MANIFESTO

DIGITAL REFORM OF THE ECONOMIC SCIENCE

ITFES

INFORMATION TECHNOLOGIES AND THE FUTURE OF ECONOMIC SCIENCE

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22nd SEPTEMBER 2019

The proposed *Digital Reform of the Economic Science* refers to the process of creating, developing, and disseminating – both theoretical and applied – the functional programming constructs of a new generation of digital technologies for managerial modeling of the economy of enterprises for machines. A six-month course of study, both theoretical and applied, on the functional programming constructs of this new type of software would help acquire a new kind of knowledge and understanding of the economic management of the enterprise for machines. An understanding that would compare much more favorably to that acquired after a complete degree in economics at any leading university, both in terms of validity and in terms of practicability for the real industrial world.

The idea of *Digital Reform of Economic Science* is based on six disregarded evident facts and one little-known fact.

1st disregarded EVIDENT FACT:

The industry for machines is a leading industry of paramount importance for the development of all other industries.

The industry for machines is comprised of numerous enterprises for machines that provide machines and spare parts to all industries as well as household machinery. In addition, this industry provides various services, such as repair and maintenance services of machines, and in some cases even modernization of various machines among many others.

It is perfectly clear that today the industry for machines represents the basis for the operation and development of all other industries.

It is enough to imagine our modern global world with no machinery – no household appliances such as cookers, fridges, washing machines, air-conditioners, etc.; no transport vehicles such as cars, trains, airplanes, and so on; no agricultural machinery; no textile industry or food industry machinery; no medical machinery; no smartphones or computers; no machines whatsoever.

If some unknown force suddenly wiped out all machines in our contemporary world, this would lead to a devastating calamity comparable to a nuclear war.

Furthermore, the industry for machines is a *meta-industry*: not only does it provide machinery for all other industries, but it does so for itself as well.

These facts establish the industry for machines at the highest, supreme rank among all other industries.

2nd disregarded EVIDENT FACT:

The scientific understanding of the ontological model of the economy of the enterprise for machines is the most significant knowledge and task of economic science; this designates it as a "fundamental scientific knowledge of economy."

The entire global collection of enterprises for machines can be compared to the global population. Each individual person is unique, but the blueprint of the human body is the same and can be understood through the ontological model of the human – widely known as the anatomical and physiological model of the human body.

The same holds true for all enterprises for machines – they are all unique; however, the makeup of each one can be understood through the knowledge of the ontological model of its economy. After 2010, this ontological model gained scientific popularity under the term "business model ontology."

Knowledge of an ontological model of the economy of the enterprise for machines does exist. It is commonly known as 'double-entry bookkeeping' and was conceived over 500 years ago by an Italian monk by the name of Luca Pacioli.

This scientific knowledge of the double-entry bookkeeping model of the economy of the enterprise has been invaluable to date, yet as early as the last decades of the 19th century, it was found to suffer from great shortcomings with respect to managing the effectiveness of the industrial economy (specifically, the effectiveness of industrial labor) in the context of the Industrial Revolution. Practical necessity gave rise to three engineering waves, which aim to remedy some of these shortcomings.

3rd disregarded EVIDENT FACT:

The history of the fundamental scientific knowledge of economy clearly shows three engineering waves of its development, all originating in the USA.

The first engineering wave in the development of the fundamental knowledge of economy dates back to the 1890s up to the 1920s. It involves the creation, development, and dissemination of knowledge of operational modeling of processes in the enterprise. This wave is associated with the names of the US engineers Henry Robinson Towne and Frederick Winslow Taylor.

The second engineering wave in the development of the fundamental knowledge of economy covers the 1930s, 40s, and 50s. It involves the creation, development, and dissemination of knowledge of production management focused on quality. It is associated with the names of the US engineers Walter Andrew Shewhart, William Edwards Deming, and Joseph Moses Juran.

The third engineering wave covers the 1970s, 80s, and 90s. It involves the creation, development, and dissemination of knowledge of computer-integrated modeling of the sales, production, and supply processes.

The key concepts for the knowledge of this computer-integrated modeling are MRP I (Material Requirements Planning) and MRP II (Manufacturing Resource Planning). MRP I refers to a knowledge of computer-integrated modeling of the sales, production, and supply processes without taking into account the production capacity of the enterprise. MRP II refers to the same type of knowledge; however, also considering production capacity.

