

Security, technologies and economic competitiveness

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Abstract.

Security, technologies and economic competitiveness are an immutable part of the agenda of economic and political forums of last decades. The article studies how technological changes are influencing the security. National security system is presented through National Security Model (NSM) and technology influence is considered for major sub-systems in this model. Also, a Global Security Index (GSI) for measuring economic security is introduced.

Keywords: security, technology, competitiveness

1. Introduction

Security usually means protection against risk. In broader sense security is the management of the risk. And commonly by security we mean national security.

The subject of study in this article is namely the national security and specifically economic security. And the matter of study is how technologies change the paradigm of economic security and the practical approaches for assuring economic security.

Historically the national security is first considered as military security. Later, political security is considered – internal and external. The term economic security is first used in 1971 by Ministry of International Trade and Economy of Japan denoting dependency of the economic growth on international relations.

In the today's changing world, security is also changing and obtains much broader meaning than ever before.

2. National Security Model (NSM). Studying and managing the National Security System

One attempt to systemize different aspects of security is the next model proposed by the author (Stoynov, 2016):

The model considers the National security system at two main dimensions.

The first dimension is existential dimensions. It considers the main subsystems from point of view of society. They are: Environment (Nature), Economy, Policy and Society.

The second dimension is Security dimension. It includes the following subsystems: Risks, Exposures, Security Products, Security Resources and Security Management. Each of these subsystems intersects with every one of the subsystems in the existential dimensions which gives 20 subsystems of more granular level.

Environment resource for security can be any natural factor which can be actively used for creating security products. For example, relief can be actively used by armies to neutralize the attacks of enemy. Climate conditions also may be used during war to obtain some advantages against the enemy. Waters can be used as transportation route for military units, but also as barrier in front of enemy. There are cases when dams are destroyed during military actions to neutralize the advancement of the enemy.

Economic resources for security are any economic resources with security use: labor (with knowledge and skills), capital, land, entrepreneurship. For example, military industry uses these resources to produce weapon and military equipment. The national economy itself may be considered generally as economic resource for security with its pulsing degree of militarization in different periods (mobilization, war, conversion, peace period).

Political resources for security are mainly the state itself with its central and local administration as well as specialized security organizations (army, police, fire brigades etc.). One of the main reasons of the state itself is to guarantee the security and sustainable development of the nation.

Environmental exposures include any natural resources which could be harmed or destroyed due to natural or anthropogenic hazards. This includes contamination of air, water or soil as well as destruction of biological resources and biodiversity.

Economic exposures include all elements of the economic system of a country. In domestic aspect, it includes mainly sustainable growth, employment and financial stability (controlled and small inflation, stable

national currency etc.). In international aspect, economic exposures include mainly stability of supply chains, guaranteed export and positive trade balance, stable exchange rate.

Fig 1. Model of National Security System. Stoynov (2016).

	SOCIETY		POLICY		ECONOMY		ENVIRONMENT
Security Management	Social security management through social security policies and programs	↔	Internal and external security management through internal and external state policy	↔	Economic security management through economic security policies		Ecological security management through environmental policies and programs
	↓		↓		↓		↓
Security Resources	People, Social groups	↔	State with central and local administration, specialized security organizations (army, police,...)	↔	National economy and economic resources with security use		Relief, climate, waters, food
	↓		↓		↓		↓
Exposures	Life, personal values, human rights	↔	Sovereignty, territory, rule-based international system, national values, public safety	↔	Sustainable growth, employment, financial stability; stability of supply, positive balance, guaranteed export, reserves		Air, water, soils, biodiversity
	↓		↓		↓		↓
Security Products	Social security system	↔	Internal and external security, activities of the specialized security organizations (army, police,...)	↔	Military sector of economy, security products, security services	↔	Readiness system for protecting public safety form natural hazards
	↓		↓		↓		↓
Risks	Social risks	↔	Political violence and military treats	↔	Internal and external economic risks		Natural hazards

Political exposures include the political organization of the nation itself and more specifically sovereignty, territorial integrity, public safety, national values (in interior aspect) and rule-based international system (in foreign aspect).

Societal exposures are life and health of the people, integrity of social institutions like property, religion, culture, traditions, as well as wellbeing of people and social groups.

Environmental security products include any observational and readiness systems for monitoring and predicting of natural hazards as well as contamination of natural resources (air, water, food, soil, biodiversity) or worsening of climate conditions or radiation environment .

Economic security products are the security products (goods or services) produced by economy and more precisely by military industry, trade and logistics.

Political security product is the national security ensured by the state and more specifically by the activity of the specialized national institutions with competence in security – government, ministries (of defense, of foreign and internal affairs), army, police etc.

Social security products are any products in the frame of social security system – social services, social funds, products of the activity of different governmental and non-governmental organizations focused on social wellbeing.

Ecological security management includes set of policies and programs for sustainable and healthy environment.

