# DIGITALIZATION AND DEVELOPMENT OF DIGITAL QUALITY OF LIFE IN THE REPUBLIC OF MOLDOVA

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**Abstract.** One of the strategic goals of the development of different countries is to improve the quality of life of the population. This scientific paper analyses the main trends in the development of digital quality of life in the Republic of Moldova. In the Republic of Moldova, as well as in all developed and developing countries, the sale of wearable electronic devices is increasing. More and more so-called wearable devices with built-in sensors, displays and other digital technologies are appearing. The emergence of miniature and inexpensive sensors and LED modules has triggered a real race among technology giants and startups offering wearable devices in the form of clothes, shoes, jewelry, accessories, even contact lenses and stickers. The analysis of this research based on information from national and international scientific research, data from the National Bureau of Statistics of the Republic of Moldova, data from national and international Reports. Also, this article presents data from various world analytical companies about global volume of wearable electronics market. According Statista Platform, aprox. 139 million wearables were shipped worldwide in fourth quarter of 2022 alone, representing an increase compared to the previous years and aprox. 492 million wearable units, such as: smartwatches, fitness monitors, smart wearables, head-mounted displays and many other devices were sold in 2022 alone. The following research methods were used in the presented work: economic analysis, logical, monographic, synthesis, comparative analysis, etc.

**Key words:** information technology, internet accessibility, digital state, e-government, wearable electronic devices, national programs, Republic of Moldova

**Introduction.** In the end of the 1990s, the world started talking about the digital economy. More than 30 years have passed since then and digitalization has become a usual phenomenon for everyone. Today, digitalization is applied in everyday life, in production, at work, in government structures, and in business. For example, in the home, many people often use such a digital system as an alarm system. A special sensor monitors whether there are strangers in the apartment, and if they are detected, it signals to the console to the duty officer. Almost everyone has smart devices at home, of which there are already more than 26 billion units worldwide.

At the state level, digitalization is also being implemented particularly actively. This is expressed through the reduction in the number of paper carriers and bureaucracy in the processing of documents. Statements and passports can now be ordered through an application, and all data can be stored and updated there.

The choice of technology for a particular enterprise or business depends on why digitalization is being performed, what goals need to be achieved.

Several key areas of digital transformation can be identified:

- Developing a new digital business model.
- Creation of digital goods and services.
- Product lifecycle management.

- Automated collection, storage and processing of information.
- Implementation of digital design.
- Managing production processes and supply networks.
- Performing administrative functions.

The main purpose of this research is to analyze the level of digitalization and main trends in the development of digital quality of life in the Republic of Moldova and the market of modern electronic devices that make our lives better and quality. The following research methods were used in the presented paper: induction and deduction, synthesis, logical, monographic, comparative, economic analysis of the statistical data and grouping method.

**International analysis.** According to analytical company Statista Platform, about 139 million wearable devices were shipped globally in the fourth quarter of 2022, up from previous years, and a total of about 492 million wearable devices such as: smart watches, fitness monitors, smart wearable devices, overhead displays and many other devices were sold in 2022 [1]. In the period 2014 - 2022, the number of total wearables device unit shipments worldwide increased in 17 times (Figure 1).