This third engineering wave of development of the fundamental scientific knowledge of economy stems from the work of two IBM engineers – Joseph Orlicky and Oliver Wight.

In the early 1990s, Gartner employees introduced the concept of ERP (Enterprise Resource Planning) as a vision for the upcoming development of the MRP systems. They claimed that the ERP systems were a new generation of MRP systems, which integrated a set of specialized enterprise software applications for digital modeling of the management of finance, human resources, distribution, manufacturing, supply chain, services, etc. ERP tools (both MRP systems and business applications) should share a common digital process and database.

The approach of integrating many and diverse business applications to the classic MRP system has ensured the exceptional market success of the current ERP software (worth over 500 billion US dollars per year). However, this approach leads to the significant departure of the functional constructs of all modern ERP systems from the cognitive universalism, which is inherent in the functional construct of every pure, application-free MRP system. This departure from the cognitive universalism hinders the development of this type of system as an indispensable means of addressing the major flaws of the fundamental scientific knowledge of economy.

4th disregarded EVIDENT FACT:

Compared to the fundamental scientific knowledge of medicine, the fundamental scientific knowledge of economy is still at a "medieval" level, and therefore, it still has major functional flaws.

A closer look at the current fundamental scientific knowledge of economy will show that it comprises numerous and conceptually different elements that are unrelated in terms of content. For instance:

(1) knowledge of accounting modeling, (2) knowledge of productivity and quality management, (3) knowledge of planning and control, (4) knowledge of human resources (HR) management, (5) knowledge of change management, (6) knowledge of project management, (7) knowledge of crisis management, (8) knowledge of business modeling, among many others.

It is clear that these elements do not form a robust and monolithic foundation for economic science, in the form of a systemic universal model of the enterprise for machines, unlike the foundation that was developed by medical science at the very beginning of the Renaissance (in the form of a systemic anatomical and physiological model of the human body).

This means that, in the era of digital information technologies, the fundamental scientific knowledge of economy has only evolved to the level of medieval scholasticism compared to the fundamental scientific knowledge of medicine.

The above is the result of two major flaws intrinsic to the way the fundamental scientific knowledge of economy is commonly taught today:

First major flaw:

The fundamental scientific knowledge of economy does not provide a comprehensive and clear understanding of the principle setup and way of functioning of the enterprise as a systemic **object**. Just as medieval medicine could not provide a systemic explanation of the human anatomy and physiology, so is modern economic science incapable of providing a systemic explanation of the "anatomy" and "physiology" of the enterprise for machines.

Second major flaw:

The fundamental scientific knowledge of economy does not provide an understanding of the principle setup and way of functioning of the enterprise for machines as a systemic **subject**.

In other words, economic science does not provide any systemic knowledge of the nature and meaning of collective, and therefore, of individual professional responsibility for sustaining the operation of an enterprise for machines.

These major flaws have a strong negative impact on the development of the human capital in the industrial sector of the Western world. This negative impact is amplified by the fact that modern economic science denies the historically proven culturally traditional understanding of the world:

(1) it rejects the nature of the Man as a Maker and a Creator in the image and after the likeness of God, (2) it rejects that human virtue is the primary source of economic activity, (3) it rejects that the unity of human labor is the foundation of economic efficacy.

5th disregarded EVIDENT FACT:

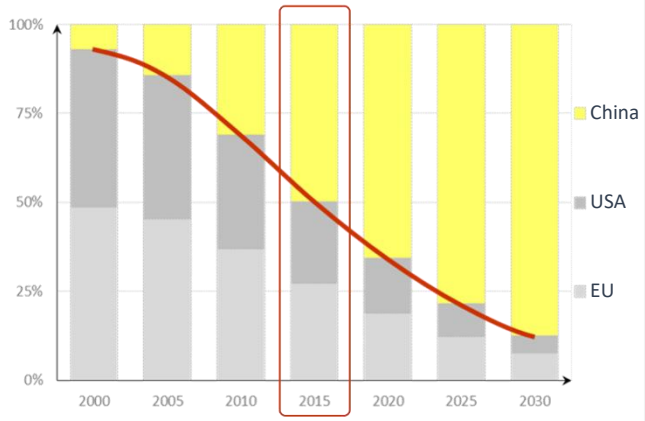
The flaws of the fundamental scientific knowledge of economy lead to unfavorable development of the human capital in the Western world.

