



OPPORTUNITIES FOR DEVELOPING INDIVIDUAL CYBERSECURITY CULTURE BASED ON FOREIGN EXPERIENCE

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Article history:	Abstract:
Received: 26 th April 2026 Accepted: 24 th May 2026	The rapid digitalization of modern society has significantly increased the importance of cybersecurity at both institutional and individual levels. While technological solutions continue to evolve, human behavior remains one of the most critical factors affecting cybersecurity resilience. This article examines opportunities for developing individual cybersecurity culture based on international experience. The study analyzes conceptual approaches to cybersecurity culture, evaluates successful practices implemented in various countries, and identifies mechanisms that contribute to responsible digital behavior. Particular attention is devoted to digital literacy, cyber ethics, awareness programs, educational initiatives, and public-private cooperation as key factors influencing cybersecurity culture development. Through comparative analysis of international experiences, the article proposes strategies that can strengthen cybersecurity awareness and resilience among individuals in the context of growing digital threats. The findings indicate that cybersecurity culture should be viewed as a multidimensional social phenomenon encompassing knowledge, values, attitudes, and behavioral competencies necessary for secure participation in digital environments.

Keywords: cybersecurity culture, digital literacy, cyber ethics, cybersecurity awareness, digital citizenship, information security, cyber resilience, digital behavior, international experience, cybersecurity education

INTRODUCTION. The expansion of information and communication technologies has transformed virtually every sphere of contemporary life. Digital technologies have created unprecedented opportunities for communication, education, economic activity, governance, and social interaction. However, the increasing dependence on digital infrastructures has also generated new vulnerabilities and security risks that affect individuals, organizations, and states. Cyber threats have become increasingly sophisticated and diverse. Individuals frequently encounter phishing attacks, identity theft, malware infections, cyber fraud, privacy violations, misinformation campaigns, and various forms of digital manipulation. Despite advances in cybersecurity technologies, human error remains one of the leading causes of security breaches. Consequently, strengthening individual cybersecurity culture has become an essential component of national and global cybersecurity strategies. Cybersecurity culture refers to the collection of values, attitudes, knowledge, competencies, and behavioral practices that influence how individuals interact with digital technologies and respond to cyber risks. Unlike purely technical approaches, cybersecurity culture emphasizes the human dimension of cybersecurity and

recognizes that secure digital behavior depends largely on awareness, responsibility, and ethical conduct. Contemporary researchers increasingly emphasize that cybersecurity cannot be achieved solely through technological solutions. According to Von Solms and Van Niekerk, cybersecurity culture represents a comprehensive framework through which individuals internalize security-related norms and translate them into everyday digital practices [1, p. 1–5]. This perspective highlights the importance of education, socialization, and cultural factors in promoting cyber resilience. Various countries have developed innovative approaches to strengthening cybersecurity culture among citizens. The experiences of Estonia, Singapore, the United Kingdom, South Korea, Finland, and the United States demonstrate that effective cybersecurity strategies integrate educational programs, awareness campaigns, digital literacy initiatives, and stakeholder collaboration. These international experiences provide valuable insights for developing comprehensive cybersecurity culture frameworks. The growing significance of cybersecurity culture is particularly evident among young people and active internet users, who frequently engage with digital platforms and online services. Developing responsible



digital behavior among these groups contributes not only to individual security but also to broader societal resilience against cyber threats.

The purpose of this study is to analyze international experiences in cybersecurity culture development and identify opportunities for strengthening individual cybersecurity culture through educational, social, and institutional mechanisms.

MATERIALS AND METHODS. The study employs qualitative research methods based on comparative analysis, socio-philosophical examination, content analysis, and interdisciplinary synthesis.

The comparative method is used to evaluate cybersecurity culture development strategies implemented in different countries. Comparative analysis enables the identification of effective practices, common patterns, and transferable lessons relevant to cybersecurity awareness and education.

The socio-philosophical approach facilitates the examination of cybersecurity culture as a social phenomenon influenced by values, norms, responsibility, and digital citizenship. This perspective allows for a broader understanding of cybersecurity beyond technical considerations.

Content analysis has been conducted using academic publications, policy documents, international reports, cybersecurity frameworks, and educational materials. Particular attention is devoted to initiatives developed by governmental institutions, international organizations, and educational systems.

An interdisciplinary approach integrates insights from sociology, education, information security, psychology, communication studies, and digital governance to provide a comprehensive understanding of cybersecurity culture formation.