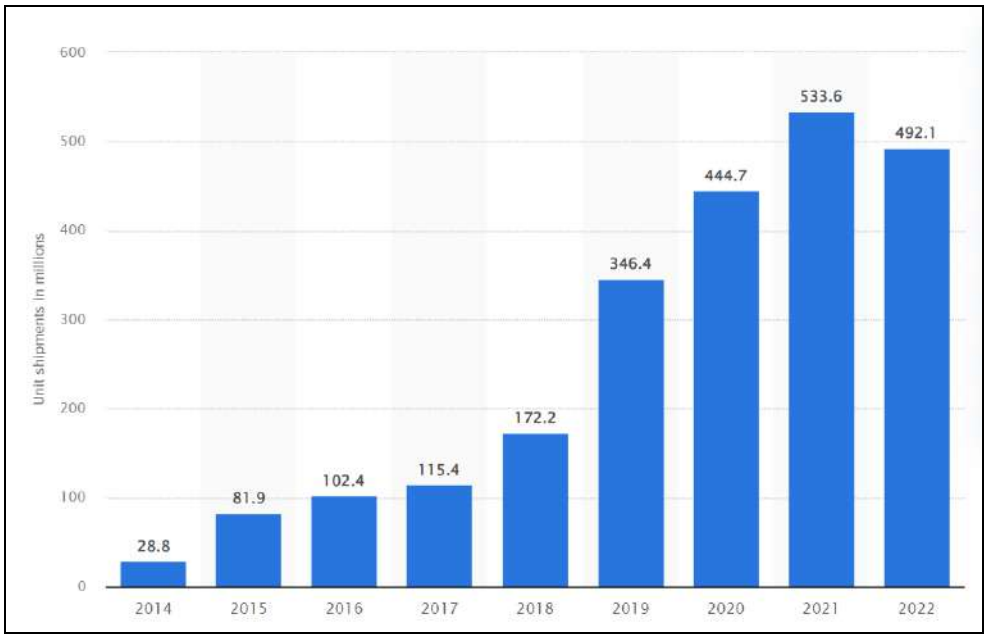


**Figure 1. Total wearable device unit shipments worldwide 2014-2022**
***Surce:*** Statista Platform [1]

According to data from platform Statista, Apple is the leading manufacturer in terms of global wearable device shipments, with total shipments totaling more than 46 million units in the fourth quarter of 2022. Fitbit was overtaken by Apple and Xiaomi in 2017, and was acquired by Google in 2021. Apple is currently the largest manufacturer of wearable devices, accounting for 29.7% of the market in 2022. With the launch of the Apple Watch into the consumer market in April 2015, the tech company has rapidly increased its share of the smartwatch market, which was previously led by Samsung. Apple shipped about 146.3 million devices in 2022 [1] – (Figure 2).

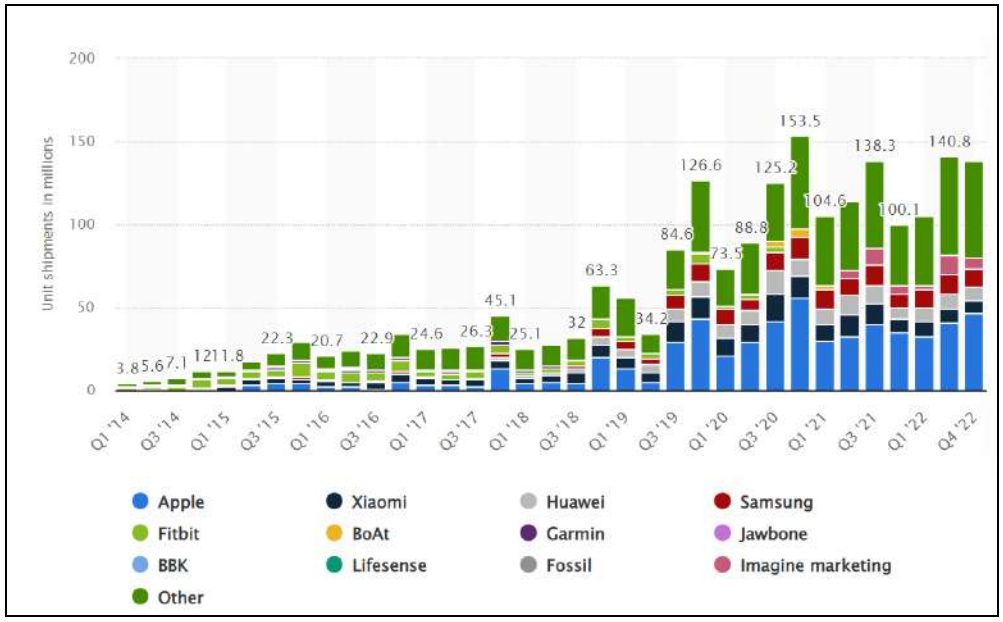


**Figure 2. Wearables unit shipments worldwide by vendor from 1st quarter 2014 to 4th quarter 2022***(in millions)*

***Surce:*** Statista Platform [1]

The Apple iPhone has become the sales leader among smart phones, covering 20% of the global market, and in some countries all 50%. By 2023, 14 lines of i-phones have been released, with a division into consumer and professional models. Many people become appreciated Apple gadgets because of constantly improving technologies and designs, others - because of the extraordinary ideas of the brand, but most appreciate iPhone because of its ability to provide everything a user needs and even more.