These flaws keep the fundamental scientific knowledge of economy in a state of utter helplessness in regard to a significant economic and political cognitive deficit. This deficit is expressed by the lack of high-quality scientific knowledge for strategic management of the educational and scientific research systems.

This deficit underlies the overall inability of Western social scientists and political elites to develop and implement truly effective strategies for achieving national security by devising and implementing strategies for the constructive and morally responsible development of the physically available workforce of their nations. These should be concise and comprehensible strategies, instilling reasonable faith and hope for the fair and decent economic future of these nations in the future global world.

The overall inability of the social scientists and political elites of the Western world is manifested in the comparison of the development of the combined workforce potential of the USA and the EU to that of China within the field of machine engineering technologies.

The technological labor force parity between the West and China, as seen in late 2015, might have been slightly exaggerated; however, the exaggeration is in favor of the West. The truth is that China, in regard to the workforce potential in the field of machine engineering, is already ahead.



Trend of development of Western and Chinese technological elites.

If this process – as unpleasant as it is for the whole Western world – does not happen to lead to a world war in the coming years, by the end of 2030, the positions from the early 21st century will have swapped.

In line with the theory of "knowledge economy" and its inherent idea of deindustrialization, for more than two decades now, the Western world has been purposefully discouraging the development of the engineering human capital of the Western world. At the same time, the Western world has been mass-producing a range of social workers, social science professionals, and above all others, professional economists. And this is even more reckless.

It is reckless because some of the finest young people of the West are becoming professional economists. After four, five, or more years of study at leading universities, these people can write brilliant theoretical essays on the topic of economy, but none of them can actually give a decent explanation of the objective meaning of the term "economy." They are even less capable of explaining a perfectly clear construct – the universal, principle setup and way of functioning of the enterprise for machines in its capacity as an **object** and a **subject**.

It turns out that the Western educational system has been turned into a machine for intellectual and professional distortion of its most valuable human resources. It sounds absurd, but this is a fact. A fact that presents a grave issue for the future of the Western world.

6th disregarded EVIDENT FACT:

The problem with the unfavorable development of the human capital in the Western world has only one reasonable SOLUTION: the development and widespread study of a new type of ERP systems - holistic ERP systems.

Today's digital information technology market offers a wide range of different ERP systems. Alongside these, there is a similar in nature wide range of technology parks engaged in designing and subsequently developing these ERP systems.

The process of designing and developing ERP systems involves the employees acquiring specific, as well as general, knowledge of the systemic setup and way of functioning of various types of enterprises, including enterprises for machines.

Through this process, every employee possessing the intellectual capacity to generate such knowledge independently would inevitably be able to describe the nature of an enterprise for machines using the following three common projections:

First common projection:

Every enterprise for machines is a **subject** that, in turn, belongs to a set of **subjects,** all of which – in their capacity as customers and/or suppliers of machine engineering products and/or services – collectively make up a logical fragment of the global industry for machines.

Second common projection:

Every enterprise for machines is a systemic **object** which comprises a set of **objects** defined as capital assets, some of which are owned, others - borrowed.

Third common projection:

Every enterprise for machines exists in its capacity as a systemically and continuously realized **object** by retaining and re-allocating (altering) its capital assets through the coordinated operation of five technological systems.

1) Technological system for Sales;

2) Technological system for Production;

3) Technological system for Supplies;

4) Technological system for Financing;

5) Technological system for Implementation of the Technological Environment of the enterprise.

If these three conclusions are analyzed thoroughly at the level of a technology park and are then employed in a capacity of a cognitive foundation for the development of the functional construct of a new type of ERP systems ("holistic" ERP systems), this would mark a return of this class of digital systems to the cognitive universalism that they were initially designed to have. This type of system should have exactly seven functional subsystems, ordered and defined as follows:

1) Functional subsystem “Subjects”;

2) Functional subsystem “Objects”;

3) Functional subsystem "Implementation of the technological environment";

4) Functional subsystem “Sales”;

5) Functional subsystem “Production”;

6) Functional subsystem "Supplies";

7) Functional subsystem "Finances ".