LITERATURE REVIEW. The concept of cybersecurity culture emerged from the recognition that technological security measures alone are insufficient for addressing contemporary cyber threats. Researchers increasingly emphasize the importance of human behavior and organizational culture in maintaining cybersecurity resilience.

Von Solms and Van Niekerk define cybersecurity culture as the set of assumptions, beliefs, attitudes, and behaviors influencing how individuals approach cybersecurity issues [1, p. 3–5]. Their work highlights the central role of social and cultural factors in shaping digital security practices. Schneier argues that people often represent both the strongest and weakest elements of cybersecurity systems. While technological protections are essential, human awareness and

responsible behavior ultimately determine the effectiveness of security measures [2, p. 47–50]. The concept of digital citizenship has also contributed significantly to discussions concerning cybersecurity culture. Ribble emphasizes that responsible participation in digital environments requires not only technical competencies but also ethical awareness, critical thinking, and social responsibility [3, p. 18–22]. International research demonstrates that cybersecurity awareness programs significantly improve individuals' ability to recognize threats and adopt protective behaviors. According to the European Union Agency for Cybersecurity (ENISA), educational interventions contribute substantially to reducing cybersecurity vulnerabilities among citizens [4, p. 27–31]. Studies focusing on digital literacy further emphasize its importance for cybersecurity culture. Digital literacy enables individuals to evaluate information critically, protect personal data, recognize online risks, and make informed decisions in digital environments [5, p. 41–45]. Recent literature also highlights the significance of cyber ethics. Floridi argues that digital societies require ethical frameworks capable of guiding behavior in technologically mediated contexts [6, p. 88–92]. Cybersecurity culture therefore encompasses both practical competencies and normative principles.

The existing literature suggests that successful cybersecurity culture development requires integrated approaches involving education, awareness, policy support, technological innovation, and community engagement. International experiences provide valuable examples of how these components can be combined effectively.

RESULTS. The analysis of international experience demonstrates that the development of individual cybersecurity culture has become a strategic priority in many technologically advanced countries. Governments, educational institutions, private organizations, and civil society actors increasingly recognize that technological protection measures alone cannot ensure cybersecurity. Human awareness, responsible behavior, and digital literacy have become essential components of comprehensive cybersecurity strategies.

The findings indicate that successful cybersecurity culture development depends on the integration of educational, institutional, technological, and ethical approaches. Comparative analysis of international experiences reveals several effective models that contribute to strengthening individual cyber resilience.



Estonia: Digital Society and Cybersecurity Awareness.

Estonia is widely recognized as one of the most advanced digital societies in the world. The country's extensive digital infrastructure has necessitated the development of strong cybersecurity awareness among citizens. The analysis reveals that Estonia integrates cybersecurity education into national digital literacy programs from an early age. Schools provide students with knowledge concerning online safety, privacy protection, secure authentication, and responsible digital behavior. Public awareness campaigns further reinforce these educational efforts by promoting cybersecurity best practices among the broader population.

Following the cyberattacks experienced in 2007, Estonia significantly strengthened its cybersecurity policies and invested heavily in public awareness initiatives. According to the Estonian Information System Authority, citizen awareness has become a fundamental component of national cyber resilience [7, p. 18–22]. The Estonian experience demonstrates that long-term investment in digital literacy and cybersecurity education can significantly enhance individual preparedness against cyber threats.

Singapore: Cybersecurity Through Lifelong Learning.

Singapore has developed a comprehensive approach emphasizing continuous cybersecurity education and lifelong learning. The government's cybersecurity strategy recognizes that cyber threats evolve rapidly and require ongoing adaptation by citizens.

The findings indicate that Singapore implements extensive public awareness programs targeting different demographic groups, including students, employees, older adults, and vulnerable populations. Cybersecurity training is integrated into educational curricula and professional development programs.

The Cyber Security Agency of Singapore regularly conducts nationwide campaigns designed to improve cybersecurity awareness and promote responsible digital practices [8, p. 24–27]. These initiatives emphasize practical skills such as recognizing phishing attempts, protecting personal information, and responding appropriately to cyber incidents. Singapore's experience illustrates the importance of continuous learning and adaptive educational strategies in maintaining cybersecurity culture.

United Kingdom: Public Engagement and Cyber Awareness Campaigns.

