Dr. Vladimeri Napetvaridze[1]

Georgia's Cybersecurity Environment in the AI Era

Abstract

This research paper examines the development of artificial intelligence (AI), international cyber threats, and Georgia's changing cyber security environment. This paper describes the transformation of Georgia. A weak cybersecurity outpost for a nation that emphasizes promoting cybersecurity capabilities, drawing on theoretical frameworks and historical context.

Georgia experienced a paradigm shift after the 2008 cyber attack when it saw the connection between cyber security requirements and national security. In this regard, the legislative turn decisively determined Georgia's cybersecurity laws. Important turning points were achieved with the adoption of the "Law on Information Security" and the ratification of the Council of Europe Convention on Cyber Security, which establishes a theoretical and practical basis for a comprehensive government policy on cyber security.

Recognition from international organizations such as the International Telecommunications Union (ITU) has confirmed Georgia's progress in the industry, but there are weaknesses and vulnerabilities that need to be addressed.

Keywords: Artificial Intelligence; Cyber Security; Georgia.

[1] Researcher at Institute of Political Sciences of Ilia State University

Introduction

Following the technological evolution of the 21st century (Sarker, 2021), the development of artificial intelligence (AI) and robotics, this article explores the mentioned complex relationship, paying special attention to the experience of Georgia. The events of 2008 catalyzed the evolution of Georgia's cybersecurity landscape (Swanson, 2010).

Organized large-scale cyberattacks during the Russia-Georgia War became a turning point, placing Georgia at the forefront of countries facing challenges posed by malicious actors in cyberspace. The current tensions and cyber threats have forced Georgia to rethink the relationship between national security and the resilience of its digital infrastructure.

Adopting the "Law on Information Security" and the Council of Europe's cyber security convention was a turning point for Georgia's transformation in the cybersecurity space. Following the cyberattacks of 2008, these legislative achievements established the foundation for a state cybersecurity strategy. Policy positioned cybersecurity as a crucial element of national security.

In the following years, action plans were implemented, and attempts were made to incorporate cybersecurity concerns into the larger national security framework. Georgia has received international recognition for its commitment to strengthening its digital defenses. The International Telecommunication Union (ITU) ranked the country among the top 10 in the world in its 2017 Cybersecurity Survey. Following the 2018 global survey, Georgia's inclusion in the Global Cybersecurity Index among the top 20 countries highlighted the observed advances in cybersecurity capabilities.

Despite the progress Georgia has made, the country still faces significant challenges. Studies by the ITU and the Estonian e-Governance Academy have pointed out several areas in Georgia's cybersecurity policy that need further improvement. As artificial intelligence continues to evolve, the digital landscape becomes even more complex, offering both opportunities to strengthen cybersecurity and introducing new risks that need to be addressed.

The chapters below chart Georgia's cybersecurity journey, examining its assessment from vulnerability to a cyber-centric state. It unfolds as a narrative of resilience, strategic policy, and international cooperation, offering a microcosm of the global conflict between technological advances and the imperative of cybersecurity measures.

This study closely examines Georgia's experience to offer insights into the country's distinctive approach to the challenges of AI development and cybersecurity. By analyzing Georgia's policies, the research aims to enhance our understanding of the country's strategies and contribute to the wider global conversation. As nations worldwide navigate the intricate balance between advancing AI and securing digital spaces, this study hopes to provide perspectives that will inform and influence the ongoing discussions on these important issues.

Cybercrime in the AI era

According to Andrew Ng, a British-born computer scientist and a leading thinker on artificial intelligence (AI), artificial intelligence is the new electricity (Jewell, C 2019). Understanding electricity and the invention of proper tools for its use were turning points in humankind's history (Erenoğlu, 2019). With the advent of electricity and new technologies, the world has seen considerable advances in communication and production. Many scientists assume AI can become a decisive factor in the next industrial revolution (Butler-Adam, 2018). It must be seen as a means for progress, not the final product; therefore, it can be used in both directions: to serve in favor of public interests or against it. The democratization of modern technologies has made the Internet and AI available to everyone (Canaday, 2017), but at the same time, they can be used as tools for cybercrime (Sudmann, 2019).

