Conceptual framework and toolbox for digital transformation of industry of the Eurasian Economic Union

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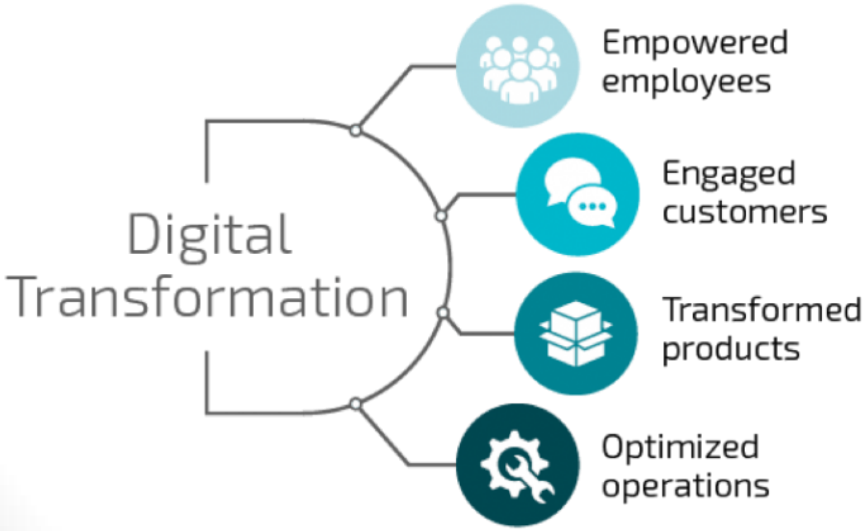
Digital Transformation of the Engineering Industries in the Baltic Sea region
Riga, 30 November 2018

Digital transformation of industry
is seen as

- as a *stage of development* of the national economy which provides an access to a qualitatively different, higher level of technological development;
- as a large-scale national (supranational) *project* involving the implementation of a set of activities for the long term



Digital transformation ≠ informatization (IT equipment)
Digital transformation = changes in the business model, incl. internal business organization,
economic relations within the enterprise
with other economic agents (B2C, B2B, B2G)

https://www.catapultsystems.com/

Why a conceptual & logical framework is needed?

- **What** is Digital Industry?
- **Why** is DI still not there?
- What needs to **happen** for Industry to be come Digital?
- What needs to be **done**?
- **How** can it be done?

- Form the **vision of the perspective structure of the industry built** on the new organizational principles and modern technological base;
- Identify the **systemic problems** of DTI in EAEU
- Reveal the **conditions** for DTI in EAEU
- Formulate the **tasks** of DTI in EAEU
- Develop a **system of tools** for DTI in EAEU and the formation of a single digital industrial space of the EAEU

Principles of digital industry transformation

- **Consistency** in the development and coordination of digital transformation processes;
- **Leading role of the state** as an organizer and coordinator of the digital transformation;
- **Public-private partnership** in the implementation of projects on digital transformation in the economy and social sphere;
- **Harmonisation** of national digital transformation processes with the EAEU policy & key global trends;
- **Scientific approach** towards concepts and projects on digital transformation;
- Understanding the **resource potential** of the national economy;
- **Optimization of time, financial, organizational costs** as an indicator of the effectiveness of projects on digital transformation

The vision of the industry of the future

Technical regulation - technical regulation, standardization, certification, technical specifications, determining the exchange of information and its processing, as well as communication between objects

ICT infrastructure (broadband Internet) to ensure guaranteed quality of communication, including requirements for minimizing network delays and the number of lost data packets

Information security and protection of sensitive data (protection of objects, processes, communication channels, organizational protection of information objects)

Cyber-physical systems, including:

- Robotic complexes (autonomous robots)
- Sensors and sensors that monitor production processes in real time
- Service Oriented Architecture (SOA)
- Network infrastructure (data exchange environment)
- Application software for real-time monitoring and control
- Additive production