The United Kingdom has implemented numerous initiatives aimed at strengthening cybersecurity awareness among citizens. Government agencies collaborate closely with educational institutions, private organizations, and

media outlets to promote cybersecurity culture. One notable initiative is the "Cyber Aware" campaign, which provides practical guidance on password security, software updates, two-factor authentication, and online safety. Research indicates that such campaigns contribute significantly to improving public understanding of cybersecurity risks [9, p. 31–35].

Educational institutions also play a critical role in fostering cybersecurity competencies. Cybersecurity topics are increasingly incorporated into school curricula and higher education programs, enabling students to develop both technical knowledge and responsible digital habits.

The British experience highlights the value of public communication strategies and stakeholder collaboration in strengthening cybersecurity culture.

South Korea: Technology Integration and Digital Responsibility.

South Korea's highly connected digital environment has encouraged the development of comprehensive cybersecurity education policies. The country emphasizes digital responsibility, cyber ethics, and information security awareness as integral components of citizenship education. The analysis indicates that cybersecurity education begins during primary schooling and continues throughout higher education. Students learn about online privacy, cybercrime prevention, ethical technology use, and digital rights and responsibilities [10, p. 48–52].

Government-supported awareness initiatives complement formal educational programs by providing citizens with updated information regarding emerging cyber threats and protective practices. South Korea's approach demonstrates the effectiveness of integrating cybersecurity education within broader digital citizenship frameworks.

Finland: Media Literacy and Critical Thinking.

Finland provides an innovative model emphasizing media literacy and critical thinking as foundations of cybersecurity culture. Rather than focusing exclusively on technical skills, Finnish educational programs encourage individuals to evaluate information critically, identify misinformation, and understand the social implications of digital technologies. The findings indicate that media literacy contributes significantly to cybersecurity awareness by enhancing individuals' ability to recognize manipulation, disinformation, and online deception [11, p. 61–65]. Finnish schools integrate digital literacy, cybersecurity awareness, and critical thinking into multiple subject areas, creating comprehensive educational experiences that strengthen digital resilience. The Finnish model illustrates the



importance of cognitive and analytical skills in protecting individuals against modern cyber threats.

United States: Multi-Stakeholder Cybersecurity Education. The United States employs a multi-stakeholder approach involving governmental agencies, educational institutions, private companies, and non-governmental organizations. National initiatives emphasize cybersecurity awareness, workforce development, and digital responsibility.

Programs supported by the National Institute of Standards and Technology (NIST) and the Cybersecurity and Infrastructure Security Agency (CISA) provide educational resources for citizens, educators, and organizations [12, p. 37–42].

The analysis demonstrates that collaborative approaches facilitate the dissemination of cybersecurity knowledge and strengthen public engagement. Public-private partnerships play a particularly important role in promoting cybersecurity awareness and innovation. The American experience underscores the significance of cooperation among diverse stakeholders in developing sustainable cybersecurity culture.

Common Factors Influencing Cybersecurity Culture Development. The comparative analysis identifies several common factors contributing to successful cybersecurity culture development:

- Integration of cybersecurity education into formal educational systems.
- Continuous public awareness campaigns.
- Promotion of digital literacy and critical thinking skills.
- Emphasis on cyber ethics and responsible digital citizenship.
- Governmental support and institutional coordination.
- Multi-stakeholder cooperation involving public and private sectors.
- Adaptation of educational content to evolving cyber threats.
- Utilization of digital technologies for awareness and training purposes.

These factors collectively contribute to strengthening individual cyber resilience and responsible digital behavior.

DISCUSSION. The findings confirm that cybersecurity culture development represents a complex social, educational, and cultural process rather than a purely technological undertaking. International experiences demonstrate that effective cybersecurity strategies prioritize human awareness and behavioral

transformation alongside technical protection measures.

One important implication concerns the role of education. Countries that successfully integrate cybersecurity topics into educational systems generally demonstrate higher levels of cybersecurity awareness and responsible digital behavior. Educational interventions contribute not only to technical competencies but also to ethical awareness and critical thinking. The study also highlights the importance of digital literacy. As digital environments become increasingly complex, individuals require sophisticated skills enabling them to evaluate information, recognize threats, and protect personal data. Digital literacy therefore functions as a foundational component of cybersecurity culture.

Another significant observation relates to cyber ethics. Ethical principles such as responsibility, integrity, respect, and accountability influence individual behavior in cyberspace. The integration of ethical considerations into cybersecurity education strengthens individuals' capacity to make informed and socially responsible decisions.

