in the policy making in society through engagement behaviors.

International cooperation is the main objective for the development. According to the experts view multinational companies' implementations are assisting to not remain standardized. And giving a chance to some government officials to work with multinational enterprises can bring innovative ideas.

Capacity Building and Awareness Campaigns: Investing in capacity building programs to ascending policy makers' comprehending of digital technologies and their implications for public administration and awareness workshops to educate the public about the pluses, negatives and legal frameworks governing the utilization of digital technologies in public services (Chen, Zhunmin. 1982).

Ethical Guidelines and Principles is also essential. It is aiming to improve the ethical guidelines, details, points to guide the responsible utilize of digital technologies in the alteration of public administration by questioning problems such as privacy, transparency, fairness and accountability. Incorporating ethical considerations into regulatory frameworks ensures that technological advances are aligned with societal values and goals. Moving forward to the solution part experts suggested that to avoid this present issue, the implementation of the "Sandbox" model can secure

personal data (Mehdi Javadov, 2024) A sandbox is a security feature in computer security that isolates active processes, often to reduce the likelihood of software vulnerabilities or system failures propagating. A sandbox is, broadly speaking, a computer environment that is separated and allows the execution of programs or files without interfering with the application they are running within. Software engineers test new programming code using sandboxes (Wright, W., Schroh, D., Proulx, P., Skaburskis, A., & Cort, B. (2006, April)). The applet's ability to seek or access system resources is strictly limited by the sandbox constraints. Programmers are required to create code that can only be used in the sandbox, much as how kids are only permitted to play inside designated areas. You may think of the sandbox as a limited region on your computer where the code of an applet is free to run, but not permitted to run anyplace else (Kirp, D. L. (2007). The expert mentioned that the implementation of this specific system is too much costly, however, it may avoid the viable risk and at least for now maximize the protection level for now up until finding a new fraud way by hackers.

4. Policy Evaluations

In the above-mentioned chapter, several policy options were suggested based on the problems that exist in implementation of Government 4.0. initiatives. The primary goal of this chapter in the research paper is to evaluate each recommended policy option based on five main criteria which are efficiency, effectiveness, equity, flexibility/improvability, and feasibility/implementability. After examining the alternatives, one or two mostly preferred policy options will be suggested.

4.1. Cybersecurity Education Programs: Enabling People to Manage Online Threats.

The first given policy option aims to decrease the threats coming from using e-platforms in the reality of Azerbaijan. Considering previous experiences through Government 1, 2, and 3, it becomes essential to take appropriate measures and implement policies which may be helpful to eliminate existing and emerging problems in the implementation of Government 4.0 practices. According to the survey conducted among people, one of the concerns among people is the risk of online treats. As not many people are not aware of e-platforms especially in regions of the country, this risk increases even more. For this reason, considering various segments of the society, demographic causes, and safety risks along with these a policy option was proposed in the previous chapter. Our interviewer Mehdi Javadov also highlighted this policy option may be a good approach to protect people from cyberattacks and decrease security concerns (Mehdi Javadov, 2024). This principle is called "one and only" which has a strong emphasize on software design. Its characteristics such as information sharing and interoperability, user consent and control, data quality and verification, improved user experience, compliance and legal frameworks are quite promising for success and eliminating cyber threats. Below, to have more comprehensive understanding on this proposed policy alternative, it will be evaluated through 5 main criteria:

Efficiency- To analyze efficiency of the policy option, several questions should be asked: is this policy able to minimize costs? Is it utilizing resources such as human and technological efficiently? Which mechanisms will help to adjust to unexpected situations?

To implement the "one and only" system can bring various positive and negative outcomes with itself. Starting with the positive changes, a single system which unites different government structures can reduce the complexity over e-platform usage by consumers. By this, one common

platform will be easier to manage, update and adjust as all public agencies and organizations will be represented through one single platform and there will be no need for multiple interactions with government agencies (Chen, Zhunmin. 1982). The centralized system will help to decrease risks that could be faced by only one department. Also, rather than managing multiple systems, having one comprehensive e-system which offers all types of public services will reduce inefficiencies and there will be one common approach and solution to possible threats and resources will be optimized. In addition, cost savings will increase as through only platform, costs will concentrate to "one and only" system, not multiple systems, and platforms.