Digital Technologies Amplifying Industry 4.0

- 3-D modeling and prototyping
- Cloud computing and cloud infrastructure
- smart contracts
- Big Data and analytics
- Augmented and virtual reality
- Artificial Intelligence

Means and systems (technologies) of electronic identification and monitoring (tracking) of elements of the production process (RFID systems, barcodes, smart sensors)

Industrial IoT Technologies
industrial IoT platforms - IoT operating systems connecting machinery, physical infrastructure and devices
machine-to-machine communication (M2M)

System problem 1. Lack of professional competencies of managers, specialists and workers (technical performers) on various aspects of DTI

Condition:
Improving professional competence in the field of DIT

Tasks:
Organization of training on various aspects of digital transformation

Tools:

- **Development of new and modifying the existing educational standards** and educational programs of vocational, secondary special, higher education, additional adult education, providing training on various aspects of digital transformation
- **Equipping laboratories** of institutions of vocational, secondary special, higher education, further education, equipment and technical training in the field of digital transformation
- **Organization of competence centers** in the field of digital industry transformation on the basis of science and technology parks and scientific organizations
- Creation of a specialized Internet resource accumulating distance learning programs on various aspects of DTI and information on existing educational centers and competence centers (**Digital Competence Platform**)

System problem 2. The lack of modern standards and certification schemes; lack of harmonization of standardization systems both at the level of the EAEU countries and with the EU, which prevents the provision of interoperability and compatibility of solutions at the national and supranational levels

Condition:

Formation of a single harmonized space of standards in the field of digital transformation

Tasks :

- Determine the perspective directions of standardization and certification schemes at the national and supranational levels
- Organize the development of standards and certification schemes

Tools:

- Formation of a **pool of stakeholders** in standardization and certification among the EAEU organizations
- Formation and implementation of a plan for the **preparation of standards and certification schemes** in the field of digital transformation by the EAEU member states

System problem 3. Insufficient penetration of high-speed (broadband) Internet in the regions to ensure the digital transformation of the industrial enterprises located there

Condition:

Development of ICT infrastructure providing access to high-speed Internet

Tasks:

- Improving access to high-speed Internet of business entities

Tools:

- Attraction of financial resources of **international organizations** and int**ernational technical assistance** for the modernization of telecommunications infrastructure
- Using the **public-private partnership mechanism** to build telecommunications infrastructure nodes by private business (mobile operators, data centers)

System problem 4. Outdated system of management organization at industrial enterprises

Condition:

Reengineering and optimization of business processes in industrial enterprises

Tasks :

- Optimization at the national level of the processes of **interaction of enterprises with government agencies (B2G)** and the formation of the **regulatory framework** governing the interaction of business and the state
- Providing access of business to **tools for business processes optimizing**
- Implementation of **best practices** in the organization of industrial enterprises management

Tools:

- Preparation of new and adjustment of existing legislation projects, including technical regulation (at the national level)
- Formation of the list of organizations of the real sector, on the basis of which **pilot projects** will be implemented, including the restructuring and optimization of their business processes

System problem 5. Fragmentation and inconsistency of legacy systems inherited by enterprises (the problem of "patchwork" informatization)

Condition:

Ensuring the possibility of data exchange between various information systems for servicing end-to-end processes within enterprises and in their interactions with other enterprises, government agencies and consumers in the domestic and foreign markets

Tasks :

Ensuring technological modernization of organizations in the real sector, taking into account the requirements of interoperability of information systems, service-oriented architecture (SOA) and modern logic models (as a reference architectural model of Industry 4.0 (RAMI 4.0))

Tools:

- Development and implementation of the state program of development of specific industries
- Formation of a single trusted information environment for the exchange of technological data both between subjects of the same industry and with subjects from related industries

System problem 6. Inconsistency of the existing organizational forms in industry with the requirements of the modern economy