Economic security management includes political economy and its instruments for sustainable economic development.

Political security management includes the state policy for achieving security of the nation and protecting national interests.

Social security management includes the social security a set of policies for wellbeing of the individual, social groups and the whole society.

As National security system is a complex system in the intersection of different areas of the society and the environment, it requires interdisciplinary knowledge and expertise which includes the knowledge, data and methodology of different sciences – natural sciences, economical sciences, political sciences and social sciences.

Systematic approach considers the social security as a complex system with many interacting subsystems as in the proposed model.

Mathematical approach uses mathematical models and permits quantitative study of the all subsystems (including the risks and the indetermination which can be modeled by stochastic techniques).

Economic approach to security systems pays attention mainly on the input (security resources), production and output (security products) of security system. Here a main problem is to distribute the resources in an effective, efficient and optimal way to produce needed security.

Political (managerial) approach or managerial approach deals mainly with the management of the security exposures and security products to achieve security goals.

Managerial approach to Security system deals with taking decisions and performing actions to obtain the security goals.

This process has the following steps: Problem formulation, Gathering information, Analysis of obtained information, Taking optimal decision, Applying the decision – action, Monitoring and feedback from the action.

Operational management is management oriented to performing prescribed operations in an efficient way. Operational management is focused on operation.

Tactic management is management oriented to behavior in specific situation. Tactic management is focused on the tactics.

Strategic management is management oriented to the goals of the system in its environment and with vision for future. Strategic management is focused on the vision, strategies and programs.

Functional approach is approach related to specialization. Operations are grouped into activities and activities are grouped into functions and these functions are managed separately. Functional approach focuses on organizational structure and processes, on formal part of the system and formal regulation of system environment. It takes operational techniques at all management levels.

Situation approach is related to the behavior in specific situation. This means to analyze different scenarios and to choose optional scenarios in real time. Situational management focuses on the scenarios for environment and behavior of the system depending on the scenarios. It emphasizes on the tactics.

Program management is related to long-term goals and planning and consists of creating and following programs. Program management is focused on goals and their achieving. It emphasizes on the strategy.

Technologies – the Forth Industrial Revolution and its impact on security

The fast developing technology today is altering fundamentally the way we live, work, and relate to one another. The scale, scope, and complexity of this transformation is so large that experts called it Forth Industrial Revolution.

The First Industrial Revolution used water and steam power to mechanize production. The Second used electric power to create mass production. The Third used electronics and information technology to automate production. The Fourth Industrial Revolution is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.

3. How the Forth Industrial Revolution influences the security system?

The economists Erik Brynjolfsson and Andrew McAfee have pointed out, the revolution could yield greater inequality, particularly in its potential to disrupt labor markets. As automation substitutes for labor across the entire economy, the net displacement of workers by machines might exacerbate the gap between returns to

capital and returns to labor. On the other hand, it is also possible that the displacement of workers by technology will, in aggregate, result in a net increase in safe and rewarding jobs.

In addition to being a key economic concern, inequality represents the greatest societal concern associated with the Fourth Industrial Revolution. The largest beneficiaries of innovation tend to be the providers of intellectual and physical capital—the innovators, shareholders, and investors—which explains the rising gap in wealth between those dependent on capital versus labor. Technology is therefore one of the main reasons why incomes have stagnated, or even decreased, for a majority of the population in high-income countries: the demand for highly skilled workers has increased while the demand for workers with less education and lower skills has decreased. The result is a job market with a strong demand at the high and low ends, but a hollowing out of the middle.

This helps explain why so many workers are disillusioned and fearful that their own real incomes and those of their children will continue to stagnate. It also helps explain why middle classes around the world are increasingly experiencing a pervasive sense of dissatisfaction and unfairness. A winner-takes-all economy that offers only limited access to the middle class is a recipe for democratic malaise and dereliction.

One of the greatest individual challenges posed by new information technologies is privacy. We instinctively understand why it is so essential, yet the tracking and sharing of information about us is a crucial part of the new connectivity. Debates about fundamental issues such as the impact on our inner lives of the loss of control over our data will only intensify in the years ahead. Similarly, the revolutions occurring in biotechnology and AI, which are redefining what it means to be human by pushing back the current thresholds of life span, health, cognition, and capabilities, will compel us to redefine our moral and ethical boundaries.

More than 30 percent of the global population now uses social media platforms to connect, learn, and share information. In an ideal world, these interactions would provide an opportunity for cross-cultural understanding and cohesion. However, they can also create and propagate unrealistic expectations as to what constitutes success for an individual or a group, as well as offer opportunities for extreme ideas and ideologies to spread.

