Issues in Informing Science + Information Technology

An Official Publication of the Informing Science Institute InformingScience.org

IISIT.org

Volume 15, 2018

THE ROLE OF INFORMING SYSTEMS IN SECURING SANITY AND WISDOM OF THE GLOBALIZING SOCIETY IN THE CONTEXT OF CIVILIZATION SUSTAINABILITY IN THE 21ST CENTURY: THE CASE OF POLAND

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ABSTRACT

Aim/Purpose	To monitor the Sustainability Development Goals (SDG) established by the United Nations through the hierarchical architecture of informing systems
Background	The paper discusses the case of Poland and its Gdansk region.
Contribution	The solution combines the big-picture of civilization with the small-picture of regions, cities, and firms.
Findings	The presented solution can be implemented if the political will can be secured.
Recommendations for Practitioners	Take the main idea of this paper and adapt to your local case.
Recommendation for Researchers	Develop some prototypes of presented informing systems and test in your local environment.
Impact on Society	The success of the sustainability of globalizing society can be secured if the coherent informing systems can be applied to the planning, monitoring, and implementation of the UN's universal SDGs.
Future Research	Work on the modeling costs and benefits of the presented solution.
Keywords	sustainability, globalizing society, sustainability development goals, informing systems, population bomb, ecological bomb, strategic resources depletion bomb

Accepting Editor: Eli Cohen | Received: January 19, 2018 | Revised: February 19, 2018 | Accepted: February 20, 2018.

Cite as: Krawczyk, H., & Targowski Targowski, A. (2018). The role of informing systems in securing sanity and wisdom of the globalizing society in the context of civilization sustainability in the 21st century: The case of Poland. *Issues in Informing Science and Information Technology, 15,* 97-107. https://doi.org/10.28945/4013

