

Strategies for Developing Competencies for the VUCA World

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Abstract—The determinant role in the ongoing transformation is acquired by research and invention, which requires creation of system of research and invention management in digital region economy field enabling coordination of efforts of interested parties - representatives of the Federal Agencies of Executive Authority, companies, higher educational establishments and scientific organizations. Intensive development of digital region economy society inevitably involves tasks in knowledge management field. The priority sources are information and knowledge acquired from the knowledge-based experience. And, competencies, being a competitive position on the market, are innovativeness, expert knowledge, creativeness, cognition. Therefore, transition from physical to digital region economy requires fundamentally new approaches not only in industries and factories, but also in formation of human resources for digital region economy: education, staff training, establishment and innovative human capital management. In the paper we considered approaches, tools and mechanisms of formation of key conditions for digital region economy staff training and perfection of the educational system which must provide digital region economy with the competitive work force. The crucial point of the approach must be formation of the support system of exploratory and applied research in digital region economy (research infrastructure of digital platforms), providing technological independence of every direction of transparent digital technologies which are competitive on a global basis.

Keywords—*digital transformation, digital economy, digitalization, competencies, competency-based approach, VUCA, region economy.*

I. INTRODUCTION

The configuration of global markets undergoes substantial changes as affected by digitization. Many traditional industries become less significant in the global economy structure alongside the rapid growth of new sectors, generating fundamentally new needs. Despite the fact that equipment manufacturers have already released the first

samples of 5G equipment on the market, and telecom operators began to obtain licenses and create test zones to check the technology's capabilities, we are still at a very early stage of its implementation. The spread of the new communication format around the world is expected no earlier than in 3 years, and the maximum effect from its use in the form of fast interfaces, widest network bandwidth, super-fast response and lightning-fast communications in the machine-to-machine format with a large number of connected devices possible only after 10 years. Practice has shown that this is the standard development-to-deploy cycle duration in the telecom industry. In addition, the new technology requires billions of dollars in investments from telecom operators and efforts from governments to allocate frequency bands for the comfortable use of the novelty.

COVID, self-isolation, remote workplaces and virtual entertainment have increased the load and introduced new requirements for the stability of the existing network, pulling resources away from the 5G mega project.

Artificial intelligence is a living organism. Algorithms are trained on data and their task is to respond to changes, but what to do when the world is transforming too dramatic, as in a period of the pandemic and restrictions, when a system trained on ordinary time data is suddenly forced to adapt to the data that a new reality generates. Is the algorithm capable of doing this on its own or does it require human intervention?

On the other hand, each crisis is an opportunity for AI developers to retrain the system on data that is not typical for normal time, in order to make the algorithm stable and able to make accurate decisions in an unstable environment.

Today, every person leaves "digital traces" by which he can be identified. You can transfer money using your phone, pay in a store with just your fingerprint, you can track your movements using a photo and mobile traffic and clicks can tell more about you than your close friends even know.

Soon, every citizen will have their own digital ID. At the same time, the state, banks, service providers and Internet companies are developing and promoting various methods of identification.

The circular economy is at the heart of the Fourth Industrial Revolution. The concept assumes the solution of global problems of raw materials and energy resources scarcity, waste generation and environmental pollution by changing the traditional paradigm "TAKE, MAKE, WASTE" to "TAKE, MAKE, REUSE".

Such a transition is a mega-project of a global scale, requiring appropriate resources, knowledge and science-intensive technologies. According to experts from the World Business Council for Sustainable Development, in order to achieve this goal, it is necessary to concentrate the efforts of developers on three main areas of research: digital, material/physical and biotechnology.

This year the European Commission adopted a plan to implement a new ecological development model. It sees significant innovation and economic potential in the circular economy and predicts the contribution of the new development model to EU GDP increase by additional 0.5% per year by 2030 creating around 700,000 new jobs.

In 2020 the healthcare system and all industries are facing challenges during the COVID-19 pandemic. The pandemic has made its own adjustments to the activities of many companies, organizations and investors. Innovative solutions for combating coronavirus (treatment, diagnosis, prevention, vaccination) have become the main drivers in the healthcare market. The population is looking forward to the end of the epidemic and the return of social activities. According to experts, it is currently too early to talk about the end of the infection.