Condition:
Popularization and promotion of best practices

Tasks:
Assisting the formation of **clusters, technological alliances, business partnerships** between science and the real sector, **holdings, multi-divisional firms, network structures, platform aggregators** and other modern organizational forms

Tools :

- Preparation of draft regulatory legal acts aimed at the **creation and state support of new organizational forms in the industrial sector**
- Attraction of international technical assistance and implementation of international technical assistance projects on industrial restructuring
- **Ecosystem** development **for open digital innovations** with a wide variety of institutional forms

System Problem 7. Lack of commercially attractive technologies to ensure digital transformation in the domestic market and an inefficient system of their transfer from science to practical application

Condition :

Facilitating the transfer of modern technologies for digital transformation

Tasks:

- Improving the effectiveness of national innovation systems
- Concentration of resources on a narrow (specified) range of priorities of scientific, technical and innovation activities to ensure digital transformation
- Development and capacity building of the existing technology transfer system

Tools :

- **Eurasian technology transfer network** (including the subsystem for industrial and innovative infrastructure facilities and expert networks);
- **Eurasian technology platforms**

Eurasian Technology Transfer Network

- create a common network system for finding technology developers and enterprises interested in them;
- create a common network system to find partners for joint R&D;
- integrate the Eurasian network system into the international one

http://ictt.by/Docs/news/2017/10/2017-10-24_01/EEC__Concept__RU.pdf

Eurasian Technological Platforms

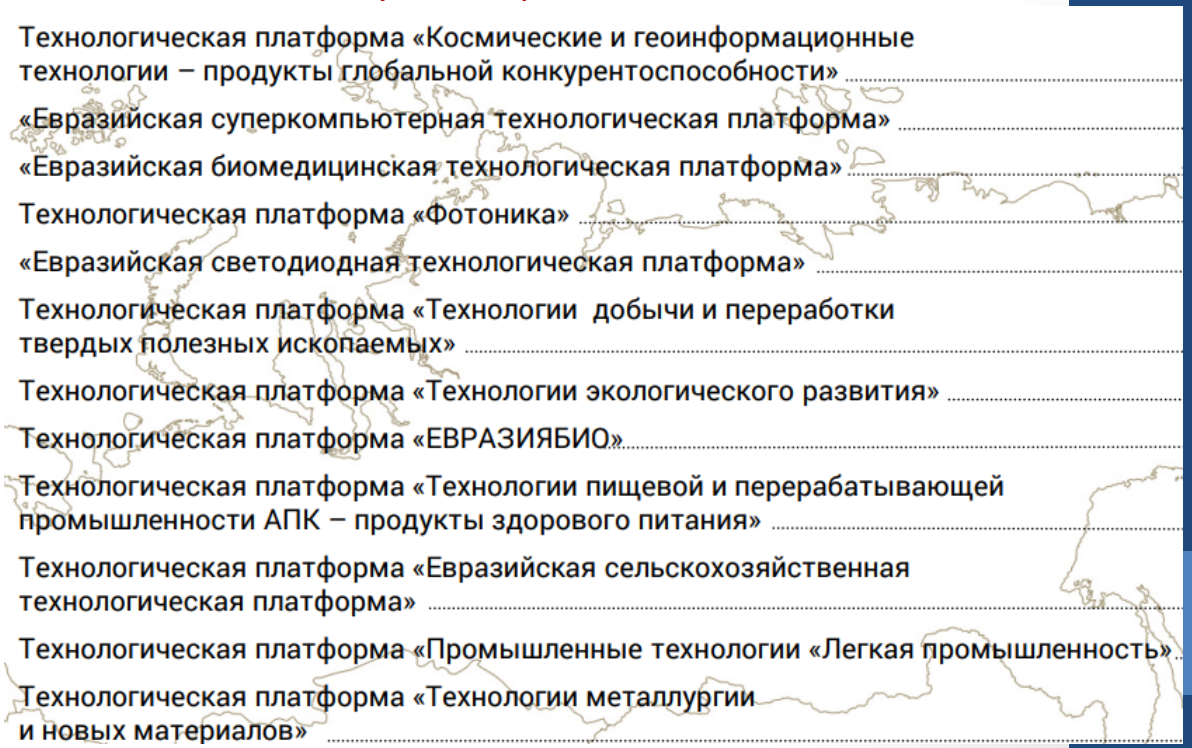
The list of directions for the formation of Eurasian technology platforms

