
Innovative Activity in the Digital Economy

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Annotation: The article examines the conditions in which companies will have to carry out innovative activities during the period of digital transformation and the emergence of Industry 4.0. The article also presents a comparative analysis of the innovating companies of Industry 3.0 and the digital champions of Industry 4.0.

Key words: Innovation activity, digital economy, Industry 3.0, Industry 4.0.

The accelerated development and emergence of new technologies leads to the formation of innovative concepts for organizing production, ensuring that the capabilities of the industry correspond to the ever-increasing and permanently changing needs of society. The need for flexible adaptation to environmental conditions requires the maximum possible reduction in time for implementation of operations and, therefore, bridging the gaps between the current state of industry and digital production. Disruptive innovations and exponentially increasing digitalization of processes are actively changing the business models of enterprises. In these conditions, to describe the directions of development, terms such as the concept of Industry 4.0, digital economy, smart economy, Internet of things, cyber-physical systems, supercomputers, digital transformation, digital society, smart cities, etc. are used. The digital economy defines a completely new stage of development, ensuring a transition to a knowledge economy, in which the main factor of development is human capital (knowledge, skills, abilities and capabilities of labor resources). Digitalization of the economy is implemented through the development and implementation of innovative digital technologies on an ongoing basis, as well as the formation of appropriate legal, socio-economic, organizational and other conditions for the transformation of society and the economy to a new level of development.

Adapting companies to the new conditions of digital transformation, or Industry 4.0, is a key challenge facing not only industry leaders, but also all economic entities that want to develop sustainably in the present and future. If Industry 3.0 involves selective automation of individual stages of production and management processes, then Industry 4.0 requires “end-to-end digitalization and integration of value chain data: offering digital products and services, operation of related physical and virtual assets, transformation and integration of all processes and operational activities, partnerships, as well as optimizing customer service.” Company management needs to understand the depth and complexity of technological, organizational, operational, personnel, and marketing transformations that need to be implemented. The new things that companies must face are innovations for them. Their success will depend on the degree of openness and readiness of management and companies for these transformations.

Industry 4.0 requires the transformation of operational management, product life cycle management, production organization, sales management, enterprise strategy, investments, since it involves changing the functioning of companies, affects the range of products, services, works, transforming them into “smart” products, necessitates the development of new strategy and business models for its implementation. Digitalization provides a number of benefits for business, in particular, it speeds up communications and simplifies collaboration; with the help of cloud computing, it allows you to quickly exchange data with all partners, while requiring the integration of technologies and planning and management processes.

Depending on the degree of innovation, there are 3 types:

- Innovators (about 2.5%) are ready to try an innovation first, take risks and have the financial resources to acquire and implement new things (technology, equipment, methods of personnel management and product promotion, etc.);
- Followers (often called early adopters, about 13.5%) are for the majority the legislators in the field of innovation, it is their opinion that is listened to, their experience and decisions made regarding the introduction of new things encourage others to think about changes and take action;
- The early majority (34%) need more time to realize the need to introduce something new. They become involved in this process only when they see the successful experience of their predecessors (innovators and followers);
- Skeptics (late majority, 34%) are less ready for changes, they accept them only when they realize that this is a matter of the company's survival in the market;
- Laggards (often called latecomers, about 16%) are conservative and slow in nature. They (often mistakenly) believe that the traditional approach, product, technology is their key advantage, therefore, as a rule, they refuse to adopt the new.

J. Schumpeter, developing the theory of innovation, determined that economic entities are divided into two types according to their role in the innovation process. Innovators initiate change and lead in the development of new products and processes. Imitators are “responsible” for the diffusion of innovations; their number increases as the innovation spreads. Imitators are heterogeneous in their composition; the early recipients are more innovatively active, followed by the early majority. Closing this line are the laggards, the companies that are not ready for change. As a rule, we are talking not just about a skeptical attitude towards innovations on the part of owners and top management, but about the lack of resources (financial, personnel, scientific and technical, managerial, production, etc.) for the implementation of large-scale innovation programs.

