CURRENT CHALLENGES IN THE EUROPEAN UNION MACHINERY AND EQUIPMENT INDUSTRY

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Abstract
The machinery and equipment industry occupies a key place in the economy of the European Union, representing a fundamental part of technological growth, employment and international trade. The article below analyzes the economic contribution of this sector, the regulatory framework at EU level, competition regulations and the geographical orientation of the sector's product flows. In this paper, we will be able to see what contribution the machinery and equipment industry makes to the EU economy, what the implications for the sector's development have been and how important it is for Europe as a whole.

Keywords: machinery and equipment industry; European Union; economic regulation; competitiveness, current challenges, digitalization.

JEL Classification: L60, O14.

1. INTRODUCTION

The machinery manufacturing industry has its origins as far back as the industrial revolution and has continuously evolved to the present day. It encompasses a wide range of sub-branches, useful in all sectors of the economy, namely, machinery, equipment, plant, machinery and means of transportation.

It also includes the manufacture of other machines with a special purpose which are not elsewhere classified, regardless of whether or not they are used in a manufacturing process, e.g. amusement equipment for fairs, bowling alleys, etc. (http://evede.net/ru/nace/2800).

This industry is an essential part of the manufacturing sector, with direct contributions to exports, productivity and innovation. The role of the machinery manufacturing industry is growing steadily, based on the transition to a digital and at the same time sustainable economy.

Globally, the most competitive sector is machinery and equipment. Europe generates more than a third of the production of machinery and equipment, plus half of exports come from Europe.

One by one, a series of questions arise in connection with this branch, including: why are these machines and equipment so important? What does it mean for Europe to have the largest and most advanced manufacturing base for machinery and equipment? Their answer is as simple as that. We look around us every day and realize how much these things matter to us - computers, mobile phones, watches, machines, etc. (www.export.gov, European Union, n.d. - Machinery Legislation).

The machinery and equipment industry is a sub-sector of the mechanical engineering industry. Machinery and equipment have a strategic place within this industry, namely to enable the production of all other industrial products. They underlie almost every manufacturing process involving metal.

The machinery and equipment industry as such is fundamental to the productivity and competitiveness of the entire European manufacturing base.

Europe has the largest production of machinery and equipment in the world. Equipment equipped with state-of-the-art technology is delivered to countries around the world and contributes to the industrialization of the country.

The rapid industrialization process in developing, Asian and South American countries is accompanied by strong growth in industrial production in the automotive, components, electronics and electrical sectors, as well as increased investment in energy and infrastructure.

The general and special purpose machinery and equipment manufacturing sector covers less than 3.0% of industrial production in the country and contributes about 3.5% of value added in industry.

The production process consists of the manufacture of engines and turbines, hydraulic pumps, compressors, compressors, valves, bearings, gears, furnaces and burners, lifting and handling equipment, office equipment, tools, refrigeration and ventilation equipment, agricultural machinery,

machine tools, and other industrial machinery (http://www.mi.government.bg/en/themes/manufacture-of-machineryand-equipment).

2. EUROPEAN UNION REGULATORY FRAMEWORK AND IMPACT ON THE SECTOR

The machinery and equipment industry is one of the most valuable components of the European economy, playing an important role in providing technological solutions for sectors such as transportation, construction, agriculture or manufacturing. The European Union, for this reason, has created a well-developed and constantly updated regulatory framework, which refers to product safety, free movement of goods, digitalization of industrial processes and last but not least their sustainability.

The domestic and international framework that companies have, come with a considerable impact on the competitiveness and export performance of the machinery and equipment industry.

The European Single Market was designed to offer businesses a large market by removing technical barriers to trade. European economic integration has stimulated competition and led to increased productivity and efficiency in industry.

The big regulatory role is occupied by the Machinery Regulation, established in 2023, which replaces the old Machinery Directive 2006/42/EC. This important regulation will fully come into force from 2027 and brings strong changes in terms of safety requirements for industrial equipment, the introduction of digital technologies and manufacturers' obligations (ETICOR, 2023, Bureau Veritas, 2023).