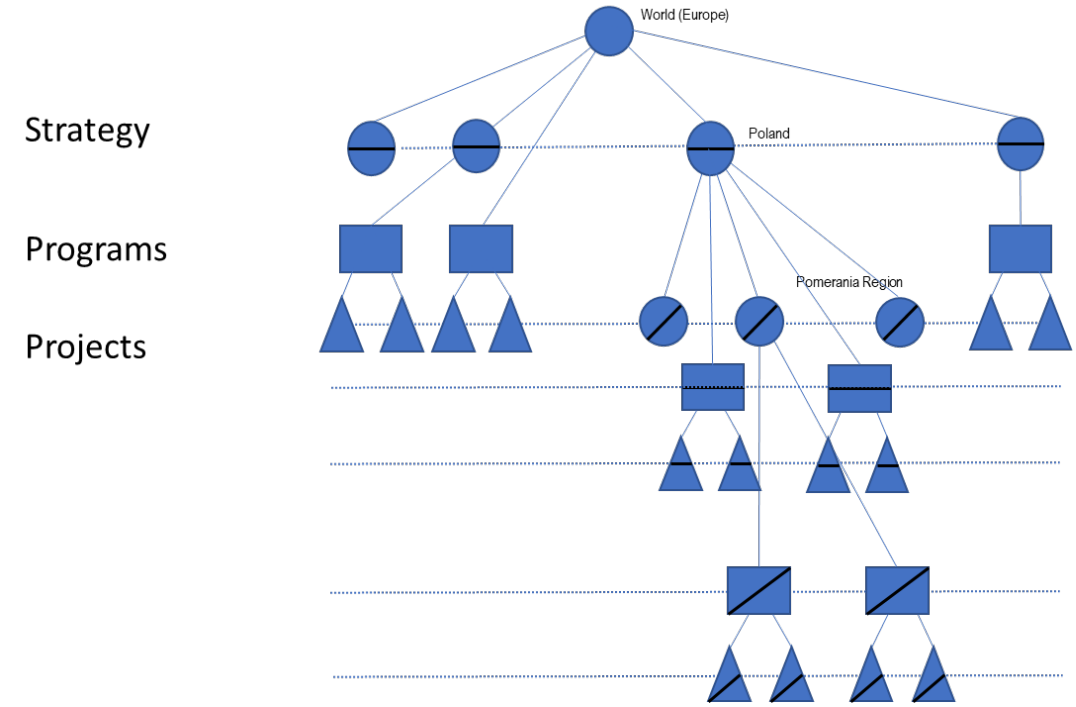
INTRODUCTION

This position paper suggests using big data in the framework of informing systems to implement the UN Sustainable Development Goals (UN SDGs). It describes how a percentage of GDP could be used to fund projects that would allow global progress towards these goals. It also illustrates how Poland could implement the presented procedure and how the hierarchical architecture of informing systems can support the Polish executives. The case of Poland can be applied in other countries beyond Europe like in Asia, Africa, and America. The paper is written for those specialists who would like to use information technology in big-picture-oriented projects for sustainability of a company, city, region, nation, continent, or/and the world. The presented concept-driven solutions require some pilot projects to be undertaken to tests in a more detailed manner different technological and societal approaches.

Nowadays, Global Society's (as defined in the UN SDGs) development causes quantitative and qualitative changes in its functioning, that is monitored by hand or computers by many governmental and NGO agencies (including the UN) to eventually help the society to realize its aims, strategies, and states of affairs better. The monitoring function of UN SDG's accomplishment should increase executives awareness of new needs, improve the ability to harness the available societal tools such as politics, knowledge, wisdom, and skills, and provide a proper understanding of modern social and technological trends or formulation of more precise laws and regulations. Also, is very important to efficiently convey different forms of data, concepts, knowledge, and wisdom from one generation to the next. Why? To inform the subsequent generations about what to do with the undestroyed civilization that is left. Societal development is governed by many factors, which reflects achieved so-called progress. In consequence, it may mean perhaps higher creativity, better work organization, higher productivity and effectiveness, reasonable resource exploitation, or, finally, more top quality of life. The desired societal development can be stimulated by government initiatives through special programs and policies. Besides, some new agencies or organizations should be created to support monitoring, overseeing and realization of the projects compatible with government programs and the society's expectations. Figure 1 shows the strategic developmental tree for the global national and regional levels. It can be the whole world (or only Europe), Poland and Gdansk region respectively.

There are many approaches that can support the layer-oriented strategies for societal improvements. However, the general idea is unique, (see Figure 2) independently if we consider global national or regional society. In the development cycle we distinguish three main steps:

- Monitoring allows us to collect data describing the current state of societal development. In these data, we can discover knowledge (rules) and wisdom (choices) about society and civilization and their problems.
- Planning of further development strategy can be based on obtained knowledge and wisdom and consist of some programs, which define new goals for society. The programs are executed in implementation steps, by the best projects selected from many submitted proposals. The developmental strategy is described for five or more years, and during its implementation, we can monitor assumed programmed directions and achieved project goals. If development significantly departs from the assumption, some corrections must be defined and implemented.
- Implementing of planned goals and strategies



Symbol Meanings:

- global, national, regional **strategy** respectively
- global, national, regional **programs** respectively
- global, national, regional **projects** respectively

Figure 1. Strategic development trees for different levels of activities triggered by the globalization challenges