In contrast, negative consequences may occur as well. A successful cyberattack to the platform may have disastrous results as all data and updates will be all together. Also, the responsiveness and quality of service may decrease because of having all services together.

Effectiveness- This unified approach will help effective implementation of all policies and procedures to all government systems together and it will also help to have general monitoring practices and more comprehensive measures to detect threats. In contrary, it would be difficult to detect the scale of use and there is a possibility that a single program cannot handle diverse types of attacks and respond to them effectively.

Equality- From the perspective of equality, the "one and only" system is a good approach as it offers the same platform and promises the same user experience despite the specific service and region of usage. On the other side, it can trigger digital divide, as not regions and urban places have the same technological infrastructure, and it will reduce equal protection.

Feasibility- Having a centralized system to reduce cybersecurity concerns, will help a centralized decision-making towards existing problems. Also, in case of emerging risks, centralized support will be offered. These factors show the feasibility of the option, while serious drawbacks may also

occur. It requires significant time and financial investment, especially during the initiation of the model. The system may encounter integration challenges because of varying legislative measures for different departments and incompatibility may occur.

Flexibility- Analyzing the flexibility of the "one and only" model, we see that it would be for a country like Azerbaijan to unite various governmental organizations and regions. Meanwhile, adaptability issues may arise. As different organizations may have their own way of management and handling issues, resistance to change and adaptability may be an issue.

4.2. Campaigns for Digital Literacy: Encouraging Every Azerbaijani to Take Advantage of Digital Opportunities

Digital inclusion is an inseparable part of development. If a government wants to achieve high quality in the implementation of Government 4.0 principles, one of the key factors to be considered is digital literacy. For this, campaigns for inclusiveness seem like a promising strategy. Below, this strategy will be evaluated based on five main criteria.

Efficiency- The efficiency through campaigns to bridge the digital divide will be achieved. The campaigns may be held for larger audiences with lower incremental costs and the institutions may reach wider audiences. To achieve efficiency through campaigns, strong planning and implementation is important.

Effectiveness- Well-organized and implemented campaigns and trainings for developing people's understanding of Government 4.0 and the use of its principles will have effective results. More people will be involved in e-government practices and community engagement will increase. As a drawback, if ongoing efforts are not made, it may become ineffective considering technologies and e-services are developing continuously.

Equality- The main motivation behind offering campaigns to bridge the digital divide, and to ensure that everyone is well informed and trained about the use of e-services is to bring equality. It will focus on those with disadvantages, lack of information regarding the emerging practices. Inclusivity will increase elderly people, people living in rural areas benefits from the services as well. The main point here to consider is to ensure that everyone gets the same quality of support and information.

Feasibility- In this regard, feasibility may be challenging. Because, ensuring the coordination across departments and equal delivery will not be easy to achieve as they have varying needs (Ilkin Iskandarli, 2024). Although if effective measures and rules are made, this complexity may be eliminated to achieve feasibility.

Flexibility- To achieve flexibility, campaigns and offered digital literacy tools should be able to align with emerging technological and digital trends, and get adapted to those. In realities of Azerbaijan, if ongoing investment and effort is put, flexibility will be achieved.

4.3. Public-Private Partnerships for Capacity Development: Leveraging Expertise for National Growth

The main purpose of Public-Private partnership is to combine both public and private sectors and achieve goals through joint practices. It is also included in Azerbaijani Legislation and the importance is emphasized. In the above-mentioned chapters, the problem of capacity building and lack of highly qualified stuff is explained in detail. As a policy alternative to reduce this concern, PPP for capacity development is suggested. Below, I will be evaluating this policy alternative based on five main criteria:

Efficiency- Public-Private Partnership would be a good tool for the government as the financial burden on the government may decrease by sharing it with the private sector. Also, using practices and experiences of private sector organizations may increase the quality of work while implementing capacity development strategies. Although, in the long run, the private sector's emphasize on profit may decrease the efficiency of the policy alternative and increase costs.

