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INFORMATION TECHNOLOGIES AND THEIR APPLICATIONS: DEVELOPMENT STAGES, PRACTICES AND FUTURE PROSPECTS

Abstract

This article provides a scientific analysis of the role of information technologies (IT) in the social, economic, and scientific development of modern society, their main areas of application, as well as the opportunities and challenges brought by technological transformation. Examples of IT use in public administration, education, healthcare, industry, and business are presented, and Azerbaijan's national experience is analyzed in the context of its digital development strategy. The study concludes that for the effective implementation of IT, the development of human capital and the improvement of digital literacy are as essential as technological infrastructure.

Keywords: *information technologies, digitalization, e-governance, artificial intelligence, innovation, cloud technologies, digital economy.*

INTRODUCTION

Information technologies are recognized as one of the leading directions of development in the 21st century. Due to the global digitalization of social and economic systems, a new stage of development - the *information society* - is taking shape.

While the industrial revolution of the 20th century was characterized by an increase in physical production, the 21st century is often referred to as the "Age of Information." The essence of IT lies in the efficient processing, storage, and use of information flows. This process not only has technological aspects but also generates social and economic transformations.

Development stages of information technologies

Stage	Time Period
I Stage (1940–1960)	Emergence of electronic computing, first computer systems (ENIAC, IBM 701)
II Stage (1970–1980)	Era of microprocessors and personal computers
III Stage (1990–2000)	Development of the Internet and global communication networks
IV Stage (2000–2010)	Mobile technologies, social media, and digital communication
V Stage (2010–Present)	Artificial intelligence, cloud computing, Big Data, blockchain, Internet of Things (IoT)

Currently, the world is in the stage of the *Fourth Industrial Revolution*, where technologies play not only the role of tools but also function as integral elements of decision-making mechanisms.

Application of IT in Various Sectors

Public Administration

The implementation of IT plays a crucial role in optimizing public services and increasing transparency.

Azerbaijan is among the regional leaders in this field. Platforms such as **ASAN Service**, **E-Gov**, **ASAN Login**, and **myGov** ensure the fast and transparent delivery of electronic services to citizens.

International experience: Estonia has achieved full digitalization of public administration through its **e-Estonia** model.

Education

The role of IT in education has significantly increased in recent years. E-learning platforms such as **Moodle**, **Coursera**, and **Khan Academy** enable global knowledge sharing.

Azerbaijani

experience:

Projects such as **AzEduNet**, the **Virtual School** platform, and the **Distance Education** system have accelerated the digitalization of the educational process in the country.

Healthcare

Digital healthcare (*e-Health*) is characterized by the electronic management of patient data, online consultations, and AI-based diagnostic systems.

Example: According to the WHO (2023), the use of artificial intelligence in medical analysis has increased diagnostic accuracy up to 95%.

Azerbaijani

example:

The **Electronic Health Card** and **MyHealth** platforms enable citizens to manage their medical data within a centralized system.

Business and Industry

The application of IT accelerates business processes, reduces costs, and enhances production efficiency.

Technologies such as **ERP**, **CRM**, cloud-based analytics, and **Big Data** have become essential management tools for modern enterprises.

Example: Platforms such as **Amazon Web Services (AWS)** and **Microsoft Azure** provide enterprises with large-scale cloud infrastructure solutions.

Azerbaijani

example:

The **AzInTelecom Cloud Platform** and **Smart City** projects contribute to the formation of the digital economy.

Agriculture and Environment

In recent years, **AgroTech** and **GreenTech** directions have been developing rapidly. Through sensor technologies and satellite data, the management efficiency of land and water resources has significantly improved.

Azerbaijani example:

Smart Village projects promote the implementation of digital agriculture models in rural areas.

Key Challenges in the Application of IT

1. Cybersecurity and Data Protection

- Hacker attacks and data breaches continue to pose global threats.

2. Digital Inequality

○ Disparities in internet access and technological opportunities among regions limit balanced development.

3. Ethical and Legal Regulation

○ Legislation regarding artificial intelligence, data processing, and privacy protection remains incomplete.

4. Workforce Shortage

- A lack of professionals with digital skills slows down the pace of development.

Future Directions of IT Development

1. Artificial Intelligence and Machine Learning

○ Automated decision-making systems will be applied across more sectors.

2. Blockchain Technologies

○ Will enhance transparency and reliability in data exchange.

3. Quantum Computing

○ Will open a new stage in the processing of Big Data.

4. Digital Economy and E-Commerce

○ Will completely transform global trade relations.

5. Inclusive Digitalization

○ Ensuring equal access for every individual to technological opportunities will become a main priority.

Azerbaijan's Strategic Vision

Within the framework of the “**Digital Azerbaijan 2030**” strategy, Azerbaijan has identified the implementation of IT in all sectors as a national priority.

Key directions:

- Expansion of e-government services;
- Implementation of artificial intelligence and “Smart City” projects;
- Support for the startup ecosystem;
- Programs for enhancing digital skills.

These directions serve as the foundation for Azerbaijan's transition to an innovative economic model.

CONCLUSION

Information technologies play a fundamental role in the development of modern society, serving as a driving force for social, economic, and scientific progress. For sustainable technological development, not only a strong technical base but also human capital, ethical regulation, and digital awareness are essential. The digital transformation programs and international cooperation initiatives implemented by Azerbaijan in recent years position the country as one of the potential digital leaders in the region.

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***Açar sözlər:** informasiya texnologiyaları, rəqəmsallaşdırma, elektron idarəetmə, süni intellekt, innovasiya, bulud texnologiyaları, rəqəmsal iqtisadiyyat.*