**Digital quality of life devices.** The priority areas for information technologies are: self-directed wearables electronic (healthcare), smart-house, environment. But the biggest penetration of information technology is in the medical field and it affects everyone. They promise new methods for preventing, diagnosing, and controlling diseases, as well as new drugs and technology for tracking and treating ailments. For instance: the global *smart watch* market is segmented on the basis of operating system (Watch OS, Wear OS, other operating systems), display type (AMOLED, PMOLED, TFT LCD), application (personal care, medical, sports), and geography. *Fitness-bracelet* is a gadget that, in most cases, is worn on the arm and has built-in sensors that track activity throughout the day, including: number of steps, heart rate, sleep, calories burned, etc. It is not a piece of jewelry, but a tool to monitor your health. The basis of any fitness bracelet is an accelerometer - a sensor that detects when you move. A *glucometer* is a device for measuring blood glucose levels and today this device is electronic in 90% of cases. A *contact lens-based diagnostic device* allows a biosensor to be placed in close proximity to eye tissue and to use tear fluid, which is known to reflect pathophysiological changes in certain systemic and eye diseases, to monitor diabetes. Biochemical reading technology for biomarkers in tears is rapidly evolving, allowing future diagnostic contact lenses to incorporate either electrochemical or optical reading technologies.

Apple Inc. pioneered the digital health platforms ResearchKit, HealthKit, and CareKit, which support physicians, medical research, and the development of health-related apps in a variety

of ways: Autism & Beyond tracks signs of autism in a child, EpiWatch forecasts epileptic attacks, and more. Developed by experts from Oxford, Yale and other scientific and medical centers.

**National analysis.** Today, in the Republic of Moldova, as well as in all developed and developing countries, the sale of wearable electronic devices is increasing. With the entrance in the country the Global companies as Apple, Xiaomi, Huawei, Samsung, the sales of wearable electronic devices began to grow rapidly.

At the same time, the country itself is a producer of electronic equipment and electronic devices. The tradition of electronic equipment manufacturing has long prevailed in the Republic of Moldova. Moldova has historically had a strong school of electronics, which was actively invested in by the Soviet government in the late 1980s. Known as the third largest supplier of electronic equipment in the former Soviet Union, with more than 170 companies and 16000 employees, the electronics industry is one of the most promising industrial sectors in the country in terms of contribution to GDP and job creation. The wide range of Moldovan companies' products covers hardware and software, electronic components and devices, smart meters, printed circuit boards, micro- and nanoconductors, design and manufacturing of electronic devices, nano- and micro-wire sensors and much more [5].

The electronics produced in Moldova are exported to numerous countries on almost all continents. For example, Moldovan Company ADD Grup has exported more than 7 million smart meters to 27 countries. The company is one of the pioneers of electronics in Moldova, successfully develops and manufactures „smart" meters to measure the consumption of electricity, water and a number of other utilities. At the same time, Moldovan smart meters are among the most reliable and efficient in the demanding European market [5].

The success of this sector is ensured by a solid engineering foundation, which includes: education and professional formation, specialized colleges and excellence centers, as well as higher education institutions, including the Technical and State Universities of Moldova and the Academy of Economic Knowledge of Moldova. The curricula of schools, colleges and professional universities are under constant supervision of the government and the needs of the whole industry, ensuring that they meet the needs and standards of the sector. Moreover, the availability of a dual system of education allows companies to use skilled labor at an affordable price.

The information and communication technologies industry in the Republic of Moldova has a dynamic growth due to high market demand, competition and consolidation of efforts of all participants. It annually generates about 7% of the country's gross domestic product, with the total revenue amounting to about 15 billion MDL. Over the last 5 years, the communications market has grown to competition and dynamic growth, positioning the electronic communications country among the leaders in the measurement of high-speed Internet, availability, and more recently in the availability of gigabit Internet. In 2015-2020, the information technology sector is becoming the engine of information and communication technologies industry growth in Moldova, with a fourfold increase in growth, outpacing the telecommunications sector. A dedicated policy and legislative framework for the information technology and digital industry has played a central role in its remarkable and dynamic development [4].

The implementation in the country of such Strategies as: „ Electronic Moldova „ in 2005, „Digital Moldova 2020", „e-Transformation" programs, Information Security Strategy of the Republic of Moldova 2019-2024, other policy documents, have led to the creation of a solid infrastructure with a coverage of 99% of the population with Internet access, half of the users of

public services access services electronically, 127 out of 662 public services are accessible electronically. The ICT sector has become a driver of development, overtaking traditional industries such as the wine industry in terms of export volume - the share of ICT services exports reached 5% of total trade or 23.8% of total services exports [4].