1. Medical and medical biotechnology, pharmacy
2. Information and communication technology
3. Photonics
4. Aerospace technology
5. Nuclear and radiation technologies
6. Energy
7. Transport technologies
8. Metallurgy technologies and new materials
9. Extraction of natural resources and oil and gas processing
10. Chemistry and petrochemistry
11. Electronics and engineering technology
12. Ecological development
13. Industrial technology
14. Agriculture, food industry, biotechnology

Goal: R&D and production cooperation via PPP

Support measures:

- Support of cooperation projects by EAEC
- National level: interstate programs,
- Eurasian Development Bank,
- national industry development funds



http://www.eurasiancommission.org/ru/act/prom_i_agroprom/dep_prom/SiteAssets/broshura%20ETP.pdf

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Технологическая платформа

Материалы и технологии металлургии

Документы

Платформа

Новости

System problem 8. **Insufficient involvement in the global innovation system and the system of international division of labor; being on the technological periphery of the world economy**

Condition:

Promotion of the development of scientific and technological cooperation with economically developed countries; overcoming the technological gap in the field of DTI

Tasks:

Stimulate the integration of EAEU enterprises into the global innovation system and the international division of labor with a focus on increasing the role in the value chains

Tools :

- **Technological forecasting and foresight**
- Tools for **integration into international supply chains**, international **logistics system**, including e-commerce and logistics tools
- Tools for **protection and management of intellectual property rights** in foreign markets
- Tools for **legal support** in foreign markets
- Cooperation with technologically advanced foreign enterprises; occupying niches in their value chains; formation of own value chains; entry into international clusters and networks of cooperation

System problem 9. Different sectoral and technological structure of the industrial sector of the EAEU countries, different ratio of private and public sectors of industry, as well as domestic and foreign capital

Condition:

Ensuring synchronous and coordinated digital industry transformation in various EAEU countries

Tasks:

Form and implement a coherent industrial policy providing for specialization and cooperation between various EAEU member states in accordance with the fundamental principles of the EAEU

Tools :

