KEY CLASSIFICATION CRITERIA OF INDUSTRIAL SECTORS IN THE DEVELOPMENT OF THE REGIONAL ECONOMY

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Annotation

This article examines the key classification criteria of industrial sectors in the development of the regional economy. The study systematizes theoretical approaches to industrial classification based on technological intensity, resource dependence, value-added level, innovation capacity, export orientation, employment contribution, and environmental impact. The paper analyzes how different industrial sectors influence regional economic growth, structural transformation, competitiveness, and sustainable development. Special attention is given to the role of industrial diversification, digital transformation, and integration into global value chains in strengthening regional economic resilience. The research highlights that an effective classification of industrial sectors enables policymakers to design targeted industrial policies, optimize resource allocation, and ensure balanced socio-economic development of regions. The findings contribute to improving methodological approaches to industrial policy planning within the framework of sustainable regional development.

Keywords

industrial sectors, regional economy, classification criteria, industrial policy, economic development, structural transformation, technological intensity, value-added production, innovation capacity, export orientation, sustainable development, regional competitiveness.

In turn, the high-technology sectors of the manufacturing industry are also classified according to the following three levels:

High level: chemical production, pharmaceuticals, computers, electronic and optical products, electrical equipment, machinery and equipment manufacturing, automobile manufacturing, transport machinery, medical and dental instruments.

Medium level: rubber products, construction materials production, metallurgy, shipbuilding, machinery and equipment repair and installation.

Low level: beverages and food products, light industry, wood processing, paper industry, petroleum products manufacturing, furniture industry, metal products manufacturing.

These three levels are directly linked to the "historical experience of industrialization," which demonstrates the existence of a sustainable model in countries that have successfully transitioned from an agrarian and raw material-based economy to a high-technology economy. This model is referred to as the "ladder of industrialization," which implies a consistent transition from initial sectors with high labor intensity to complex sectors relying on knowledge and innovations (Table 1).

Table 1

Stages of industrialization in the historical experience of industrialization

Industrialization Stage	Description
First Stage	Based on attracting a large volume of labor force to labor-intensive sectors with simple technological cycles. The main tasks of this stage are creating mass employment, activating domestic demand, and initiating export activities. Priority sectors are those with low entry barriers, high scaling potential, and orientation toward external markets.
Second Stage	Countries transition from the export-assembly model to forming their own production base. This medium-term stage envisions the development of an industrial platform aimed at import substitution. At this stage, the systematic establishment of heavy and capital-intensive industry is implemented, encompassing metallurgy, mechanical engineering, energy, and chemical industry.
Third Stage	The transition to a knowledge-based economy and knowledge exports begins when the country achieves maturity in manufacturing sectors and is prepared for creating high-technology production. This is the stage of an innovation economy relying on R&D, encompassing startups, technology exports, and the innovation ecosystem. Here, the focus is directed toward information technologies, microelectronics, biopharmaceuticals, intelligent equipment, financial technologies, and new energy solutions.

In another scientific source, four types of production are distinguished in the classification of economic activity types of the industrial sector according to technological structure:

High-technology manufacturing: pharmaceutical products manufacturing, office equipment and computing technology, radio, television, and communication apparatus manufacturing, medical equipment, optical instruments and equipment manufacturing, aerospace apparatus manufacturing.

Medium-high-technology manufacturing: machinery and equipment manufacturing, chemical production, electrical equipment and electric machinery manufacturing, automobiles, trailers, and other transport vehicles manufacturing.

Medium-low-technology manufacturing: coke and petroleum products manufacturing, rubber and plastic products manufacturing, metallurgical production, other non-metallic mineral products manufacturing, construction and ship repair.

Low-technology manufacturing: food products, beverages, and tobacco products manufacturing, textiles, clothing, leather, and fur products manufacturing, wood processing and wood products manufacturing, cardboard, paper, and cellulose production, secondary raw material processing.

According to certain studies, industrial sectors such as the machine-tool industry, industrial biotechnologies, engineering activities and industrial design development, industrial parks, and children's goods industry are also grouped based on the following principles: sectors oriented toward creating new types of innovative products (composite materials, rare and rare earth metals), sectors oriented toward the consumer market (primarily automobile manufacturing), and sectors oriented toward investment demand (mechanical engineering, machine-tool industry, and others).

The sectoral structure of industry characterizes the degree of social division of labor and production differentiation across sectors, the level of industrialization and technical progress of the region and country, production links between industry and other sectors of the national economy (agriculture, transport, construction, trade, and others), as well as intra-industrial production interdependencies (between extractive and manufacturing industry, etc.).

The following significant factors influence the formation of the sectoral structure of industry: scientific and technical progress, planned rates of development of industry as a whole and its individual sectors, the composition and volume of market demand, raw material resources, forms of social organization of production, concentration, specialization, cooperation, and combination, the material well-being of the population, division of labor, and socio-historical

conditions, among others. The classifications of industrial sectors carried out using all the above-described criteria can be generalized according to the following characteristics (Table 2).

