

SCTMG 2023

**International Scientific Conference «Social and Cultural Transformations in the Context of
Modern Globalism»**

PERSONAL AND SOCIAL DEVELOPMENT IN CONDITIONS OF MARITIME INDUSTRY DIGITAL TRANSFORMATION

George Igorevich Kulikov (a), Demid Igorevich Biryulin (b), Alexey Ivanovich Epikhin (c)*

*Corresponding author

(a) Admiral Ushakov Maritime State University, 93, Lenin Ave., Novorossiysk, 353918, Russian Federation

(b) Admiral Ushakov Maritime State University, 93, Lenin Ave., Novorossiysk, 353918, Russian Federation

(c) Admiral Ushakov Maritime State University, 93, Lenin Ave., Novorossiysk, 353918, Russian Federation,
bsmbeton@mail.ru

Abstract

This article analyses the topic of a global digital revolution by the example of maritime transport. The main stages of the digital revolution are considered. It is concluded that the introduction of digital technologies has both pros and cons. The issue of digitalisation is the most urgent now, as the world is developing by huge steps. A number of psychological problems of personality arising in the conditions of Digital Transformation are highlighted. The article analysed the performance by the example of industrial giants. We determined that most companies would soon have to implement modern technologies because their position in the market directly depended on it. Due to the example of Russian innovations, we can observe the progress by the example of our industry. In the article, the psychological aspects of acceptance of progress by society and individuals were analysed in detail. The reflection of progress on people's activity is considered and it is concluded that it will be necessary to change the vector of education for this sphere, as some professions will not be in demand, but new jobs will appear. The aspects of achieving savings, increasing efficiency and productivity of investments in the maritime industry are also analysed.

2357-1330 © 2024 Published by European Publisher.

Keywords: Digital revolution, efficiency, innovations, industrial giants, maritime transport, productivity of investments

1. Introduction

Nowadays, it is impossible to imagine modern society without digital technologies, widespread automation of not only the simplest labour processes, but also many complex ones that even humans cannot perform. Many things that 20 years ago seemed like fantasy are now an integral part of our lives, both every day and at work (Verkhoev et al., 2019).

Banking, power grid management, medical records, transport, security and many other fields are tied to automation and robotisation. Increasingly, they are being digitalised and are moving towards computer networks, databases, decision support technologies, analytical tools and so on. Society is becoming more and more digital and therefore more dependent on technology. Digitalisation in many ways surpasses man's abilities, and it leads to serious changes in his subjectivity. The person who is in close contact with the digital environment becomes in many ways an agent of "networked practices". It is also about Existential Needs: the individual cannot be sure of the future, of security and of being anchored in his or her workplace because the process of digitalisation leads to many jobs previously used by people being replaced by digital processes or automated mechanisms. There is existential crisis, financial security and stability of human life is disrupted. There are pros and cons to this (Dokuchayeva et al., 2024; Tang & Yang, 2024).

Digital technology is not only modern technology, but also an evolution of thinking and personality, humans are adapting to new living conditions; that is how we are organised. Hence the major personality changes are shaped by the fact that the next technological revolution, the Digital Revolution, is happening right now (Muller & Shea, 2021).

2. Problem Statement

The American physicist Thomas Kuhn put forward that the essence of a scientific revolution is the transition from one paradigm (old) to another (new). "A new scientific truth paves the way to triumph not by persuading its opponents and forcing them to see the world in a new light, but rather because its opponents sooner or later die and a new generation grows up and become accustomed to it" Max Planck stated, which Kuhn cited in his study (Lipich & Balahura, 2024; Regnerová et al., 2024; Shumilina & Antsiferova, 2024).

In 1962, American physicist Thomas Kuhn wrote his book "The Structure of Scientific Revolutions", where he rejected the concepts of "verification" and "falsification" and introduced the concept of "paradigm". Kuhn's theory revolutionised the philosophy of science, but was also heavily criticized (Ivanov, 2021).

According to Kuhn, science develops not in the course of verification or falsification, but in the confirmation of the current paradigm. Scientists, having created a fundamental concept, do not seek to disprove it and do not break it down into protocol propositions; they seek confirmation of their theory by solving puzzles. Kuhn called this puzzle-solving a normal period in the development of science (Dimakos & Papageodjou, 2021).

Therefore, Kuhn's criterion of demarcation is a paradigm and the scientific community working within that paradigm. The only thing that matters is the opinion of scientists at a given moment, and there is no universal principle of demarcation.

Thomas Kuhn rejects the "objective" approach to the problem of demarcation, replacing it with a "historical" approach.

