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QUANTITATIVE AND QUALITATIVE TRENDS OF THE GLOBAL INDUSTRIAL AND MOBILE HYDRAULIC MARKET DEVELOPMENT

Successful continuation and initiation of new research and development projects in the industrial and mobile hydraulics, as well as the introduction of new components of hydraulic and pneumatic systems to the market, require a clear understanding of the main trends in the global hydraulic equipment domain. There are many reports and scientific articles which investigate different aspects of the current state and future development trends of the hydraulic market [1–5].

The research aims to generalise qualitative and quantitative trends of the global hydraulic market development. For achieving the aim integrative review method was used. Three main trends were analysed.

The first is the quantitative growth of the hydraulic equipment market over the next 10 years. Based on eight marketing research reports for the industrial and mobile hydraulic systems market, the average compound annual growth rate (CAGR) from 2024 to 2034 is 4.07%. One of the graphs characterizing the growth of the hydraulic equipment market is shown in Figure 1 [3]. Analytical report [4] indicates that the Asia-Pacific region will lead in hydraulic equipment consumption (Figure 2). According to recent fluid power market research, the main factor driving market transformation and growth is the integration of heavy-duty industrial and mobile equipment with Industry 4.0 technologies, including the Internet of Things (IoT). This factor identifies the second trend is rising in demand for smart, automated hydraulic equipment.

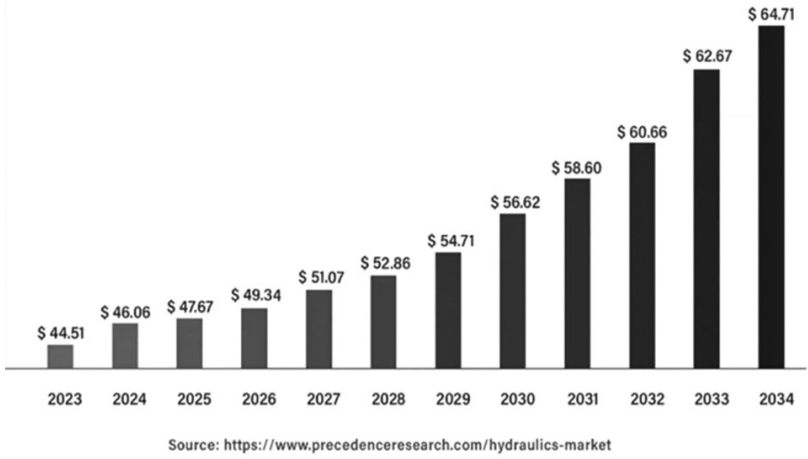

Figure 1. Global Hydraulic Market Size 2023 to 2034 (USD Billion) [3]

Figure 2. Hydraulic Equipment Market CAGR (%), Growth Rate by Region, 2025–2030 [4]

The report [2] is one of the most comprehensive generalisations of the trends in the hydraulics equipment market. The report shows that industries with high energy consumption (row materials mining, the process sector, agriculture, construction, etc.) have huge potential for the application of smart hydraulic systems. Increasing energy prices and the green transition will boost the adoption of smart hydraulics. Based on practical business

rationales, the report's authors demonstrated that technological leaps in smart hydraulics can lead to performance boosts and competitive advantages, as well as new business models in the industrial equipment and machinery sectors. As smart hydraulic technologies become increasingly widespread, first movers among such equipment developers and producers will gain a competitive advantage. It is shown that the implementation of the prospective applications of smart hydraulics does not require long preparation or a large up-front investment. According to [2, 5, 6, 7] companies can make progress on embracing the full potential of smart hydraulics if they quickly jump into these technologies [8].

The third trend involves the green transition of fluid power systems within the industrial equipment and machinery sectors. According to the data presented by the European Fluid Power Academic Association, fluid power equipment produces 2.4 times more CO2 than global aviation, making energy-saving solutions for hydraulic systems an important contribution to climate change mitigation.

The convergence of quantitative growth of the hydraulic equipment market, digitalisation and green transition in the sector makes new research and development projects in the industrial and mobile hydraulics, as well as the introduction of new components of hydraulic and pneumatic systems to the market, auspicious undertakings. Nevertheless, some electromechanical technologies, e.g. planetary roller screws linear actuators [9, 10], can become a serious competitor to electrohydraulic drives in the process of ongoing industrial and mobile equipment electrification.

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