



## PROBLEMS OF THE PROCESS OF DIGITAL TRANSFORMATION OF THE INDUSTRY OF UZBEKISTAN

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### Abstract

Industry 4.0 has provided the technological integration of cyber-physical systems and Internet-based communication in the production value creation processes. Despite the potential benefits of Industry 4.0, organizations face common obstacles and challenges in adopting new technologies and successfully implementing them in their business models. This article identifies and analyzes the problems that may hinder the implementation of Industry 4.0 in production organizations, and gives practical recommendations for their elimination.

**Keywords:** Industry 4.0, value chain integration, cyber safety problems, database problems, organizational structural model, digitize and intellectualize, cyber-physical objects, human-machine interfaces.

### Introduction

The transition from mass production to a diversified production method requires industrial enterprises to digitize and intellectualize their operations in response to the requirements of the current market economy [1]. Industry 4.0 integrates the digital world into the physical world with the help of cyber-physical objects and human-machine interfaces, resulting in increased efficiency in the operations of enterprises. Industry 4.0 will provide individual and efficient production at a reasonable price through smart machines, smart sensors and other computer-based technologies. Our country's industrial enterprises will have to develop clearly defined strategies to move the production process to the digital stage. Despite the many advantages of Industry 4.0, there are problems that prevent the adoption of these new technologies and their impact on existing production practices. Therefore, in order to overcome these difficulties, it is very important to describe the barriers to the implementation of Industry 4.0 and observe the interactions between them [2]. Industrial enterprises operating in our country should be aware of the problems that may arise in the process of digital transformation and be able to overcome them. For this purpose, the experiences of foreign enterprises and the practical research of a number of scientists who have conducted research in this field are useful to us. Having studied and analyzed them, we can identify several obstacles that may arise in





enterprises for the implementation of Industry 4.0, such as cyber security, unskilled labor force, high costs of introducing new systems. Below are the identified problems and their description.

Table 1 Obstacles to the adoption of Industry 4.0 in production organizations

<b>Obstacle</b>	<b>Description</b>
Complexity of value chain integration	IoT ( internet of things ) integration is a big problem in the industry 4.0 environment as creating infrastructure between cyber - physical technologies and systems is difficult task.
Cyber safety problems	Cyber security risks exist in the Industry 4.0 environment because it involves the interaction of everything in the entire value chain
Abstraction of economic efficiency	The economic benefits of capital investments in the introduction of Industry 4.0 technologies have not been clearly assessed.
lack of relevant skills in the workforce	The lack of digital skills is a major challenge in the successful implementation of Industry 4.0.
High investment necessity	Difficulties in introducing new technologies in their production environment due to the lack of resources
Lack of infrastructure	Lack of Internet coverage and IT infrastructure can act as a potential block in the implementation of Industry 4.0 strategies.
Unemployment level	Ongoing technological progress and automation are changing the structure of existing jobs, creating challenges for labor markets.
Database problems	These challenges relate to the ability to process large amounts of data generated by various machines, processes, sensors, and products, as well as the ability to extract meaningful information from large amounts of data.
Lack of safety standards and norms	Due to the lack of security and common standards, there are difficulties in integrating value creation networks with different standards.
Reluctance to changes	Reluctance of management and employees to use new technologies



Model construction based on OSM. The structural model of barriers is constructed from the final attainment matrix as shown in Figure 1. Six level barriers obtained from the level splitting iteration process are placed in this model.