The world's first coronavirus vaccine has already been registered in Russia. This was announced by Vladimir Putin during a meeting with the government on August 11, 2020. As the President noted, the drug has already proven its safety and effectiveness. The Sputnik-V vaccine was developed by the National Research Center for Epidemiology and Microbiology. N.F. Gamaleya (NITsEM). In the following days, a post-registration study will begin on more than 40 thousand patients in full accordance with international standards.

The scale and pace of the healthcare sector transformation, caused by both technological development and challenges facing the healthcare system, make society, government and business rethink the previously established rules of interaction. People put forward new requirements for the quality of medical care, its availability and technology, which, as a result, should increase the duration and quality of life. In Russia, this indicator is registered as a goal of the Healthcare national project and is one of the priority development direction. But how can this goal be achieved?

In recent years, the world of biotechnology has introduced many innovative solutions in the field of genetics, the use of cellular technologies, genome editing, bioprinting and personalized medicine. The industry has not stayed on the sidelines from global digitalization, artificial intelligence is actively being used to analyze patient data and develop new medicines, the healthcare system and the paradigm of doctor-

patient relationships are being transformed, increasing the availability of medical care and its quality.

The ability to quickly restructure the production management system, logistics, sales, and financial function is the key to the success of a modern company, in a world where supply chains can be broken at once, and the buyer of the product can suddenly find himself behind the iron curtain.

Protectionism is a natural reaction of many countries to the economic crisis. States strive to preserve jobs and protect the domestic market from foreign competition through a system of certain restrictions. Such a policy, on the one hand, contributes to the development of national production and the protection of domestic producers, and on the other hand, may run into retaliatory measures of other States, lead to stagnation in the economy, increase monopolism and reduce the competitiveness of national goods.

Because every crisis is unique, its solution also needs to be unique, and every new wave provides entrepreneurs and investors with new ways to build a resilient business that will be able to withstand threats of any kind, from financial to biological.

What technological approaches can businesses use to protect themselves from the shocks caused by crisis situations? The digitalization of business processes and the use of up-to-date business models to the maximum possible extent, the automation of production using industrial Internet technologies and predictive analytics, the use of the most advanced digital sales channels and investment in personnel. These, and many other factors, have a role to play in the modern resilient business model.

Ongoing changes all over the world, society, professional area in Russia and abroad newly identify issues of development and preservation of competencies, skills, a part of which is unnecessary now, but in future they may become popular. Therefore, here arises a problem of preservation of skills (even though on description level), important for history educational culture, but even more critical need is to form "new" skills which were not operational earlier. It is connected not only with introduction of ICT into educational area, or further entrance of networking cooperation in it, but also with application of non-traditional research technologies, which presupposes other methods of students activity organization.

II. METHODS

General scientific methods of analysis and synthesis were used as research tools, as well as specific research methods such as: monographic method, abstract-logical, calculation-graphic, economic-statistical, comparative financial-economic analysis, etc.

III. MAIN PART

The concept of competency was firstly applied by D. McClelland in his writings. Though, thanks to the paper of Richard Boyatzis "Competent manager", the term "competencies" became commonly used much later. The concept of competency was spread by R. Boyatzis.

Competence and competency are the terms which are commonly used as synonyms. But Charles Woodruff and other researchers consider that the word "competence" shall be used to tell about an ability to do one's work competently

and a worker's activity. Thus, in order to avoid misunderstanding and confusion it makes sense to separate the two concepts:

- competence is a concept relating to an individual, which tells about aspects of behavior required for performance of work;
- competency is a concept relating to labor activity, which tells about the area of professionalism where a worker is competent.

D.K. McClelland, R. Spencer and other researchers consider that the competency consists of:

- motives, representing basic needs, which rule and drive one's behavior forcing a person to make his choice;
- qualities - basic propensities to a specific behavior or method of reaction; for example, self-confidence, self-control, stress tolerance and endurance;
- "I am" concept - personal orientation and values;
- knowledge volume - knowledge of facts or technical (how to fix a computer fault) or communicative (how to provide a feedback) procedures;
- cognitive and behavioral skills which are behind the scenes (for example, capacity for deductive and inductive conclusions) or those which are in view (for example, active listening).