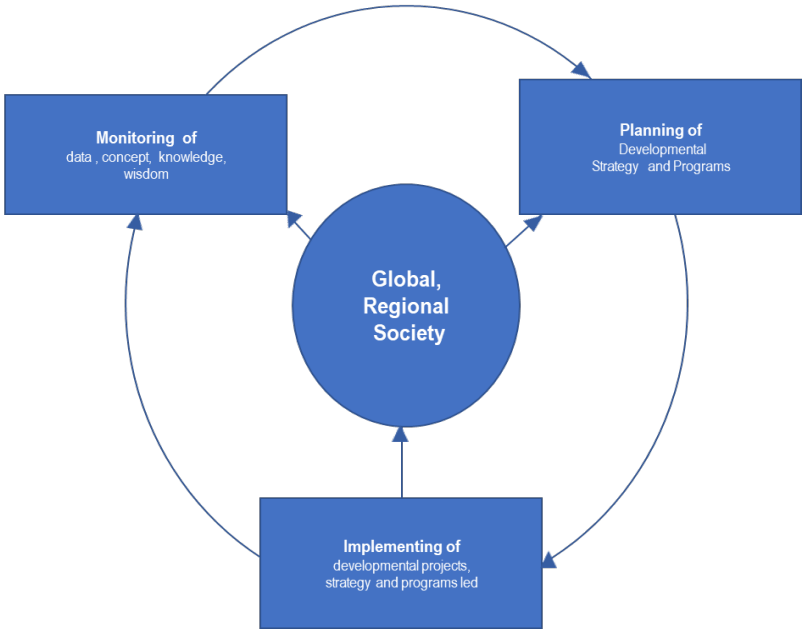


Figure 2. The five years-oriented Development cycle of society-oriented strategy, programs, and projects

All these steps are performed in a sequential and parallel way to control the proper execution of strategy. The development cycle can and should be re-executed periodically from one to the next specific points following from projects milestones. In that way, we can control and check the progress of several projects.

The European Union's Development Strategy-Europe 2020, accepted by The European Council in 2010, assumed intelligent and sustainable development based on the social market economy. Its essential aspects include robust economic growth, high level of employment, high productivity, and social cohesion. The primary goals of that strategy aim at the significant reduction of energy consumption, global climate protection, wide-ranging education, and increasing financial expenses on R+D. Besides these targets, additional challenges are noticed, such as growing social inequalities, saturated economy, and the necessity to successfully apply of vital technologies.

Poland tries to adopt this development strategy. Presently Poland took this new EU's strategic plan called in Poland as the Strategy in favor of Responsible Development from 2020 to 2030. Poland expects that this strategy should impact the human and social capital, as well as expand digitalization of societal information systems, transport, energy, environment and national security. Presently five pillars (domains) of the economic development in Poland are proposed as follows:

- Re-industrialization,
- Development of innovative companies,
- Growth of capital for R & D,
- Foreign trade expansion, and
- Social and regional development.

Based on these pillars some strategic programs and projects are defined and initiated throughout the globalizing Polish society. Consequently, after preparing the national programs for each domain, several projects are starting to work. A similar approach was implemented for all regions, and also for big Polish cities. Needless to say that these goals and strategies can or even should be used beyond Europe in Asia, Africa, and America at the level of countries belonging to these continents.

The strong planning of the strategies, adequate definition of the programs, and selection of the best project is significant to achieve success. In such cases, human factors play an essential role. Besides, it must have the necessary budget appropriation and other resources such as modern technological tools. The high dynamic of technological destructive innovations cause that what today is innovative, tomorrow will be out of date. Therefore, risks of programs and projects are still increasing, and alternative solutions must also be taken into account. In the paper, we limit our consideration to only the impact of information technologies (IT) on some aspects of this strategic development of the globalizing society in Poland.

Everyone knows today that the accelerated development of information technology is changing our lives tremendously. The current trends are about the transformation of the global world into one global society as is shown in Figure 3. Three main aspects are more visible and play an essential role in such a transformation; they are as follows:

- Interconnection of various information (Maracas & O'Brien, 2007) and informing systems (Cohen, 1999; Targowski, 2016) allowing one to take on execution of integrated actions,
- Definition of common, shared goals that can be accepted in programs and consistently implemented by strategic projects,
- Choice of consistent criteria which lead to the sustainable development on each level of planned global-oriented activities.