The regulation contains clear responsibilities for manufacturers in terms of (Bureau Veritas, 2023; Pilz, n.d.):

- assessment of risks associated with equipment equipped with automated machinery;
- include cybersecurity and artificial intelligence concepts when exploring product security;
- technical information on the ensemble available in digital form;
- use of electronic manuals.

In parallel, the European Union's Industrial Strategy supports this regulation with a technique oriented towards competitiveness, resilience and sustainability. The machinery and equipment industry is seen strategically, due to its role in European value chains and its innovation skills (European Commission, n.d.).

At the same time, the permanent inclusion of these regulations provides free movement of products in the EU market and supports investments in automation, digitalization and in enriching the environmental performance of equipment. Indeed the implementation of new requirements may also come with some additional costs, especially for SMEs, but the long-term gains are considerable, with an increase in the international competitiveness of EU industry (Pilz, n.d.).

Emerging countries undergoing a rapid process of industrialization and pursuing new industrial policies to support the development of their domestic industries have increased protectionism in recent years. Customs duties and non-tariff barriers are used to protect domestic producers from foreign competition.

Important barriers to market access recently identified by EU carmakers in different countries include health and safety regulations, certification requirements, lengthy customs and border clearance procedures, frequent government changes, lack of explicit and implicit intellectual property rights protection for local companies, the opacity of certain overseas government procurement channels, and minimum content requirements imposed on original equipment manufacturers operating in developing countries.

Most developing countries ignore global trade rules or neglect subsidizing and promoting industries. The global playing field is heavily skewed by political practices.

Outward investment is a risky decision because of the regulatory environment and distrust of government policies. A major concern stems from developing countries forcing European companies to form joint ventures with local companies if they want to invest in their own country. This creates serious knowledge transfer of risk. The transfer of profits from abroad to the country is another concern. Moreover, too much mobility of employees jumping from one company to another increases the risks of knowledge transfer.

Competition policy plays a significant role in ensuring the efficient functioning of the Single Market and is one of the cornerstones of the machinery and equipment industry in the European Union.

In the machinery and equipment sector, these regulations help to maintain a fair economic environment where innovation, quality and efficiency prevail over anti-competitive practices.

3. MAJOR CHALLENGES FOR THE MACHINERY AND EQUIPMENT SECTOR IN THE EUROPEAN UNION ECONOMY

The machinery and equipment industry comprises establishments primarily concerned with the manufacture of industrial and commercial machinery. These units were concerned with assembling parts into components, sub-assemblies and complete machines (https://www.prnewswire.com/news-releases/machinery-manufacturing-global-market-report-2018).

The term trade refers to an activity in its own right, analyzing it directly to the term trader (Aurel Burciu, Rozalia Kicsi, Economie Comercială, Editura Universității din Suceava, 2001).
Worldwide, those involved in the production of machinery are redeploying their manufacturing plants near consumer markets to cut costs and give consumers higher quality products. Soaring wages, rising transportation costs, and the burden of effective quality control are making them re-evaluate the attractiveness of manufacturing locations outside developing countries.

The machinery and equipment sector makes a significant contribution to GDP, employment and exports and therefore plays a major role in the industrial and technological development of the European Union. At the same time, this sector is subject to certain challenges, generated by technological, geo-political, economic and regulatory factors.

A huge challenge for European manufacturers is the transposition to the new legislative requirements introduced by the Machinery Regulation (EU) 2023, which repeals Directive 2006/42/EC. New actions include the following (ETICOR, 2023; Bureau Veritas, 2023):