AI can be used as an instrument for digital crime in many ways, for example, Automated Phishing Attacks: Hackers can use AI to study and create convincing phishing emails (Gupta, 2017). By studying the recipient's online behavior, AI can tailor the content of these emails, increasing the likelihood that the victim will click on malicious links or share personal information. Credential Stuffing (Ba, 2021): Attacks that can be automated using an AI-algorithm. Hackers using machine learning algorithms can automatically generate numerous username and password combinations and gain unauthorized access to various websites. Criminals use various manipulation methods to trick machine systems. Hackers are using artificial intelligence to find vulnerabilities in security systems; they can create fake patterns to trick machine learning-based systems (Qiu, 2019).

Automated social engineering attacks are becoming increasingly advanced as AI can analyze publicly available data and social media to create targeted scams, such as creation of fictional characters or chatbots to manipulate individuals into sharing sensitive information (Lauinger, 2010); AI-powered malware, which is emerging as a significant threat and can evolve and adapt to traditional antivirus software (Poudyal, 2019) because artificial intelligence outperforms conventional techniques in detecting and exploiting software and network vulnerabilities. Artificial intelligence is superior to conventional techniques in detecting and exploiting software and network vulnerabilities. Machine tools can quickly analyze large data sets to identify vulnerabilities and launch attacks (Wang, 2019).

Deepfake attacks: Hackers can impersonate people or alter material using artificial intelligence to create convincingly deep fake audio or video recordings. This can be used to spread false information or targeted attacks (Sharma, 2022).

It's important to remember that cybersecurity experts also use AI to improve security protocols and prevent these attacks. With new developments, the competition between hackers and security specialists is increasing. In conclusion, cyber security is essential for state security in the AI era as it protects critical infrastructure, personal data, commercial interests and democratic processes from various cyber threats.

Georgia's Cybersecurity Evolution and Shortcomings

Analyzing the state's cyber defense policy and projecting its future trajectory is crucial because, in the data age, cyber security is becoming just as vital to nations as defending their borders in the air, on land, and at sea.

Along with Estonia, Georgia was among the first nations targeted by a state-sponsored cyberattack in 2008. Unlike Estonia, Georgia was the first country against which Russia simultaneously used cyber and conventional military attacks.

Georgia's cybersecurity ecosystem evolution started in 2011. International partnerships, strategic efforts, and legislative fortifications characterized the 2011-2020. In light of the country's turbulent past, which included the noteworthy cyberattacks of 2008, Georgia decided to strengthen its cyber resilience after realizing the necessity of protecting its digital infrastructure as a part of national security.

Georgia established the framework for its cybersecurity policy in 2013, particularly with an elaboration of the Cyber Security Strategy and the Cyber Security Action Plan of Georgia – the document that defined responsible state authorities for implementing state cyber security policy. It acknowledged organizations accountable for carrying out Georgia's cybersecurity roadmap, policy, and strategy.

Georgia's cybersecurity environment was strengthened legally through specialized laws and regulations. The "Law on Information Security" adopted in 2012 established a solid legislative framework. This legislative action addressed cyber-criminal issues and set the foundation for public and private sector compliance with cybersecurity requirements.

Georgia's cybersecurity position was reinforced by legislative developments that brought it into compliance with the principles and regulations of the Budapest Convention. After adopting the mentioned document, Georgia's criminal law criminalizes unauthorized access to data, information systems, system disturbances, and device abuse.

In addition, the country has adopted the Personal Data Protection Act of 2011 to preserve human rights and freedoms when processing personal data.

Georgia proactively took part in global partnerships regarding cybersecurity cooperation. Technical teams competed against other CERT (Computer Emergency Response Team) representatives to demonstrate their cybersecurity skills. The country's technological community has actively offered training to local and foreign stakeholders and participated in several information and cybersecurity training programs.

It should be stated that Georgia also put into effect the 2017–2018 National Strategy for Cyber Security; nevertheless, the country could not create a new plan for three years after adopting the document above. Georgia's cyber security environment still faces some threats and has gaps despite the state's active efforts to improve it since 2011. These efforts included joining an international convention,

approving policy documents, identifying critical information infrastructure, and setting up state structures accountable for their cyber security.

Although studies conducted by international organizations like the ITU are crucial for gaining a broad overview of the nation, these studies have the drawback of not thoroughly examining the context of the local environment.