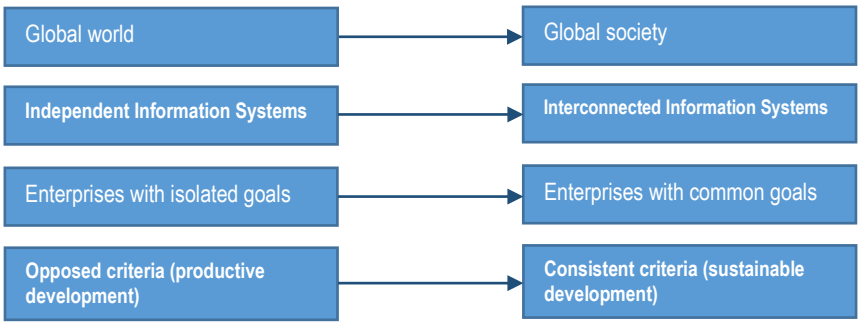


Figure 3. The transformation of the globalizing world into the globalizing society

In the paper, we will show how to control transformation from a globalizing world to globalizing society. By sanity, we consider the positive and essential mental feelings about the well-being of an individual, group. and the society due to well-functioning monitoring by the complex of informing systems. The sanity approach considers all threats to society, to eliminate them to obtain safe and wise solutions. By wisdom, we mean human decisions taken on the base of good knowledge-supported judgment and choice. These approaches should help in the planning, monitoring, and implementation of the developmental strategy for Poland.

THE DEVELOPMENTAL THREATS VERSUS SUSTAINABLE DEVELOPMENT GOALS

The development process of this magnitude is very complicated and challenging to implement, even if the goals and objectives of the strategy are well defined. On the one hand, we can control the strategy implementation course; on the other hand, we meet many barriers which may lead to the failure of our strategy, programs, and projects if these obstacles won't be eliminated on time (Kleer & Kleiber, 2015). For instance, on the global level, there is continuously a gap between rich and poor. Furthermore, the group of old people is still increasing and impacting the employment structure. Moreover, there are organizational drawbacks and bureaucratic hurdles that usually exist and play a negative role in such undertakings as these which we present here.

As it was argued above, people and their attitudes and behavior, as well as the leaders' culture and commitment, play an important role in the globalizing society's sustainable development. They can create innovative solutions and break all natural and artificial barriers. But also, they can create other unexpected new barriers due to their hidden preferences. Hence, conflicts, unethical behavior, lobbyists' influence, and so forth can delay the project realization activities and, in consequence, lead to the loss of resources such as time, money, quality, and reliability and indeed the reputation.

Figure 4 identifies the first civilizational threats to contemporary globalizing society's development as follows:

- Human cognition and behavior – data, knowledge, knowledge, and wisdom (Mackenzie et al., 2016; Targowski, 2009) about the constraints of the sustainability are incomplete and questionable by many politicians who provide the weak will to offer sound policies on how to secure the sustainability of our civilization.
- The negative technological impact is almost neglected nowadays. Treating the development of artificial intelligence as the tremendous human achievement but not as the threat of a labor-free economy which will replace human labor by machines, transforming humans into idle unnecessary creatures.

- Population Bomb – By 2050 the population should reach about 10 billion people (Department of Economics and Social Affairs, 2017) while the carrying ecosystem's ability of the Planet is approximately 8-9 billion people (Ehrlich 1968).
- Ecological Bomb – the overpopulated Earth is steadily losing its healthy environment characterized by fresh air and water due to the industrialization, which needs more and more wood and water (Friedman, 2014). Water is rationed in some Chinese regions as well as in some American states like California. Also, Poland with many rivers has the fresh and clean water volume smaller than Egypt's (Szczerbak, 2014).
- Strategic Resources Depletion Bomb – due to super-consumerism, our civilization has reserves of oil and uranium for only 50 years. Unfortunately, the alternative energy is very slowly growing because of its controlled supply to the market by the oil industry's interest in keeping the status quo.