While the “laggards”, led by “skeptics” and “laggards”, can only cope with innovations at the company level, i.e. We are talking about technologies and products that have become traditional and proven on a global and national scale.

Digital champions are companies that are leaders in global digital transformation and have managed to develop an ecosystem across four main levels: customer solutions, people, operations, and technology. These companies offer in-demand digital products and services. The leading industries are the automotive and electronics industries. 20% of enterprises of the first and 14% of the second implement innovations in their activities. However, the process of transition to Industry 4.0 is happening quite slowly. Many companies are implementing separate digitalization and automation projects, but do not create a single outline of the organization's ecosystem, which does not allow using the main economic potential of Industry 4.0, which lies in its ability to speed up corporate decision-making and adaptation processes. This applies to both the processes of increasing efficiency in design, production, service, sales and marketing, as well as the core activities of individual structural units and changes in the business model. The organization of activities of companies that are implementing the fourth industrial revolution today differs significantly from work in the conditions of Industry 3.0.

Table 1. Comparative analysis of Industry 3.0 innovators and Industry 4.0 digital champions

Options	Innovators (Industry 3.0)	Digital Champions (Industry 4.0)
The dominant form of interaction organization	Global multinational corporations	A technological platform on which an ecosystem of solutions for clients is built, among other things.
Value chain	Globally optimized value-added system	Value Network
Hierarchy levels	Vertical as dominant with a clear distribution of job responsibilities	Horizontal with flexible fixation of functions
Type of organizational structure	Divisional, matrix organizational structure	Agile organizations are capable of rapid adaptation without sacrificing ongoing processes.
Company divisions	Divisions/departments: - R&D department, - engineering and production department, - supply chain management department, - procurement department, - sales department, - marketing department	Groups of internal and external participants who unite and quickly adapt to solve specific problems
Organization of operational activities	With a time lag for making decisions and organizing interaction	Real-time based operating ecosystem
Production organization methods	Lean Manufacturing Methods	Lean and adaptive manufacturing methods
Organization of supply activities	Isolated solutions and optimization of individual processes	End-to-end integration and near real-time scheduling on the external network
IT infrastructure	- integrated supply chain planning; - predictive maintenance; - ERP	- digitalization of standard business processes (business planning); - industrial Internet of Things; - digital twins; - AR and/or VR technologies, etc.
Interaction with clients	- sales and marketing department	- sales and marketing department; - platform partners; - distributors or data providers
Trade channels	- globally optimized distribution network	- omnichannel trade (integration of all online and offline channels); - comprehensive solutions for clients

Approach to working with clients	Standardized with local adaptation to customer needs	Personalized
Working with partners	Under the terms of a globally optimized labor division system	On the terms of interaction integration
Components of competitive advantage	Global leadership, cost optimization	Speed, adaptability, customer alignment and efficiency
Principles of working with information	Knowledge and human capital management system	Self-learning system using artificial intelligence and big data processing technologies
Corporate culture	Traditional	Digital
Significant personnel qualities	Stability, experience, motivation	Potential, vision, curiosity, motivation, flexibility and adaptability
Training	Standard personnel training programs	Individualized training programs, continuous (lifelong) training

Source: compiled by the author.

There seems to be a serious need to change the organizational structure and corporate culture of companies that aim to take the position of leaders in Industry 4.0. Network interaction of groups (teams), which have sufficient resources at their disposal to quickly make decisions, boldly initiate and try new things in an environment of cooperation and flexible connections, is the basis of an organization facing the task of sustainable competitive development. The success of innovation in the new digital era largely depends on an integrated approach to the transformation of all key aspects of the company's activities, the creation of a technological platform on which all the company's key ecosystems will be built. The problems that companies face along this path and the possibilities for solving them will be the subject of further scientific research by the authors.

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