3. Research Questions

3.1. Stages of the digital revolution

- i. Digitisation of fragments of objective reality (e.g. documents, images, maps, sound tracks) is the process of digitisation of data about the surrounding reality. This stage inevitably leads to the fact that digital data successively replace analogue data, as they are significantly more convenient, compared to the latter, for processing, storage, use in practical activities, which leads to a fundamental increase in the speed and quality of data processing.
- ii. Development of an ecosystem for working with data, as the increase in volume leads to increasing requirements for the speed of its transmission and processing. It includes standards for data generation, data transmission infrastructure, storage and processing technologies, a system for ensuring security in the use of data, and a number of other elements.
- iii. Consistent spontaneous or deliberate transition to the use of digital data in life activities to replace analogue data.
- iv. Global involvement of people in the process of using Digital data instead of analogue data (it is at this stage that the transition to the activities of the future, which will develop within the boundaries of the Digital Economy, takes place).

This stage is conditional, as the processes of digital transformation in different social, cultural and economic realities may develop at different rates.

3.2. The issue of acceptance of progress by society

To date, there are a number of psychological personality problems that arise in the context of Digital Transformation:

- i. Fear of the unknown. It is expressed in the lack of desire to delve into this issue, as it seems to people complicated and incomprehensible.
- ii. Fear of upcoming external changes and, first of all, changes in oneself. People are afraid that the demand for their labour market will decrease, which, in their opinion, will lead to unemployment.
- iii. Fear of going beyond the personal comfort zone. Inertia of a large number of citizens and their unwillingness to live in conditions where the speed of processing large amounts of information with technical tools and the speed of decision-making is incomparable to that of humans.

- iv. Fear of the surrounding reality: a great reluctance to accept the idea that these changes are not a matter of the future, but of the present.
- v. Fear of not being able to learn new skills.

The common feature reflected in the problems and their causes is fear. Despite the similarity of all these points, it is necessary to work with each of the fears separately: to build programmes of psychological, pedagogical and social support of the person who is being transformed.

4. Purpose of the Study

4.1. Comparison of digitalisation in Russia

The data base for the 15-year period of observation is given, 2370 fires occurred. Cargo ships and tankers had the highest accident rates of 42% and 32% respectively, bulk carriers had 14%, passenger ships had 6% and all other types of vessels had 2% (Ahmad et al., 2024; Singh et al., 2024; Waite, 2024).

In the Russian Federation, we can observe the digital revolution of the maritime and port industries in the following directions:

- i. Electronic document management. Paperless technology simplifies and speeds up port operations, while reducing downtime, cutting costs by eliminating paper, and so on.
- ii. The concept of "lean production" is optimisation of processes by eliminating hidden losses. Changing the mindset of employees increases the efficiency of the seaport's operations.
- iii. An operational management system for container terminals (e.g. NUTEP LLC, Novorossiysk Commercial Sea Port, etc.). It is designed to manage personnel and machinery at a container terminal in real time in order to improve the efficiency of container handling.
- iv. Automated control systems in seaport and railway operations. It allows one to feed, unload, dispatch wagons to the terminal in automatic mode. This reduces costs considerably.
- v. Automated systems of interaction between seaports and federal executive authorities. The system ensures electronic interaction between all participants in the process of clearing goods and vehicles at sea checkpoints to reduce the time required for customs operations.
- vi. The "Digital Port" ship service system is a technology for maintaining distributed registers of accounting and certification of rights, which allows one to transfer the ship's document flow with the port into electronic form, thereby reducing production loads on port activity participants, port agents' work time; ship handling time; disputable moments in port activity participants' activities.
- vii. Systems of interacting with information systems of maritime vessels and with trade portals on a one-stop-shop basis.

Specialised systems, e.g.: security systems, number plate recognition systems for containers, vehicles and railway platforms.

5. Research Methods

5.1. Digitalisation by the example of an industry giant

At the company level, many established firms are losing out to fast-growing, innovative digital companies and are suffering as a result. The rapid growth of Alibaba and Amazon, for example, has had a strong impact beyond their online commerce. The Danish company Maersk fears that in the coming years its competitors will be the current giants of online commerce: the American corporation Amazon and the Chinese holding company Alibaba.

"If we don't do our job well, there's no doubt that big, strong companies like Amazon will decide to take it over themselves," Maersk CEO Soren Skou says.

In a bid to retain customers, the Danish company intends to combine its container shipping business lines into a single supply chain for better control. Today, many people are actively looking for a solution that can similarly unify all workflows in the transport and logistics industry. It should be a unified and neutral network. Only then transport processes become seamless and the cost of transport around the world will be reduced many times over, comparable to the enormous effect of the containerisation of the industry in the twentieth century. But so far, the digitalisation of individual companies and the diversity of corporate solutions only create additional barriers in the form of hundreds of thousands of incompatible systems and isolated personal offices. A neutral solution based on seamless interoperability is needed to unite all industry participants. Maersk has already asked IBM to develop a blockchain service for freight transport to keep its services relevant.