As the physical, digital, and biological worlds continue to converge, new technologies and platforms will increasingly enable citizens to engage with governments, voice their opinions, coordinate their efforts, and even circumvent the supervision of public authorities. Simultaneously, governments will gain new technological powers to increase their control over populations, based on pervasive surveillance systems and the ability to control digital infrastructure. On the whole, however, governments will increasingly face pressure to change their current approach to public engagement and policymaking, as their central role of conducting policy diminishes owing to new sources of competition and the redistribution and decentralization of power that new technologies make possible.

Ultimately, the ability of government systems and public authorities to adapt will determine their survival. If they prove capable of embracing a world of disruptive change, subjecting their structures to the levels of transparency and efficiency that will enable them to maintain their competitive edge, they will endure. If they cannot evolve, they will face increasing trouble.

This will be particularly true in the realm of regulation. Current systems of public policy and decision-making evolved alongside the Second Industrial Revolution, when decision-makers had time to study a specific issue and develop the necessary response or appropriate regulatory framework. The whole process was designed to be linear and mechanistic, following a strict “top down” approach.

But such an approach is no longer feasible. Given the Fourth Industrial Revolution’s rapid pace of change and broad impacts, legislators and regulators are being challenged to an unprecedented degree and for the most part are proving unable to cope.

How, then, can they preserve the interest of the consumers and the public at large while continuing to support innovation and technological development? By embracing “agile” governance, just as the private sector has increasingly adopted agile responses to software development and business operations more generally. This means regulators must continuously adapt to a new, fast-changing environment, reinventing themselves so they can truly understand what it is they are regulating. To do so, governments and regulatory agencies will need to collaborate closely with business and civil society.

The Fourth Industrial Revolution will also profoundly impact the nature of national and international security, affecting both the probability and the nature of conflict. The history of warfare and international security is the history of technological innovation, and today is no exception. Modern conflicts involving states are increasingly “hybrid” in nature, combining traditional battlefield techniques with elements previously associated with nonstate actors. The distinction between war and peace, combatant and noncombatant, and even violence and nonviolence (think cyberwarfare) is becoming uncomfortably blurry.

As this process takes place and new technologies such as autonomous or biological weapons become easier to use, individuals and small groups will increasingly join states in being capable of causing mass harm. This new vulnerability will lead to new fears. But at the same time, advances in technology will create the

potential to reduce the scale or impact of violence, through the development of new modes of protection, for example, or greater precision in targeting.

Technology as primary risk exposure

The technologies become an exposure and primary concern and object of protection. IT security – data security, applications security, network security.

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From one side, fast use of carbon economy creates serious global ecological problems: global warming, contamination of Earth, deforestation. From other side technologies can help to move to hydrogen economy, to reduce contamination, to transit to clear, green economy.

4. Economic security and economic competitiveness

There is a clear relation between economic security and economic competitiveness. More secure economy means also more competitive economy and vice versa. But there are still differences between these two concepts. Economic security means protection from treats for economy. Economic competitiveness means good performance even if no treat exists for the economical system.

Since 2005, the World Economic Forum has published the Global Competitiveness Index (GCI) developed by Xavier Sala-i-Martin (2004) in collaboration with the Forum.

Competitiveness is defined as a set of institutions, policies, and factors that determine the level of productivity of an economy, which in turn sets the level of prosperity that the country can achieve.

Here we propose a Global Security Index (GSI). Security is considered in the context of the presented National Security Model (NSM) and by analogy with GCI is defined as a set of institutions, policies, and factors that determine the level of security of an economy, which in turn sets the level of economic stability that the country can achieve.

The GSI combines indicators which are grouped into 7 pillars: 3 internal economic security pillars – growth, employment, inflation control; 3 external economic security pillars - supply stability, guarantied export, positive financial balance; and one additional pillar – reserves and other economic security assets.

The GSI pillars are in turn organized into three subindexes: basic requirements, efficiency enhancers, and innovation and sophistication factors. The three subindexes are given different weights in the calculation of the overall Index, depending on each economy’s stage of development, as proxied by its GDP per capita and the share of exports represented by raw materials.

While global GSI design is currently more or less completed, detailed design and use of the index is still undergoing. The next steps of the research here is to precise the indicators taking into account the phenomena related to globalization and technological industry move and also to apply this index to different countries starting with leading economic and political powers and to test usage of the index for description and prediction of their development.

5. Conclusion

There has never been a time of greater promise, or one of greater potential peril. Today’s decision-makers, however, are too often trapped in traditional, linear thinking, or too absorbed by the multiple crises demanding their attention, to think strategically about the forces of disruption and innovation shaping our future.

In the end, it all comes down to people and values. We need to shape a future that works for all of us by putting people first and empowering them. In its most pessimistic, dehumanized form, the Fourth Industrial Revolution may indeed have the potential to “robotize” humanity and thus to deprive us of our heart and soul. But as a complement to the best parts of human nature—creativity, empathy, stewardship—it can also lift humanity into a new collective and moral consciousness based on a shared sense of destiny. It is incumbent on us all to make sure the latter prevails.

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