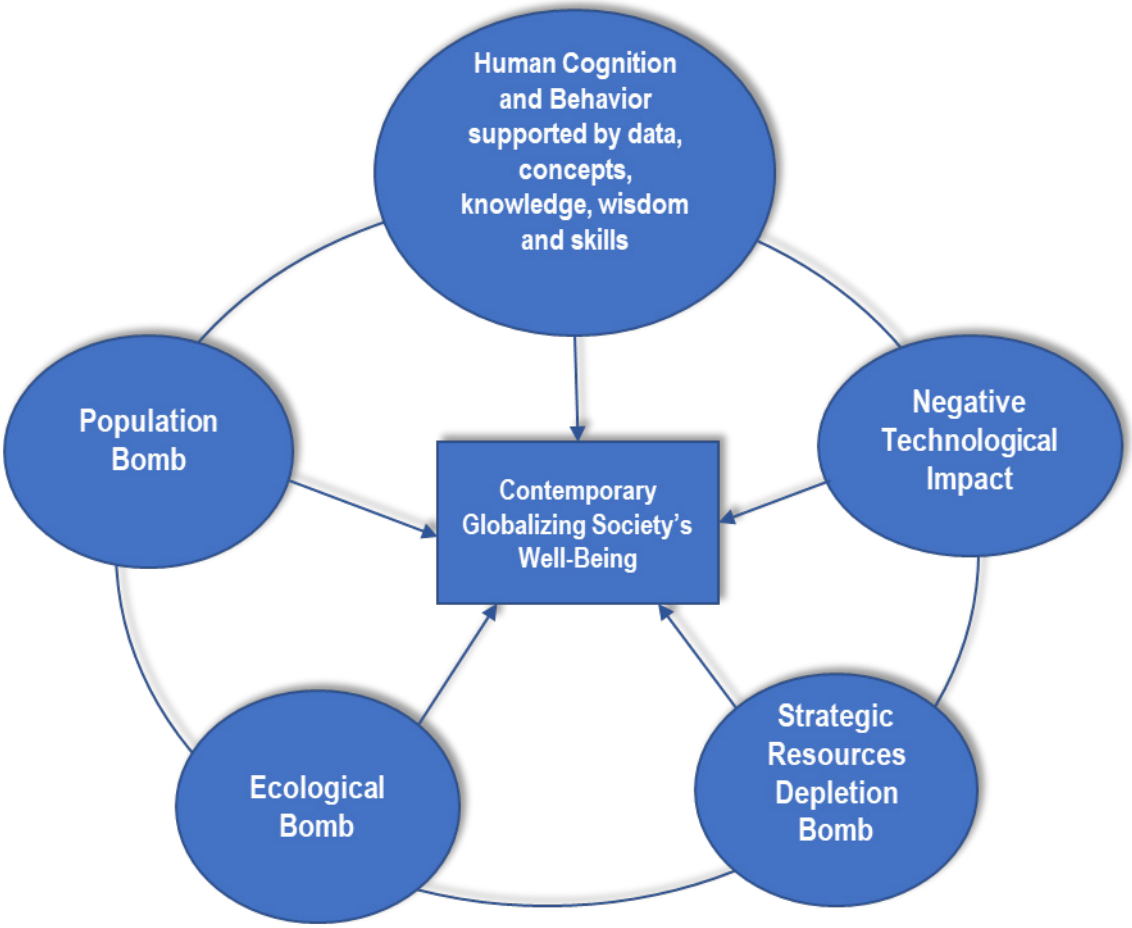


Figure 4. The main civilizational threats to contemporary globalizing society's development
(Targowski, 2009, p. 404)

Technological aspects may also, like human ones, have an ambiguous significance. Key technologies may lead to innovative solutions and significantly impact the competitiveness of a firm, region, city, or nation in the globalized market. However, such effects as the digital divide, access to low-quality data, or cybersecurity problems are severe barriers to the deployment of some advanced digital technologies, which will make projects fail or blossom. Some sane and wise decisions may create some new difficulties and obstacles. Furthermore, some production processes may be not ecological and

causing degradation of the natural environment. Taking into account exploration of natural resources, we should be aware that resources of clean water, green areas, and strategic minerals are not unlimited. For instance, Africa needs to protect its forests, its soil, and its resources from the plundering of developed countries, like Western Europe and the U.S. used to do and China does today. We also observe the quick growth of human population, which can create many social problems (e.g., widespread hunger and lack of hygiene or uncontrolled migration). The main threats should continuously be analyzed, and safe and wise solutions should be included in the development projects and their updating.