Table 2

Key classification criteria of industrial sectors

Classification Criterion	Types of Industrial Sectors
By the basic division of labor	At the economic level; At the enterprise level
By the economic purpose of the product	Sectors producing means of production; Sectors producing consumer goods
By the nature of impact on the object of labor	Extractive (coal, peat, etc.); Manufacturing sectors (carrying out further processing of raw materials)
By the source of consumed raw materials	Sectors processing raw materials of industrial origin (metallurgy); Sectors engaged in processing agricultural raw materials (meat, dairy, etc.)
By functional purpose (inter-sectoral complexes)	Fuel and energy complex (extraction and production of all types of fuel and energy); Metallurgical complex (extraction and enrichment of ore raw materials); Mechanical engineering complex (instrument-making); Chemical-forestry complex, construction materials industry (cement); Light industry (garment manufacturing, etc.); Agro-industrial complex (meat, dairy)
By functional purpose	Sectors producing intermediate products; Sectors producing finished (final) products
By cost structure	Labor-intensive sectors; Material-intensive sectors; Capital-intensive sectors; Energy-intensive sectors, and others
By the degree of concentration of production and supply, as well as the production of identical products at individual enterprises	Perfectly competitive; Monopolistic; Under monopolistic competition conditions; Oligopolistic
By the nature of the technological process	Sectors with continuous technological processes; Sectors where chemical processes

	predominate; Sectors where electrochemical processes predominate; Sectors where other processes predominate
By the possibility of year-round operation	Seasonal; Non-seasonal
By the commonality of production types (sectors uniting enterprises)	Mass production; Large-series production; Series production; Individual (custom) production

The development of the regional economy largely depends on the structure, composition, and qualitative characteristics of its industrial sectors. The classification of industrial sectors based on key criteria—such as technological intensity, value-added level, innovation capacity, employment impact, export orientation, resource dependence, and environmental sustainability—provides an analytical foundation for understanding structural strengths and weaknesses within a region. A well-grounded classification system allows policymakers to move beyond quantitative indicators and focus on qualitative transformations that ensure long-term competitiveness and resilience.

First, technological classification plays a decisive role in determining the growth trajectory of regional industry. Regions dominated by low-technology and raw-material-based sectors often face limited productivity growth and higher vulnerability to global market fluctuations. In contrast, regions with a growing share of medium- and high-technology industries demonstrate stronger innovation performance, greater labor productivity, and enhanced capacity for structural modernization. Therefore, technological upgrading should be viewed as a strategic direction for sustainable regional development.

Second, the value-added criterion reflects the depth of industrial processing and the region's position within national and global value chains. Regions that primarily export raw materials or semi-finished products typically capture limited economic benefits. Transitioning toward deeper processing, advanced manufacturing, and knowledge-intensive production increases regional income, strengthens fiscal sustainability, and enhances investment attractiveness. In this regard, industrial classification must emphasize sectors capable of generating high value-added output.

Third, innovation capacity has become a central parameter in modern industrial classification. Industries characterized by strong research and development activities, digital integration, and advanced technological adoption contribute significantly to structural transformation. Digitalization, automation,

and the implementation of Industry 4.0 technologies improve efficiency, reduce production costs, and open new market opportunities. Regions that integrate innovation-driven sectors into their industrial structure are better positioned to achieve long-term economic stability.

At the same time, social and employment aspects remain essential components of industrial classification. Labor-intensive industries may play a stabilizing role in regions with high unemployment rates; however, without technological modernization, their contribution to productivity growth remains limited. A balanced approach is required—one that combines employment generation with productivity enhancement through skill development and technological upgrading.

Environmental sustainability is another increasingly important criterion in industrial classification. In the context of global climate challenges and green transformation, industrial sectors must be evaluated according to their energy efficiency, carbon intensity, and ecological impact. The transition toward environmentally friendly production models, renewable energy use, and circular economy practices ensures not only ecological protection but also long-term economic competitiveness.

Based on these conclusions, several strategic recommendations can be formulated. Regional industrial policy should adopt a multidimensional classification framework that integrates economic, technological, social, and environmental indicators. Priority support should be directed toward high value-added and technology-intensive sectors capable of generating sustainable growth. At the same time, diversification strategies must be implemented in regions heavily dependent on resource-based industries in order to reduce structural risks.

Investment in human capital development is crucial to align workforce skills with technological transformation. Strengthening cooperation between universities, research institutions, and industrial enterprises will foster innovation ecosystems within regions. Additionally, accelerating digital and green transformation should become a core objective of regional industrial policy, ensuring compliance with international standards and integration into global markets.

In summary, the classification of industrial sectors is not only a methodological tool but also a strategic mechanism for guiding regional economic development. A comprehensive and forward-looking approach to industrial classification enables regions to enhance competitiveness, stimulate innovation, promote balanced socio-economic growth, and ensure sustainable development in the long term.

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