Effectiveness- Considering private sector's role on development and innovation, having private organizations involved will increase effectiveness of the PPPs in capacity building. It will help to organize more specialized training programs based on the needs of specific departments and offer a better quality of work as a result. The concentration point should be not being overdependent on the private sector which may undermine the government's development capacity.

Equality- From equality perspective, PPPs look promising for capacity building in implementation of Government 4.0 principles. As previously mentioned, focus on marginalized people and inclusive practices will bring equality of opportunities especially in rural areas. By these, accessibility to e-services and the quality of services will increase.

Feasibility- Like many other countries, Azerbaijan is also paying a special attention to Public-Private partnerships, and it showed itself in the legislation. In this essence, discussing the feasibility of PPP for capacity building, the implementation of this policy would be helpful, and it may fasten the technological transition and e-government system through Government 4.0 principles. The only point to take into account is that in the long run, the existing legal framework may lack, new legislation may be needed to adjust to the rapid development of technology and emerging trends.

Flexibility- By innovative approaches and being able to invest in various training and development practices as well as technological advancements, private sector involvement in developing the

capacity will be successful as the efforts will bring flexibility. The adaptability to develop capacity for specific departments and segments will end in more successful implementation of Government 4.0 initiatives.

4.4. Continuous Improvement Framework: Ensuring Excellence in Service Provision Across Sectors

The conducted survey among citizens showed that one of the main concerns that people experience while using e-services is the quality of service. The interviewed professionals gave various insights regarding the issue and the ways how to overcome this challenge and increase the quality of work. As a result, "Sand Box" model was offered by Mehdi Javadov which is a known experience by many countries worldwide.

Efficiency- The implementation of "Sand Box" model is costly as testing new policies in a controlled environment requires more investment in infrastructure. Therefore, its efficiency is under question.

Effectiveness- The policy option is effective in a sense that it creates an opportunity to test newly initiated concepts in a safe environment. As a negative consequence, it is time consuming to test and decide.

Equality- Within a safe testing environment, it would support equality through targeted testing and feedbacks in the end. Through this approach, it would be easier to create more equal environment for accessing Government 4.0 initiatives.

Feasibility- It may cause regulatory constraints and it would be time consuming to adapt and implement new options. Although, after successfully passing the testing period, there is a high possibility to succeed in the implementation as risks will be mitigated.

Flexibility- The model promises a flexible implementation through testing and adapting to varying needs. The negative situation may occur when multiple test pilots are conducted. It may be complex, and hard to handle.

Below, in a matrix, based on the evaluations for each criterion, one or two best alternatives will be suggested in a scale of 1-5. In this scale, 1 equals to (=) very poor and 5 equals to (=) excellent alternative.

Policy Option	Efficiency	Effectiveness	Equality	Feasibility	Flexibility	Total
"One and Only" Principle	4	4	2	3	2	15
Digital Literacy Campaigns	4	5	5	3	4	21
Public-Private Partnership	4	5	4	5	4	22
"Sand Box" model	2	4	4	2	3	15

As illustrated on the table, Public-Private Partnership and Digital Literacy Campaigns are best policy alternatives to offer in achieving successful implementation of Government 4.0 principles.

Conclusion

Azerbaijan's taking a step forward to Government 4., which merges cutting-edge digital technology to develop people's involvement, governance, and transparency, represents a drastic improvement in public administration. Public administration of Azerbaijan is hoped to digitalize, modernized, improved the delivery of service, and by putting the participatory government model to a new paradigm into practice. Several obstacles must be overcome, to guarantee Government 4.0's effective adoption and for long-term planning.

Starting from to see the progress by creating an e-government system which is more city centered, and establishing procedures via use of ICT, Azerbaijan has achieved viable progress in reforming public administration. "Electronic Azerbaijan" Program which was established in 2003 was the baseline for this initiative. The essential principle of this program is to utilize developing ICT to provide citizens and government officials with modern, time-friendly, transparent, and effective services. The transformation to Government 4.0 leads to high-standardized technologies like big data analytics, blockchain, IoT, AI, last but not least more responsive and developed systems. The main goal is to develop public service delivery, economic development, and increase citizen involvement.

Despite the fact that even within these achievements which brought Azerbaijan sustainable progress, still there are several obstacles such as cybersecurity threats, capacity improvement, service quality, etc. Strategic planning and developed governmental actions are planned to overcome each and all of these obstacles.