Therefore, to analyze Georgia's cyber security environment more objectively, within the framework of this work, the key findings of the research conducted by the organization PMCG in 2021 are presented as a secondary source. According to the results of the mentioned study: Cybercrime is on the rise in Georgia; both the government and society do not understand the threat. • Cybercrime is likely underestimated in Georgia and neighboring countries. • The Ministry of Internal Affairs (MIA) only tracks pure cybercrime, not cybercrime, leading to ambiguity. • Cybercrime does not pose significant challenges to criminal justice due to its low representation in crime statistics. • Cybercrime threatens national security by turning external threats into internal problems. • Georgian police approach cybercrime reactively, focusing more on investigations than prevention. • Law enforcement agencies (LEAs) face challenges in digital forensics, especially in the regions. • Factors such as lack of government policy, private sector involvement, and public awareness hinder cybercrime statistics. • While transnational cybersecurity threats to Georgia are minimal, GOCG (Georgian Organized Crime Groups) may expand illicit digital activities. • Insufficient financial support hinders the implementation of key cybersecurity initiatives (PMCG, 2021).

Georgia's cyber security shortcomings were also reflected In UN ITU's Global Cybersecurity Index reports; GCI research results regarding Georgia are quoted below. Georgia in ITU reports:

2015 report (ITU, 2015) **:**

- *Specific legislation on cybercrime has been enacted through the following instrument: Georgia Computer System Protection Act.*
- *Specific legislation and regulation related to cybersecurity has been enacted through the following instrument: Law on Information Security.*
- *The national computer incident response teams are the CERT-GOV-GE and CERT-MOD-GOV.*
- *Georgia has an officially recognized national (and sector specific) cybersecurity framework for implementing internationally recognized cybersecurity standards through the Law on Information Security which is based on ISO 27000.*
- *The Data Exchange Agency has an officially approved national cybersecurity framework for the certification and accreditation of public sector professionals.*
- *Georgia has an officially recognized national cybersecurity strategy (Cyber security strategy 2012-2015)*
- *The Cybersecurity strategy 2012-2015 provides a national governance roadmap for cybersecurity in Georgia.*
- *The Data Exchange Agency is the officially recognized agency responsible for implementing a national cybersecurity strategy, policy, and roadmap.*

- *The Data Exchange Agency is currently working to measure the cybersecurity readiness of Georgia. -Georgia Computer System Protection Act.*
- *Georgia does not have any officially recognized national or sector-specific research and development (R&D) programs/projects for cybersecurity standards, best practices and guidelines to be applied in either the private or the public sector.*
- *The Data Exchange Agency has officially recognized national or sector-specific educational and professional training programs for raising awareness with the general public, promoting cybersecurity courses in higher education and promoting certification of professionals.*
- *Georgia has 11 public sector professionals certified under internationally recognized certification programs in cybersecurity.*
- *Georgia does not have any certified government and public sector agencies certified under internationally recognized standards in cybersecurity.*
- *Georgia does not have any officially recognized partnerships to facilitate sharing of cybersecurity assets across borders or with other nation states.*
- *Georgia has an officially recognized national or sector-specific program for sharing cybersecurity assets within the public sector through the Data Exchange Agency.*
- *Georgia has an officially recognized national or sector-specific program for sharing cybersecurity assets within the public and private sector through the Data Exchange Agency.*
- *Georgia is a member of the ITU-IMPACT initiative and has access to relevant cybersecurity services. CERT-GOV.GE is a member of FIRST. Georgia also participated in the International Cyber Shield Exercise 2014 in Turkey (ICSE 2014).*

2017 Report (ITU, 2017) :

"*Georgia is top ranked in the CIS (Commonwealth of Independent States). After large-scale cyber-attacks on the country in 2008, the government has strongly supported protection of the country's information systems13. The Information Security Law14 established a Cyber Security Bureau with a particular emphasis on protecting critical information systems in the military sphere.*

Georgia established cybercrime legislation in line with the principles and rules of the Budapest Convention both in terms of substantive and procedural aspects. Illegal access to information systems, data and system interference, and misuse of devices are criminalized by the Georgia criminal code. The Personal Data Protection Act was enacted by Parliament in 2011 and is intended to ensure protection of human rights and freedoms, including the right to privacy, in the course of personal data processing".