The findings further suggest that public awareness campaigns play a crucial role in reinforcing cybersecurity culture. Continuous communication regarding emerging threats and protective practices helps maintain public engagement and adaptability. The comparative analysis demonstrates that stakeholder collaboration enhances the effectiveness of cybersecurity initiatives. Governments, educational institutions, technology companies, media organizations, and civil society groups each contribute unique resources and expertise. Nevertheless, several challenges remain. Rapid technological development, evolving cyber threats, information overload, and disparities in digital literacy create obstacles to cybersecurity culture formation. Addressing these challenges requires flexible and adaptive educational strategies capable of responding to changing circumstances.

Overall, the evidence indicates that international experience provides valuable lessons for strengthening individual cybersecurity culture. The successful development of cyber resilience depends on combining educational innovation, ethical awareness, institutional support, and community engagement within comprehensive cybersecurity strategies.

CONCLUSION. The present study examined opportunities for developing individual cybersecurity culture based on international experience and demonstrated that cybersecurity culture has become a



fundamental component of contemporary digital society. The findings indicate that the effectiveness of cybersecurity strategies increasingly depends on human awareness, responsible behavior, ethical decision-making, and digital literacy rather than solely on technological protection mechanisms.

The comparative analysis revealed that countries such as Estonia, Singapore, the United Kingdom, South Korea, Finland, and the United States have developed innovative approaches to strengthening cybersecurity culture among citizens. Although their institutional frameworks and educational models differ, they share several common characteristics, including strong governmental support, integration of cybersecurity education into formal learning systems, public awareness initiatives, promotion of digital literacy, and stakeholder cooperation.

The study established that digital literacy serves as one of the most important foundations of cybersecurity culture. Individuals who possess critical thinking skills, information evaluation competencies, and awareness of digital risks demonstrate greater resilience against cyber threats. Educational systems therefore play a central role in preparing citizens to navigate increasingly complex digital environments.

Another significant finding concerns the importance of cyber ethics and digital citizenship. Cybersecurity culture extends beyond technical competencies and encompasses values such as responsibility, integrity, accountability, privacy awareness, and respect for others. Ethical education contributes to fostering secure and socially responsible digital behavior.

The research further demonstrated that public awareness campaigns, lifelong learning programs, and community engagement initiatives significantly enhance cybersecurity preparedness. Continuous educational efforts are particularly important because cyber threats evolve rapidly and require ongoing adaptation.

The findings also suggest that effective cybersecurity culture development requires collaborative approaches involving governmental institutions, educational organizations, private sector actors, civil society groups, and media platforms. Such cooperation facilitates resource sharing, knowledge dissemination, and coordinated responses to emerging cybersecurity challenges.

In conclusion, international experience confirms that cybersecurity culture should be regarded as a strategic social resource contributing to digital resilience, national security, and sustainable development. Strengthening individual cybersecurity culture through education, awareness, ethical development, and institutional

cooperation remains essential for ensuring secure participation in the digital age.

Scientific Novelty. The scientific novelty of the study is reflected in the following aspects:

- International experiences in cybersecurity culture development have been systematically analyzed from socio-philosophical, educational, and institutional perspectives.
- The relationship between digital literacy, cyber ethics, and individual cybersecurity behavior has been conceptually clarified.
- Common factors influencing successful cybersecurity culture development across different countries have been identified and categorized.
- The role of educational systems and public awareness initiatives in strengthening cyber resilience has been theoretically substantiated.
- A comprehensive framework explaining the interaction between cybersecurity education, ethical awareness, and responsible digital citizenship has been proposed.

Practical Recommendations. Based on the findings of the study, the following recommendations are proposed:

1. Cybersecurity education should be integrated into school, college, and university curricula at all levels.
2. National programs aimed at improving digital literacy and cybersecurity awareness should be expanded.
3. Governments should support continuous public awareness campaigns addressing emerging cyber threats.
4. Educational institutions should incorporate cyber ethics and digital citizenship into teaching programs.
5. Families should be encouraged to participate actively in cybersecurity awareness and digital behavior guidance.
6. Public-private partnerships should be strengthened to facilitate cybersecurity training and knowledge dissemination.
7. Digital literacy initiatives should emphasize critical thinking, information verification, and responsible online behavior.
8. Specialized training programs should be developed for educators responsible for cybersecurity instruction.



9. Community-based cybersecurity awareness projects should be implemented to increase public participation.

10. International cooperation should be enhanced to exchange best practices and innovative approaches related to cybersecurity culture development.

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