THE ROLE IN THE GLOBAL DEVELOPMENT SCENARIOS OF NATIONS AND THEIR REGIONS

The sustainable development strategy offered by the United Nations is guided by a set of 17 Sustainable Development Goals (SDG), and they should be implemented and achieved in every country (including Poland) between the years 2016 to 2030. They are as follows (United Nations, 2015):

1. No poverty
2. Zero hunger
3. Good health and well being
4. Quality education
5. Gender equality
6. Clean water and sanitation
7. Affordable and clean energy
8. Decent work and economic growth
9. Industry innovation and infrastructure
10. Reduced inequalities
11. Sustainable cities and communities
12. Responsible consumption and production
13. Climate action
14. Life below water
15. Life on land
16. Peace, justice, and strong institutions
17. Partnerships for the goals.

These 17 SDGs are structured into 169 targets, and each target has 1-3 key performance indicators to monitor progress in accomplishing these targets and eventually these 17 goals.

It is estimated that to accomplish these goals one must spend worldwide about 2-3 trillion US dollars per year. Is it too much? The world GDP is about $80 trillion ("Gross world product," n.d.). It means that the radical improvements of the contemporary globalizing society may cost only 3-4 % of all people's work effort. It is a very inexpensive strategy. Its cost almost equals the amount of money taken by the corruption processes worldwide.

In each country, the government should translate these goals into national legislation and develop a plan of programs and projects and their activities (see Figure 1). The next step leads to the establishment of the detail budgets, and so forth. Moreover, some other considerations, such as what are priorities of strategic projects or to how to save money spending on such activities, should also be considered. Some suggestions according to economic savings are as follows:

- The best solutions cases should be principally applied as the gold pattern for others
- The prepared projects should be complementary, but not repeatable
- The existing problems should be eliminated by the decisions mostly from the top.

- The application of IT technology [such as Information Systems (Maracas & O'Brien, 2007)] is strongly recommended to obtain rich monitoring-driven information about the state of the well-being of the globalized and sustainable society in a given country, region, city, and community.

In the following parts of the paper, we are going to concentrate on the last suggestion provided above. We will consider how to integrate information and informing systems to support sustainable development-oriented management.

INFORMING SYSTEMS ARCHITECTURE - TO STIMULATE RESONANT CHANGE IN THE SANITY AND WISDOM OF THE GLOBALIZING SOCIETY

To implement the Sustainability Development Goals in the world, one must spend about $3 trillion annually as it was estimated above in this paper. Assuming $1 million per project as the average fund, one can perceive about 3 million projects in the worldwide-oriented management system. It is very doubtful that these projects will be coherently implementing these SDG. Furthermore, let us say that Poland will be ambitious and spend 3% of its GDP = $500 billion. It means that the total funding should be in the range of $20 billion annually. This amount should support about 20,000 projects implementing these SDGs. Without the computerized system, it will be impossible to manage coherently such large number of projects. Even if the "dreamed" amount of money would be assigned, it will be wasted, and perhaps some of it will also be corrupted.

Therefore, to implement a sustainable approach in the Globalizing society, we can use different kinds of information and informing systems that can support all three steps of the development cycle (Figure 2). In monitoring steps, some indicators (related to SDGs) should be defined to recognize current situations well. Then we should collect the suitable data about realized projects and their results. Based on such data we can create the following: BIG Data, information (change), conceptual state of SDG (normal, conflict, success, crisis, failure as the concept of the situation), knowledge (establishing rules and trends), and wisdom (best cases) about actual patterns versus real developmental trends.