These seven functional subsystems are just a first step in building the functional construct of this new type of ERP systems. The most important factor is that these ERP systems incorporate knowledge about managerial modeling of the professional development of people who can comprehend the enterprise as a systemic object and subject and, therefore, can bear the responsibility for introducing innovative changes to its development. Incorporating such knowledge would turn this new type of ERP system into the most effective, feasible solution to the conundrum of the current, unfavorable development of the human capital in the Western industry for machines. This is true due to the fact that several months of study, both theoretical and applied, of the functional construct of such a digital system would result in knowledge about the economy of the enterprise for machines that is much more valid and applicable than the knowledge that can be formed after several years of diligent study of microeconomics at the most prestigious, specialized universities.

All that is needed is for these digital systems to be studied on a mass scale.

Naturally, questions arise:

What is the condition of the technology parks currently engaged in designing a prototype of a holistic ERP system? Have any of these parks made a major breakthrough in designing such a prototype?

This leads us to one little-known fact.

One little-known FACT:

In Bulgaria there is a technology park, which through its working core, operating under the name of "Institute for Systemic Economic Engineering" (abbreviated "ISEE"), made a remarkable breakthrough in designing an effectively functioning prototype of a "holistic" ERP system.

The groundwork of the "ISEE" – as a working core of an actual Bulgarian technology park for strategic innovations in the field of fundamental scientific knowledge in economy – was laid in early 1998, when two small Bulgarian companies agreed to cooperate in order to develop a unique IT product for modeling industrial enterprises and systems.

One of the companies had its roots in a software engineering school that was one of the most successful programming schools in Bulgaria in the mid-1990s. The company employed three gold medallists in international programming competitions. Working jointly with four other software engineers, they were involved in completing software development contracts for insurance companies, commercial enterprises, and banks.

The other company was a special venture. It brought together the ideas of two mathematicians and two machine engineers with somewhat unconventional interests and a talent for studying the practical efficiency of the scientific knowledge of economic management of an enterprise. They were well aware of the two major flaws of the fundamental scientific knowledge for managerial modeling of the industrial economy and believed in designing an IT solution that could integrate an improved quality of knowledge - knowledge that explains, complements, and substantively replaces the current scientific knowledge for managerial modeling of enterprises for machines, which can be considered the main building blocks of any well-developed national economy.

The above concept was enthusiastically embraced by the software developers and led to the decision to merge the two companies. The idea for such an IT solution became a shared strategic goal underpinning the 20-year operation of the "ISEE".

In pursuing this goal, the "ISEE" went through three stages of cognitive development.

During the first stage, the "ISEE" developed a cognitive platform designed to provide an understanding and perception of the enterprise for machines as a **systemic object.** Subsequently, based on this platform, the first version of the IT solution for modeling the enterprise as a **systemic object** was designed and launched. This first cognitive platform was called **"The Industrial Cross**."

During the second stage, the "ISEE" developed a second cognitive platform dealing with the meaning, essence, and hierarchy of the knowledge necessary for the existence of the enterprise in its capacity as a **systemic subject**. On this basis, a second version of the IT solution for managerial modeling of the enterprise for machines as a **systemic object and subject** was developed and rolled out for use in scientific research. This second cognitive platform was called **"The Tree of Industrial Cognition".**

During this third stage, the "ISEE" designed its third cognitive platform. It supplemented and deepened the understanding of the enterprise as a **systemic subject**. Based on this platform, the third version of the IT solution for managerial modeling of the enterprise as **a systemic object with a systematically implemented subjecthood** was developed and rolled out for use in scientific research. This third cognitive platform was called **the "Subjecthood Implementation System**."

During all these years, the "ISEE" continuously carried out secondary research in the academic fields of management consulting and management software, only to determine that academics had not resolved the two major flaws of the fundamental scientific knowledge of economy. The primary research conducted by the "ISEE" demonstrated that the second version of the IT Solution created by the "ISEE" is an indispensable tool for eliminating the first major flaw, and the third version solves the second major flaw of fundamental scientific knowledge of economy.

This third version clearly integrates the understanding needed to create accurate and clear job descriptions. However, it could not be ascertained if this IT solution integrates the effective, practical knowledge necessary to develop the next generation of innovative, technological elites – this conclusion required hard-to-achieve experimental research.