**Moldova's rank in DQL index.** The Global Digital Quality of Life (DQL) index 2023 calculated for 117 countries in the world and covering 92% of the world's population. Index is analyzing the impact of five basic pillars: internet accessibility, connection quality, e-infrastructure, digital security, and e-government. In 2023 the top of the DQL index is Israel followed by France, Finland, Denmark, Luxemburg, Spain, Estonia, Austria, Switzerland, Singapore, Sweden, Netherlands, Lithuania.

Digital Quality of Life index 2023, indicates the growth of digital quality of life in the Republic of Moldova in 2023 compared to previous years (in 2022 the indicators were the same). Moldova ranks 54th out of 117 countries in the world and 33rd in Europe out of 38 countries, with the index unchanged compared to 2022. In 2023, Moldova ranks 30th for Internet affordability, 29th for Internet quality, 76th for e-infrastructure, 52nd for e-security and 69th for e-government.

**Digitization policies in the Republic of Moldova.** In 2023, the Government of the Republic of Moldova approved the Digital Transformation Strategy of the country for 2023-2030. This important event, held in September 2023, is an important milestone as this Strategy reflects a comprehensive vision of the country's digital development. The document consolidates the vision of the country's digital development until 2030 and confirms the authorities' determination to build a modern society oriented towards citizens and in line with the European integration agenda.

The main objectives of the strategy focus on contributing to the sustainable development of the country by:

- Developing a digital society;
- Developing a sustainable and competitive information and communication technology sector;
- Creation of an innovative and sustainable digital economy;
- Creation of an efficient, intelligent and transparent digital state;
- Creating an accessible, secure and inclusive digital environment;
- Strengthening the image of the Republic of Moldova as a digital nation.

The implementation of the Strategy requires joint efforts of all parties involved: public institutions, private sector and civil society. Public services in the Republic of Moldova will be rethought and transformed to ensure fast and inclusive access for citizens. In the coming years, the government will have to strengthen measures to ensure a secure cyberspace, develop the digital economy, and strengthen society-wide knowledge and skills to utilize digital interactions between institutions, citizens, and the business environment.

The approval of the Digital Transformation Strategy for 2023-2030 is an important step towards a better future for the Republic of Moldova. It reflects the country's commitment to moving closer to international standards and adopting best practices in the digital sphere.

The Strategy was the result of a common effort of the Government of the Republic of Moldova, national and foreign experts of the United Nations Development Program (UNDP) in Moldova. The institutions that form the core of the country's digital transformation, namely the e-Government Agency, the Public Services Agency, the Information Technology and Cyber Security Service, were also involved.

**References:**

1. STATISTA: Total wearable device unit shipments worldwide 2014-2022. https://www.statista.com/statistics/437871/wearables-worldwide-shipments/

2. COLESNICOVA V., DOGA V. *The influence of information technologies on improving people's quality of life: global experience.* În: Conferința Internațională Științifico-Practică „Creșterea economică în condițiile globalizării"; ed. a XV-a, 15-16 octombrie 2021. Chișinău: INCE, 2022, vol. 2, - 426 p., pp. 353-360. ISBN 978-9975-3529-6-3

3. COLESNICOVA V., DOGA V. *The digital quality of life in the world: the assessment and comparative analysis.* În: Conferinţa Internaţională Ştiinţifico-Practică „Creșterea economică în condițiile globalizării", Ediţia a XVI-a, 12-13 octombrie 2022, pp.386-390 https://doi.org/10.36004/nier.cecg.IV.2022.16.23

4. Digital Transformation Strategy of the Republic of Moldova for 2023-2030 / Strategia de transformare digitală a Republicii Moldova pentru anii 2023–2030 (STDM 2030). https://particip.gov.md/ro/document/stages/anunt-privind-initierea-elaborarii-strategiei-de-transformare-digitala-a-republicii-moldova-pentru-anii-20232030-stdm-2030/9355

5. ЕШАНУ В. Электронная промышленность Молдовы открывает перспективу для молодых людей. Логосс-пресс №14 (1420) 15 Апреля 2022. http://logos.press.md/1420_04_1/