2018 Report (ITU, 2018)**:**

„Georgia started a cyber research project in 2018, a Portal of Online Cyber exercises79. CyberLab – a new online resource created by Computer Emergency Response Team (CERT.GOV.GE) and Georgian Research and Educational Networking Association (GRENA) with the support of EU funded EaPConnect project. The portal helps IT students from educational institutions interested in cybersecurity to deepen their practical skills, so they can better discover and then respond to cyber incidents. The portal will also help IT personnel from both the public and private sectors, where

readiness is critically important to defend against attack, ensure cyber sustainability, and improve skills. Exercises available on the portal are diverse and cover : cryptography, malware code analyses of real incidents, log file analysis of cyber incidents that occurred on real servers, reverse engineering, network flaw analyses, cyber analytics etc

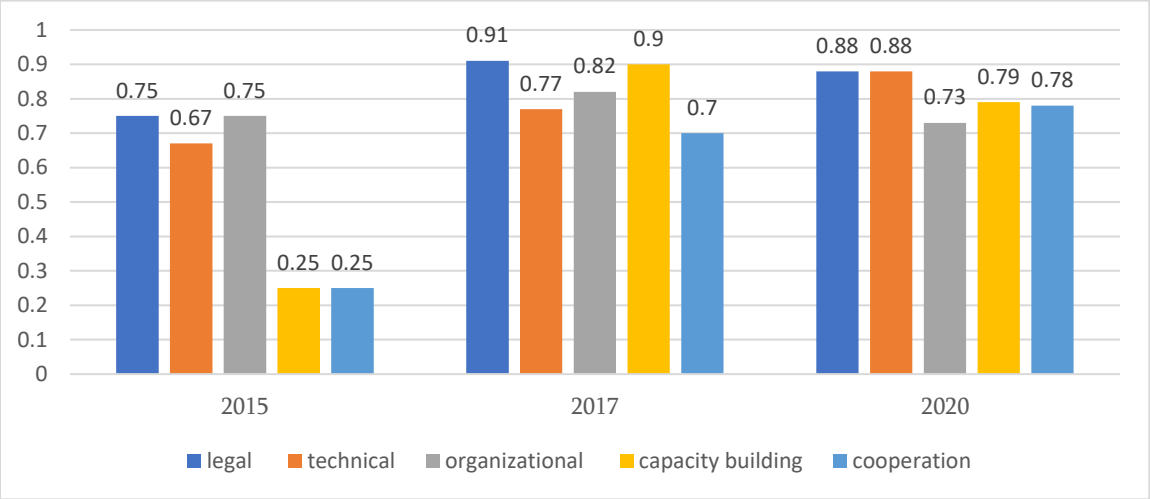
Georgia – Georgia has built up cyber capacity in-house through on-the-job training and training of teacher measures. Technical teams participate in international competitions with other CERT representatives, often successfully. In addition, the Georgia technical community provides trainings to other country stakeholders and counterparts. Representatives participate as invited experts and trainers of some international training in information and cybersecurity."

2020 Report:

Indices were provided regarding Georgia's Overall cybersecurity Score and its components.

Overall, the way Georgia's indicators are presented in the studies above paints the following picture (see diagram N1).

Diagram N1- Georgia's Cybersecurity index



The progress the nation made between 2015 and 2017 is depicted in detail in the above diagram, as is the stagnation brought on by the National Cyber Security Strategy's years-long implementation delay.

Conclusion

According to the research conducted in the framework of the study, it can be said, that in the era of digital technologies, it critically important for a country to be "digitaly flexible" in the quickly changing digital world. This includes technological advancements, collaborative efforts, and legal changes, all supported by a flexible approach to cybersecurity governance.

Georgia's cybersecurity journey — from the 2008 cyber attack to its current status as a cyber-centric nation — concludes with an urgent call to action for the future. Although the country is implementing a government cybersecurity strategy for 2021–2023, artificial intelligence is mentioned only once in the document and then in a general context.

The country's experience highlights the importance of cross-border cybersecurity issues. Fighting today's AI-powered cyber threats requires global cooperation. The call to action extends beyond Georgia's borders as it recognizes the interconnectedness of global cyber threats. It calls on researchers, cyber security experts, and policymakers worldwide to join forces to strengthen countries' overall digital resilience.

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