The informing systems (Cohen, 1999; Travica, 2014) architecture depicted in Figure 5 (Targowski 2016) should support the quest for the stimulated resonant change implemented by the executive who is responsible for a given goal's performance. To be sanity and wisdom-oriented, the architecture of informing systems should include the management dashboard (MD) for top decision-makers at all levels of the globalizing society. This MD should monitor in real-time the processes of civilization's sustainability defined in the SDGs. Today the monitoring is provided in many disturbing publications with statistics which are addressed to everybody, but usually, there is no authority which could implement the monitoring message in the user environment responsibly.

The center for informing systems in the case of the Gdansk Voivodship is under consideration, and perhaps it can be located at the Gdansk Technological University, where the Center for the Competence of Novel Architectures of Workable Applications is involved on research and development in multidisciplinary projects (Krawczyk, 2015).

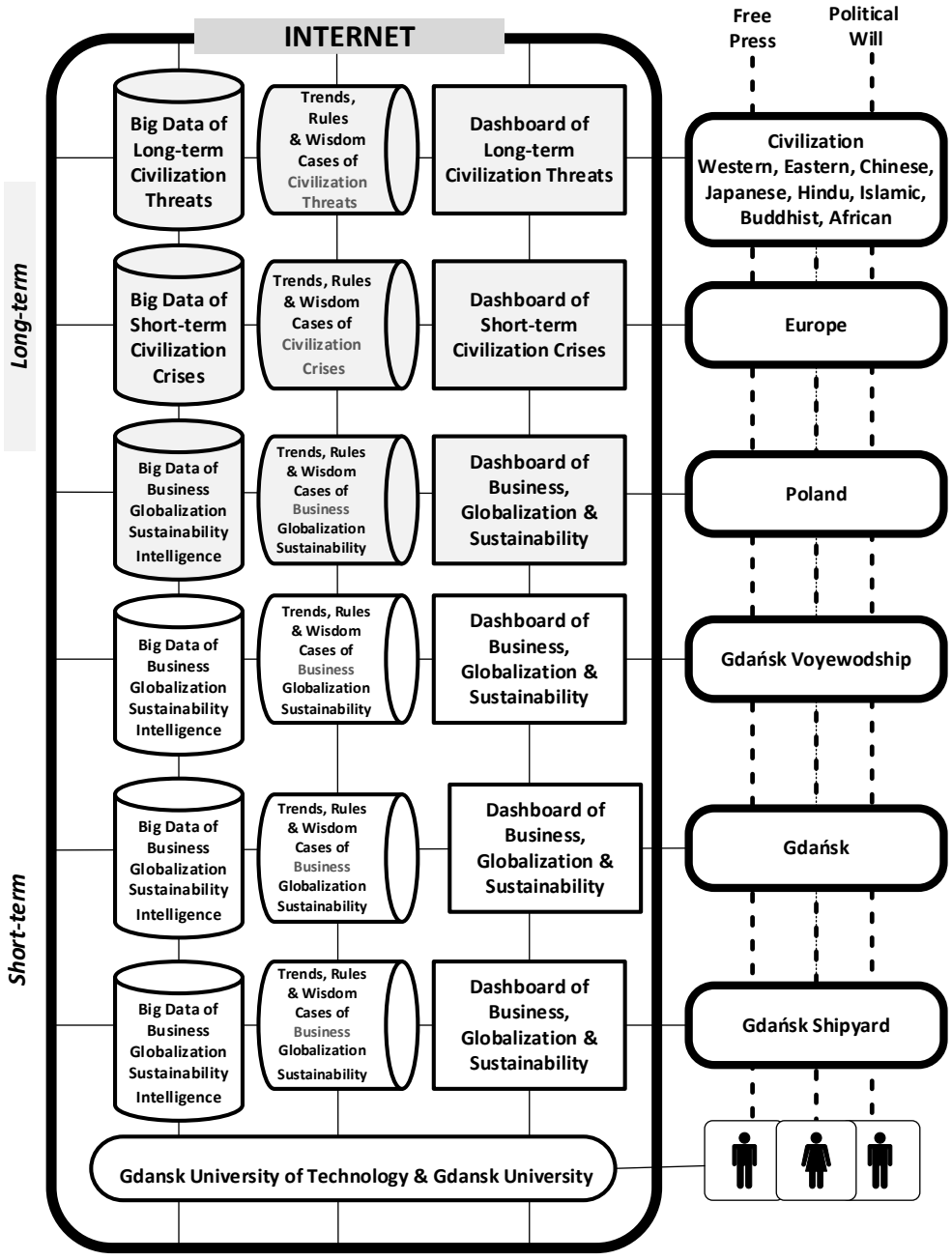


Figure 5. The Informing System Architecture of Wise-sustainable Civilization, the Case of Poland (Targowski, 2016, p. 169)

CONCLUSION

The New World Order characterizes the current state of civilization after the end of the Cold War in 1992. It eventually leads to the remaking of the world order through the Clash of Civilizations (Huntington, 1996). The removal of the Iron Curtain led to the success of free trade worldwide and the development of the Internet, which triggered the Globalization Wave and Global Economy. In the rapid growth of outsourced production to labor-cheap countries, the supply of goods is fast and

vast. It leads to super-consumerism and the fast depletion of the strategic resources. Hence, the remedy is in the strategy of sustainable development of civilization to avoid its failure.

The United Nations offers a set of 17 Sustainability Development Goals which should launch millions of projects implementing these goals. At the level of one mid-size country, it may lead to thousands of such projects. To achieve them successfully one must support them by the Architecture of Hierarchical Informing Systems as it was proposed in this paper.