D.K. McClelland determines the aforesaid competency components as being the basic qualities. He determines the competency as being the basic personal quality having causal relation to effective performance on the basis of criteria and other situations. Others (for example, A. Fletcher) emphasize that "for competitive work performance it is important not only knowledge but also its practical use" [1].

The Russian Managers Association includes two major groups of competencies into the professional frame of competencies: life skills and hard skills. The first group of competencies includes communicative and personal competencies, the second - interprofessional, professional and branch competencies.

Over the last years, many researchers consider emotional intelligence as being an important competency for university graduates. D. Goldman has determined the emotional intelligence as a "capacity for understanding of personal emotions and feelings, feelings of other people, motivating oneself, controlling of emotions towards oneself or one's relationship".

V. Dulevich and M. Higgs have examined in details how much components of the emotional intelligence (self-consciousness, emotions control, empathy, partnership, communication) and personality type comply with such competencies as sensitivity, flexibility, adaptiveness, resiliency, influence, ability to listen, leadership, consistency, motivating of others, vitality, resolution and achievement orientation [2].

At the present stage, different educational systems are attempted to be included in educational institutions. Innovative character of the teaching process basing on this type of learning is pointed out by [3], who say in their research that "electronic learning (e-learning), nowadays, plays a role of a giant accelerator of educational innovative development...

In addition, it is noticed that being essentially a tool of online study mode, e-learning increasingly involves all range of up-to-date network informative and technological solutions which satisfied the Internet with different social services of communication, online exchange of information and cooperation, formation and support of networking professional societies" [4, 5].

At the present stage of the competency-based approach development, the authors see innovative-oriented skills and competencies which are of high demand in digital region economy as the follows [6]:

- personal qualities: admitting of basic national values, intellectual curiosity, initiative;
- competencies;
- basic know-how;
- professional skills.

Supraprofessional innovative-oriented skills which have been indicated by employers as being the most important for their employees in the digital region economy era are as follows [7]:

- multilingual and multicultural skills (free English and the second language knowledge, comprehension of national and cultural context of partner-countries, comprehension of specifics of work in branches of other countries);
- cross-industry communication skills (comprehension of technologies, processes and market environment in different related and non-related branches);
- customer-oriented approach, skills of handling with customer needs;
- programming of IT-solutions/ complicated automated complex management/ working with artificial intelligence;
- skills of working with collectives, groups and individuals;
- systems thinking (ability to determine complex systems and work with them, including systems engineering).
- skills of project and process management;
- lean production, production process management basing on constant striving for elimination of all kind of loss which presupposes involving of every employers in business optimization and maximal consumer orientation;
- working in the mode of high degree of uncertainty and rapid shift of problem situations (to be quick in decisions, skills of reacting to changes in conditions of work, skills of resource allocation and time management);
- ecological thinking;
- capability for artwork, good aesthetic sense.

In accordance with the "Digital Economy in Russian Federation" Program, tasks of establishment of institutional environment for research development and inventions in digital region economy in Russia up to 2024 are as follows (Figure 1).



Fig. 1. Tasks of Establishment of Institutional Environment for Research Development and Inventions in Digital Economy

The first wave of digital transformation resulted in a large number of digital «unicorns»: companies operating exclusively in (or at least heavily dependent on) the digital realm, such as Amazon, Apple and Google. These could also be called «born digital» companies [8]. But what next? Obviously no-one can live only in the digital world, and there is a great deal of demand for Digital+Physical solutions, in which digital technologies are used to improve physical items and products, or when manufacturing companies in the physical sector of the economy grow thanks to digitalization, for example by introducing sensors, new software or digital business management models.

The crisis that unfolded on many fronts in 2020 has shown that those second wave companies which have been able to digitize their operations to the maximum possible extent have a clear advantage. They suffered less serious losses, and some of them have been able to profit from the biological threat and the resulting self-isolation regimes. Does this mean that digitalization has been successfully «tested on the field»? What form will the third wave of digitalization take? According to IDC, the spread of the COVID-19 will lead to an explosive increase in spending of AI worldwide. Digital transformation has accelerated several-fold, and it is AI technology that helps businesses remain more flexible and competitive [9].