Amazon plans to increase the number of home deliveries to customers according to the online retailer in its latest report. The company may start transporting goods to warehouses by sea on its own, without resorting to Maersk, as it does now. The way out for Amazon would be to organise its own courier service. By taking control of the organisation of the last mile (the last stage of delivery to the customer), the company will be able to manage delivery efficiency: optimise workload and reduce costs, achieving lower delivery costs.

This is the model implemented by Tochka-Tochka in the field of long-distance delivery. The point of the scheme is to pre-load the vehicle following the main route. Departures are collected in a single digital database, where they are shared between couriers. In this case, it is necessary to use the mechanism of free competition: each courier seeks to book a suitable cargo faster, offering the customer the minimum tariff within the market conditions. For urban logistics, this would be an effective way to ensure fast and inexpensive delivery.

5.2. Impact of coronavirus

The International Association of Ports and Harbours (IAPH) handles more than 60 per cent of the world's maritime trade and around 80 per cent of the world's container traffic. It seeks to ease the energy transition, accelerate digitalisation and help improve the overall resilience of its member ports in an ever-changing world. In 2018, IAPG established the World Ports Sustainability Programme (WPSP), guided by the UN's 17 Sustainable Development Goals.

Due to the impact of the coronavirus, governments and industry stakeholders involved in maritime trade and logistics are coming together and accelerating the pace of digitalisation to enable port communities around the world to embrace e-commerce and data sharing.

There are nine priority areas, ranging from optimising port calls to cyber security.

When it came to digitalisation, the COVID-19 crisis painfully demonstrated the heterogeneous system that currently exists in ports around the world. While some port communities have seized the opportunities found in the Fourth Industrial Revolution and evolved into fully-fledged smart ports, many others have barely grasped the basics of digitalization. They continue to struggle with a greater reliance on face-to-face interaction and paper-based transactions as the norms for on-board, ship-to-shore and shore-to-hinterland interactions.

6. Findings

6.1. Savings and efficiency improvements in the industry

The shipping industry, known for its conservatism and multi-layered complexity, is facing a new wave of transformation due to the introduction of advanced technologies. While other industries have long embraced digital solutions, the maritime industry has lagged behind due to its innate caution. However, this landscape is rapidly changing as shipping companies recognize the urgent need to adapt. According to a comprehensive survey conducted by Wärtsilä Marine Business, the vast majority of shipping companies - around two thirds - have already embarked on a digital transformation journey. And that's just the tip of the iceberg, as an impressive 69 percent are actively exploring and implementing digital solutions.

This paradigm shift is driven by a transforming business environment that requires shipping companies to shift from traditional sales models to customer-centric offerings. With increasing demand on global supply chains to distribute goods and services, digital business is becoming a cornerstone for shipping companies. As technology continues to improve, the shipping industry has a unique opportunity to improve efficiency and return on investment. Digitalization of operations, including route optimization, demand forecasting and task automation, promises to improve productivity and reduce operating costs.

Additionally, the adoption of digital solutions allows shipping companies to offer differentiated services such as real-time cargo tracking, predictive maintenance and customized logistics solutions. This, in turn, leads to stronger customer relationships, increased loyalty and increased revenue. The rapid growth of digital technology in shipping is creating new opportunities for optimization, innovation and growth. As the industry continues to implement and develop these solutions, we will undoubtedly witness a revolution in shipping efficiency.

Innovation in supply chains, primarily driven by the need to comply with regulatory requirements, is now shifting towards reducing operating costs (OPEX) and improving operational efficiency as the industry's primary focus. Digital transformation is revolutionizing the shipping industry, introducing revolutionary applications to streamline processes, enhance customer experiences and increase efficiency. Digital platforms, real-time location tracking systems, big data analytics, Internet of Things, blockchain technology and integration with third-party online logistics providers (3PLs) are steadily disrupting and

reshaping this traditional industry, opening up new horizons. Additionally, the number of connected ships is predicted to skyrocket over the next five years as digital transformation promises to reduce operating costs by more than 15%. This increase will be driven by the industry's desire to streamline its operations, increase efficiency and remain competitive in the changing shipping landscape.

7. Conclusion

In this article, we have analysed the topic of a global digital revolution by the example of maritime transport. We have learnt that the introduction of digital technologies has both advantages and disadvantages. The issue of digitalisation is the most urgent nowadays, as the world is developing by leaps and bounds. Owing to the example of industry giants, we determined that most companies would soon have to implement modern technologies because their position in the market directly depends on it. Due to the example of Russian innovation, we can see progress in our industry.

The psychological aspects of acceptance of progress by society and individuals were analysed in detail. We considered the reflection of progress by people's activities and concluded that it will be necessary to change the vector of education for this sphere, as some professions will become out of demand, but new jobs will appear.

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