Starting from cybersecurity, it’s an undeniable fact that for effective development of Government 4.0, it’s a viable obstacle. For protecting data, cyberattacks, and other security flaws government systems are vulnerable. For maintaining the digital infrastructure for the citizens, strong cybersecurity programs have been taken into account through a legislative framework. For stopping data privacy laws exploitation, they are also desperately needed for protecting personal data.

The second essential obstacle that majorly effects should be taken into account is the digital gap to the broad implementation of e-governance. Unjust access to governmental systems is impeded by internet connection, and technical infrastructure between rural and urban communities. To close the gap for this obstacle digital literacy, priced access to technology is indeed needed. Based on

the practices that came from Georgia, Estonia is the best examples for tackling this problem and deduction in the gap, and it might be beneficial for some other points as well.

In terms of rewards in digital transformation developing capacity effectively is crucial. The reasons why Azerbaijan lacks in this perspective are poorly developed technology infrastructure, insufficient investment, and some historical reasons for instance being post-soviet country. The establishment of an innovative culture, and cooperation among government agencies, working with the educational institutions, and having improved training programs are all necessary aspects to develop a trained workforce.

The quality of e-governance services is the core element for gaining the public's confidence, and guaranteeing people's satisfaction. From the perspective of insufficient support for several languages for comparing the efficacy, including the issues of the user interfaces. Ongoing feedback systems, not individual, but group-centric approach, for designing, and solving these problems are necessary.

The third considerable issue is the adoption of security protocols both in private and public digital service providers in order to descend the problems in terms of cybersecurity. By using vulnerability assessments, putting sophisticated security processes into place, developing international collaboration are the points that keep ahead of evolving threats and diving into the details of the best practices. Robusting data privacy laws as well as depends to be passed and implemented to safeguard citizens' data and protect accountability processing procedures in data processing.

For closing the digital gap, a comprehensive strategy is needed. In underserved and rural areas providing fair access to digital services, investments in global infrastructure are necessary. For the people who are low-income digital literacy program should be shared, older folks, and disadvantaged groups' members to provide them with the skills they ought to use the internet

safely. Private-partner collaboration in both cases might be very important, financing, PR side and it may increase the accessibility and affordability.

By getting ongoing education and training according to the strategic plan and for capacity building development plan should be improved. The first way that comes to mind is forming strategic alliances with institutions, and providing specific training programs in digital governance. Promoting innovative, developed and experimental culture it's possible to provide people firsthand exposure with cutting edge technology just by pilot projects and developed laboratories. By actively engaging in the development of their digital skills and adopting new technology employees in the public sector might be encouraged to actively engage.

Service quality can be enhanced by using user-centric design concepts, and by adding multilingual assistance to accommodate a variety of demographics are all core points to providing high-quality e-governance services. For actively enhancing digital platforms using ongoing feedback methods is important. Industry specialists who are working together with technology businesses, and may assist in incorporating the newest advancement and overall user experience. By promoting cross-agency information exchange and cooperation digital governance can be fostered with a more unified approach to digital governance. In civil society, the commercial sector of Azerbaijan should improve cooperation between them to encourage innovation and collaboration in handling the problem. By leveraging expertise and resources public-private partnerships may assist in improving and executing innovative ideas.

For staying up with the rapid changes and solutions in technology, legal and regulatory frameworks must be reviewed and innovated on a regular basis regulatory and legal compliance are core. For safeguarding public interest regulations are flexible and adaptive and should encourage for accountability, and innovation. Public discussions assist to guarantee the frameworks and

initiatives for management and compliances of all parties involved and represent a variety of perspectives.

To conclude all public administration with the adoption of Government 4.0 Azerbaijan has a revolutionary advantage to develop service delivery. Azerbaijan has the potential to establish a governance model that is more flexible, accountable, inclusive, and efficient by diving into the issues that have already been mentioned. By using a sustainable and successful legislative framework it may be implemented quite successfully way. Focusing on the people's needs, and announcing the essence of innovation, and social advancement by constantly improving may lead Azerbaijan to achieve the main goal.

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