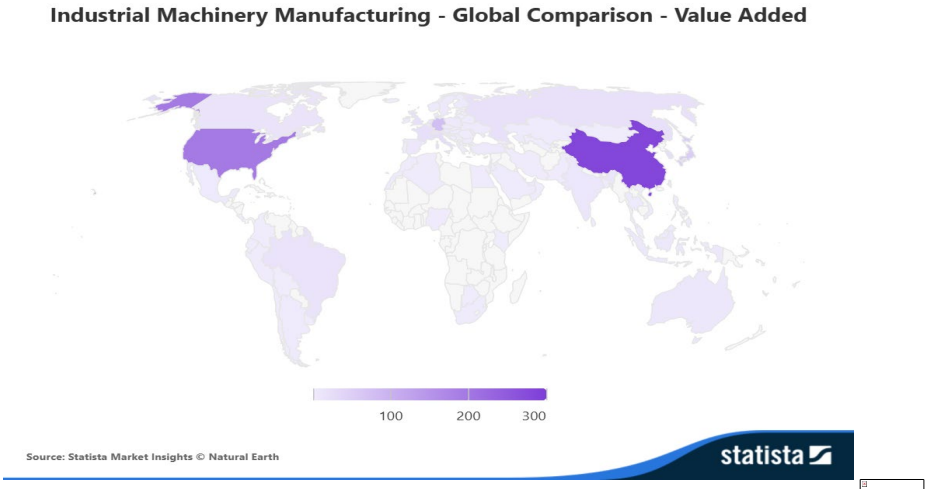
- technical documentation to be done digitally;
- introducing cybersecurity requirements;
- adding emerging technologies (e.g. AI, interconnectivity) when assessing possible risks.

In the case of large companies, the transition is maintained by their own resources, but for most SMEs, the new standards can entail considerable costs, both financial and administrative (Pilz, n.d.).

The European Union market supports the free movement of equipment, although in practice there are some technical barriers and differing national regulatory views (European Commission, n.d.). Moreover, the uneven implementation of regulations can bring artificial competitive advantages for some companies or regions (European Commission - State Aid, n.d.).

Raw material supplies have been considerably affected by the war in Ukraine, global trade pressures and fluctuating supply chains, thus increasing prices and delivery times for manufacturers. At the same time, competitors from third countries, in particular the USA and China, have put pressure against the competitiveness of the EU industry (Consilium, 2023).

Figure 1 - Industrial Machinery Manufacturing - Global Comparision - Value Added



Source: Statista Market Insights & Natural Earth, accessed in 2025

Producers in this machinery and equipment industry need to align their products with the updated objectives of the European Green Pact and Industrial Strategy. This requires:

- digitalisation of the value chain;
- increasing energy efficiency;
- reducing carbon emissions within manufacturing.

The targets are important for sustainability, but the transition costs are quite high, especially for small and medium-sized enterprises, which are put at a disadvantage in accessing green finance or in training skilled personnel (Pilz, n.d.; Burau Veritas, 2023).

The shortage of skilled labor is another systemic challenge, especially in activities such as industrial maintenance, mechatronics, automation. This lack of specialized personnel affects the sector's ability to change and produce advanced technologies such as artificial intelligence or collaborative robotics (European Commission, n.d.).

4. CONCLUSIONS

Certainly, the machinery and equipment industry plays a particularly important role in the economy of the European Union. At the same time, the machinery and equipment sector is a very important part of the whole manufacturing sector in Europe. This industry has a wide range of products, including the most varied high technology.

In general, this sector has been named as the center of industrial development, being the main driver of productivity growth to achieve the European Union's main objective of creating as many jobs as possible.

The machinery and equipment industry is the backbone of the European economy and at the same time plays an important role in supporting digitization, the green transition and industrial competitiveness. By analyzing the regulatory framework, competition, trade flows and today's challenges, a comprehensive picture of an industry undergoing change is created.

The new Machinery Regulation creates a more regulated, fair and clear environment. At the same time, the geographic location of exports and the European integration of the production system highlights the industry's ability to respond to a global demand for safe, positive and sustainable equipment.

Elsewhere, the industry is grappling with multiple challenges: geopolitical tensions, legislative constraints, technical fragmentation of the market, lack of skilled employees and the obligation to align with green standards. The challenges require the industry to adapt, but also to receive continuous support from the EU institutions.

In particular, stabilizing the competitiveness of the European machinery and equipment industry will depend on:

- introduce the principles of sustainability.
- measuring technological innovation;
- establishing transnational relationships;
- supporting SMEs in a coordinated way.

Thus, the machinery and equipment industry remains important for strategic self-sufficiency, but at the same time it is changing into a vector of industrial transformation at continental level.

As a result of all the research, we can say that the machinery and equipment industry spans a large geographical area and that Europe has the largest production of machinery and equipment in the world. The equipment is equipped with the latest technology and is distributed to countries around the world, contributing to the industrialization of the country.

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