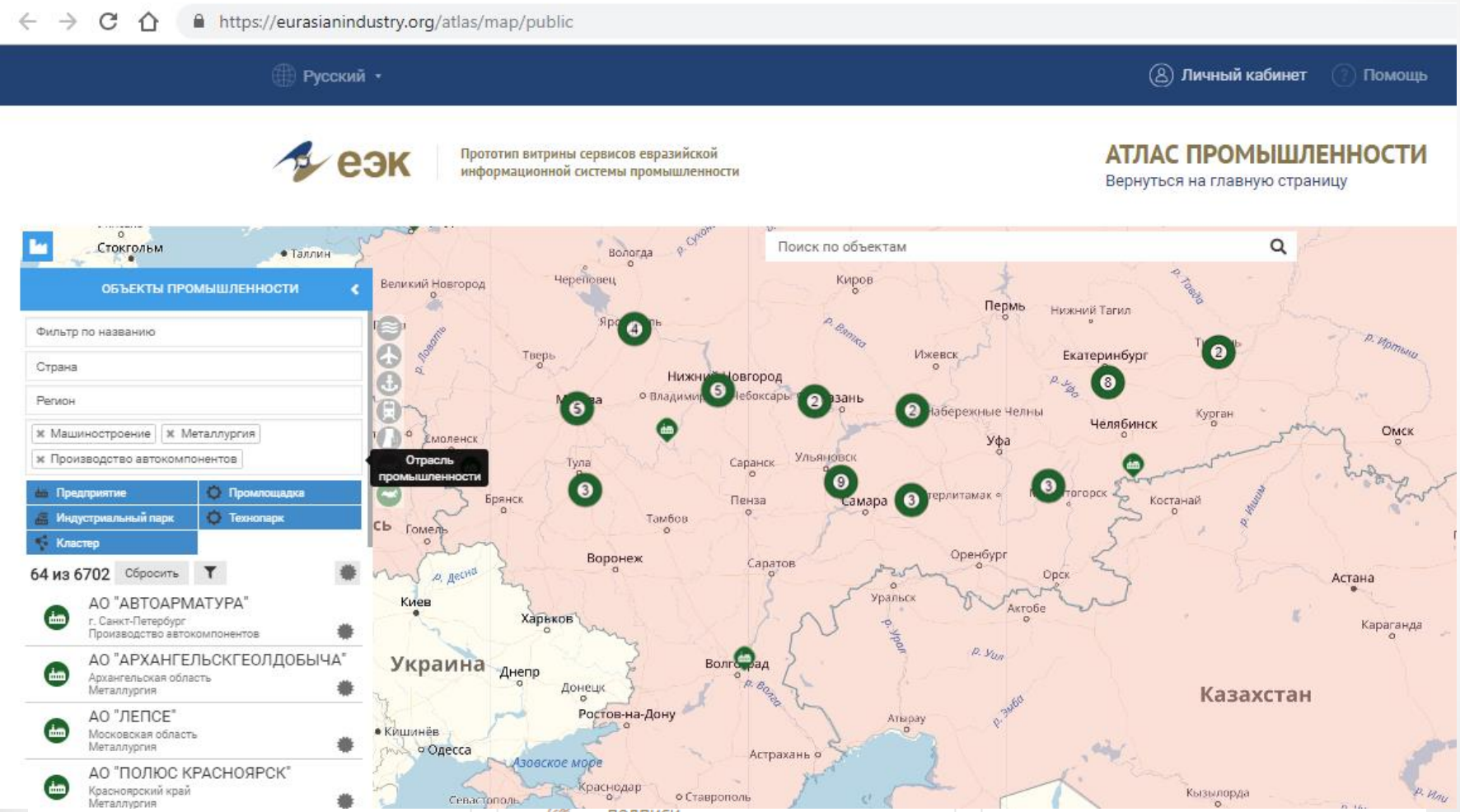
- Eurasian network of industrial cooperation and subcontracting

The mechanism for building cooperative ties between the industrial enterprises of the EAEU states, involving SMEs in production chains

The basis are the national segments (national networks) of industrial cooperation and subcontracting of the EAEU states.

http://www.eurasiancommission.org/ru/act/prom_i_agroprom/dep_prom/SiteAssets/%D0%9E%D1%82%D1%87%D0%B5%D1%82%20%D0%9D%D0%98%D0%A0%20%D0%95%D0%98%D0%A1%D0%9F.pdf

Eurasian network of industrial cooperation and subcontracting



System problem 10. Lack of financial resources for the organization of the digital transformation process

Условие:

Providing priority financing for the digital transformation of the industry using various sources

Задачи:

- Concentration of public financial resources in priority areas
- Diversification of funding sources

Tools:

- Preparation of state programs in the EAEU states
- Targeting foreign direct investment in high-tech activities
- Application of modern financing instruments: venture and project financing, crowdfunding, crowdinvesting, ICO (cryptocurrency financing)

Implementation stages

2019-2020

- identification of government bodies in the EAEU member states responsible for the DTI,
- organization of interaction between them

2019-2020

- initiation of integration projects within EAEU member states
- adjustment (preparation) of strategic documents targeting the implementation of measures in DTI

2021-2025

- implementation of integration projects and policy documents in the field of DTI

THANK YOU!