Creating the necessary conditions for this hard-to-achieve experimental research became an integral part of the "ISEE" endeavors in the years following the third stage of development.

After the necessary conditions for the experimental research necessary to determine if the "ISEE" third IT product successfully integrates knowledge for the development of the next generation of technological elites (elites who can thoughtfully and deliberately design and develop high-tech industrial systems) were secured, the experimental design was carried out within a year and a half. The results of this experiment are very impressive.

The success of this last experiment, along with the results of all the previous experimental research, leads to the indisputable fact that it is possible to create IT products that integrate improved-quality, even flawless, knowledge for the fundamental scientific knowledge for managerial modeling of the enterprise for machines.

Thus, the "ISEE" legacy to the Bulgarian people, and through it to all Western nations, is invaluable engineering knowledge for the design and development of **holistic ERP systems** as a key tool in addressing the issues of the unfavorable development of the Western human capital.

***The Digital Reform of Economic Science*, considered as a historical necessity and opportunity for a truly rational structural change in the development of global human capital.**

Everything stated above represents an exposition of facts that, for one reason or another, remain beyond the scope of public attention in its four dimensions: industrial, political, scientific, and media. Any substantive analysis of these facts leads to the conclusion that they can be divided into two groups:

The facts of the first group *(positions 1-5 of the Manifesto)* reveal a big problem that threatens our future and the future of the next generations. They also talk about the source of this big problem.

The facts of the second group *(positions 6-7 of the Manifesto)* reveal that our world has a significant potential to solve the problem in question. However, investments in the form of systemic intellectual efforts and financial means are required. On the one hand, investments are required to comprehend this problem and the provided possibilities for its solution, and on the other hand, to lay the foundations and establish a unique institutional structure assigned with the task of solving this threatening problem.

This problem, in the form of a historical decline in the quality of the collective human capital of our Western nations compared to the quality of the collective human capital of the nations of East Asia, can be solved in only one way – by implementing a *Digital Reform of Economic Science*. The *Digital Reform of Economic Science* represents a historically inevitable "Fourth engineering wave" in the development of the fundamental scientific knowledge of economy. Such a wave is essential for the transition of economic science from its medieval to a modern level of development — a key transition for the current stage of the historical development of the global economy. A "Fourth engineering wave" in the development of the fundamental scientific knowledge of economy will bring the nations of the global world, with their elites (media, political, scientific, and economic), to a qualitatively new level of economic enlightenment. Enlightenment resulted from acquiring a scientifically based understanding of the objective meaning of the term "economy" and the universal principle setup of every enterprise for machines as a systemic object and subject.

The implementing of the *Digital Reform of Economic Science* envisages the establishment and development of a "World Complex for Systemic Economic Engineering" as the greatest and last chance for our nations for an honorable technological future in the future of the global world.

The World Complex for Systemic Economic Engineering unites the worldwide multitude of organizations whose activity is aimed at developing and disseminating systemic knowledge for managerial modeling of the industrial economy. Its workforce, which creates the actual structure of the complex, is recognized as "systemic economic engineers."

A systemic economic engineer is a person who, as a result of studying theoretically, terminologically, and practically the functional construct of the new class of ERP systems (holistic ERP systems), acquires knowledge of managerial modeling of the economy of the enterprise for machines, surpassing even the knowledge of the most pretentious professionals in many of their business competencies.

"Systemic economic engineering" and "systemic economic engineer" are the two key concepts in implementing the *Digital Reform of Economic Science* and achieving a cognitive development of global human capital. This change will lead to a significant increase in economic efficiency, a decrease in social tensions caused by today's economic inequality, and a decrease in the ever-increasing risk of a devastating world war.

Forum "ITFES" is the leading initiator of the *Digital Reform of Economic Science* – "Fourth engineering wave" in the development of the fundamental scientific knowledge of economy, which through the holistic ERP systems, will advance this scientific knowledge from the medieval to the modern level of qualitative development. The most important strategic goal of Forum "ITFES" is to attract leading representatives of the economic, political, scientific, and media elites in their role as partners, investors, and associates in this cause.

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The research for this Manifesto included materials from the website of the Institute for Systemic Economic Engineering on: https://isee.bg

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