However, these informing systems must have their users which should be designated executives at each level of the management ladder of a country, region, and the world. For example, in the Gdansk, such a center in some sense is The Centre of Competence of Novel Infrastructure for Workable Applications for Pomerania Development Strategy.

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BIOGRAPHIES

Henryk Krawczyk is a professor and f. president of Gdańsk University of Technology (2008-2016). He published over 350 publications including papers in IEEE Trans. on Computers, Euromicro, Lecture Notes in Computer Science, chapters in books issued by Chapman and Hall, LNH Elsevier, Nova Science, Springer – Verlag and presentations in many IEEE conference proceedings and also scientific lectures given in many universities such as University of Oulu (Finland), New Hampshire University (USA), University of Basrah (Irag), Izmir University (Turkey), Autonomous University of Barcelona (Spain), Bristol University (England), Nova University of Lisbon (Portugal), Lecee University (Italy) and the book entitled Analysis and Testing of Distributed Software Applications issued by RSP London in cooperation with John Wiley & Sons.

Andrew Targowski is professor emeritus, a Polish-American informatician specializing in enterprise computing, societal computing, information technology impact upon civilization, information theory, wisdom theory, and civilization theory. One of the pioneers of applied information systems in Poland, he is an executive, university professor, scientist, civilizationist, philosopher, visionary, writer, and generalist. In Poland he is known for developing a computerized the social security number (PESEL, 1972–74) for 38 million citizens,[4] a prototype of INFOSTRADA (1972–1974), and authoring of the first books on applied information technology in business, economy, and society. In the United States he has developed one of the first digital cities in the U.S., teleCITY of Kalamazoo, Michigan (1992–1996). He concentrated on the cognitive informatics-oriented development of the theories of enterprise-wide system, information, communication, civilization, and wisdom. He published 43 books and 150 scholar papers. He was a Chairman of Advising Council of the International Society for Information Resources Management (1995-2005) and a President of the International Society for the Comparative Study of Civilizations (2007-2013).