Artificial Intelligence can also play an important role in helping companies and society to deal with large-scale problems caused by the COVID-19 restrictions. All public sectors are expected an increase in AI investments. A shortage of employees and supply chain failures will lead to the need of automatization of all production processes. The AI development strategy and the Federal Project are designed to change the development strategy of the entire Russian region economy and economy of many countries [10].

What will a rebooted economy look like to a technologically-minded entrepreneur? This unexpected pandemic has turned everything in today’s world upside down. Recognized technological leaders have, as yet, been unable to find a way to protect humanity from this new virus

and the governments of even the most developed countries are struggling to find a balance between economic development and public health.

But every storm must end some time, and it is important to keep our energy, resources and determination from draining away if we are want to be able to jump into action a critical second before our competitors [11].

For people all over the planet, the Covid crisis is a deeply personal experience and virtually nothing in our world will remain untouched. While some technologies have been throttled back, many others have shifted into a new gear. Suddenly the sharing economy is bad. Stadiums are bad. In-person events, airports, crowded expos, parades, professional sports, movies, and comedy clubs have all been touched by the social distancing wand of disapproval. At the same time, certain technologies are moving exponentially faster. Electric cars, sensor technology, autonomous transportation, drones, delivery bots, CRISPR, lab-grown meats, and quantum computing have all shifted into an entirely new gear. This will be the most expensive crisis in human history. We are experiencing the biggest job transition in all history. “Contact phobia” will permeate our thinking for generations. Working remote is here to stay. Universities are struggling. Roughly 50% will close by 2030. Covid-19 will become the greatest source of conspiracy theories in all history. Electric vehicle sales exploding, and the internal combustion engines will end production in 2025. Lab-grown meat production facilities will be common in 2025. Driverless technology will be the most disruptive in all history. By 2030 the largest company on the Internet will be an education-based company that we haven’t heard of yet.

The human race has an unwritten mandate to pass its knowledge from one generation to the next. However, the tools we have today are not up for the task. In their present form, libraries are not good enough, colleges are not fast enough, and technology still has a poor interface for the human mind.

During this time we will start experiencing extreme talent and skill shortages. It’s no longer possible for colleges to anticipate the needs of business 4-5 years in advance.

While the Internet is improving our ability to align the needs of business with the talent of individuals, our education systems have been built around “just-in-case thinking” which ends up being a poor fit for our “just-in-time business world” [12].

We are on the verge of seeing a whole new breed of AI-driven hyper-individualized learning platforms designed to sync up with each of our learning needs. As we apply AI to teacherbots, the new game will be to find the fastest way to teach students, whatever they need, whenever they need it.

Over time, AI’s will learn every students proclivity, idiosyncrasy, preferred tools, personal reference points, and how to keep them engaged and learning even in the face of distractions. These AIs will quickly learn what skills we’re proficient in, what skills we’re deficient in, and what’s needed to bring us up to speed.

Throughout this training curve, individual learning will begin to scale far faster than anything we’ve ever dreamed possible – 4X, 6X and perhaps even 10X faster than anything today.

For these reasons, the largest company on the Internet in 2030 will be an education-based company that we haven't heard of yet. This remains the largest opportunity in the online world where no one has managed to crack the code.

For every technology, pre-covid success stories looked vastly different than the ones we'll experience moving forward. Think of this as the end of our world as we know it and the beginning of something else [13].

Even in the darkest times of history, people of extraordinary character have lived among us, guiding us on a pathway to a better future. Now is one of those times. After all, during times of great chaos, comes great opportunities.

IV. CONCLUSION

The upheaval of the COVID-2019 pandemic leaves corporations with a choice to change or give away their market share to small companies that quickly respond to market conditions. The structure of demand, consumer preferences and behaviour have changed, and product creation chains have changed due to the closure of borders and General isolation. All these factors have fundamentally changed the ecosystem that corporations have built around themselves for decades.

Those extreme changes which all the educational systems worldwide have had to encounter during the COVID-19 pandemics in 2020 can be considered as shock-born innovations. The need for changes can lead both to negative consequences, and be a source of innovation for the educational institutions. Among the major 2020's innovations in education are adjustment technologies, coping strategies and mutual support mechanisms in the interconnected community. Instant shift to online environment was possible due to mutual micro-learning processes, unprecedented mutual attention among the stakeholders and efficient distribution of resources.

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