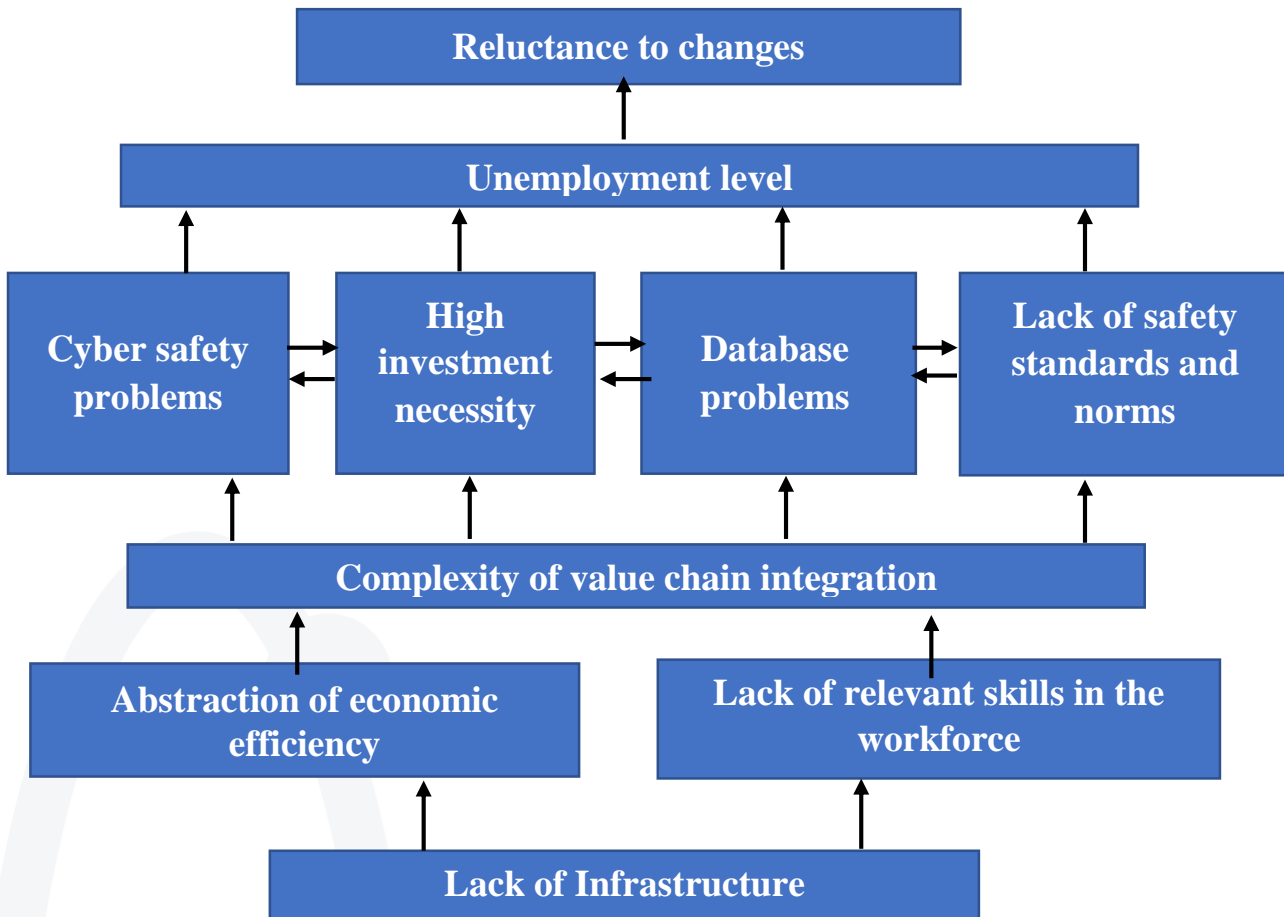


Figure 1. Organizational structural model of barriers to implementation of Industry 4.0.

The model shows that "Lack of Infrastructure" is the most important root or major barrier to the adoption of Industry 4.0 in manufacturing organizations. As the model shows, uncertainty about economic benefits and lack of necessary skills in the workforce can be caused by a lack of infrastructure to implement Industry 4.0. Inadequate skills of employees and lack of clarity about economic benefits can lead to difficulties in value chain integration between organizational units and other organizations.

It can be seen from the model that "reluctance to change" is the first level in the model and "unemployment rate" is the second level. In addition, the third level consists of four barriers, namely "cyber security challenges", "high investment", "data management and poor data quality" and "secure standards and norms".



The fourth level is occupied by "poor value chain integration", while the fifth level is covered by "uncertainty about economic benefits" and "lack of relevant skills in the workforce". "Lack of infrastructure" is at the root level and the most important barrier to the adoption of Industry 4.0. In order to successfully implement Industry 4.0, manufacturing organizations must have sufficient and capable technological infrastructure in their production environment, such as reliable high-speed connectivity, uninterrupted power supply, and IoT architecture for cyber-physical systems. This is the most important factor that plays an important role in the successful implementation of Industry 4.0 technologies. Unless this barrier is alleviated, it may not be effective to focus on alleviating other barriers. Next, it is necessary to improve the technical skills of employees in these emerging technologies, as well as to improve the entire value chain network of suppliers and partners through networking and rapid connectivity. Organizations should evaluate the economic benefits of using these technologies in production and services. A poor value chain can lead to high investments, cybersecurity issues, and challenges in data quality and management. Therefore, organizations must take necessary measures to overcome these obstacles, as they can lead to ineffective implementation of Industry 4.0.

The results show that for the proper diffusion of INDUSTRY 4.0, the government needs to provide the industry with the necessary digital infrastructure. Academia and research organizations must demonstrate the economic benefits of INDUSTRY 4.0 to industry. It is desirable to develop pilot projects to strengthen confidence in the industry. Lack of requisite skills is another important and major barrier that needs to be alleviated urgently. Universities should develop training programs in various aspects such as sensor technology, cyber security, machine-machine-human integration, data analytics, business intelligence, collaborative robotics, CPS, IoT, etc.

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