



2016 Top Markets Report **Manufacturing Technology** Sector Snapshot

Metal-Cutting Machine Tools

Machine tools used for cutting metal are ubiquitous in metalworking. Some machines such as horizontal lathes have existed in one form or another since antiquity; while others such as computer-numerical controlled (CNC) five-axis vertical machining centers are more recent. Metal-cutting machine tools are generally powered by electric motors and employ one of many cutting processes such as turning, milling, grinding, boring, and more to achieve the desired cut on the metal workpiece. Skilled machinists will use a variety of tools and fixtures to achieve different cuts and levels of precision on a workpiece, which can range from a household screw to a jet-engine turbine blade.

Metal-cutting machine tools are sold based on the needs of the customer. Machines typically price in the five- to six-figure range, while some highly specialized machines can reach into the millions. Many short-run manufacturers may not require the automated precision of CNC, whereas others may require high-volume production with accuracy up to the micrometer. The greater the capability of the machine, typically the greater the price and the greater the skillset required of the machinist and operator.

Export Outlook

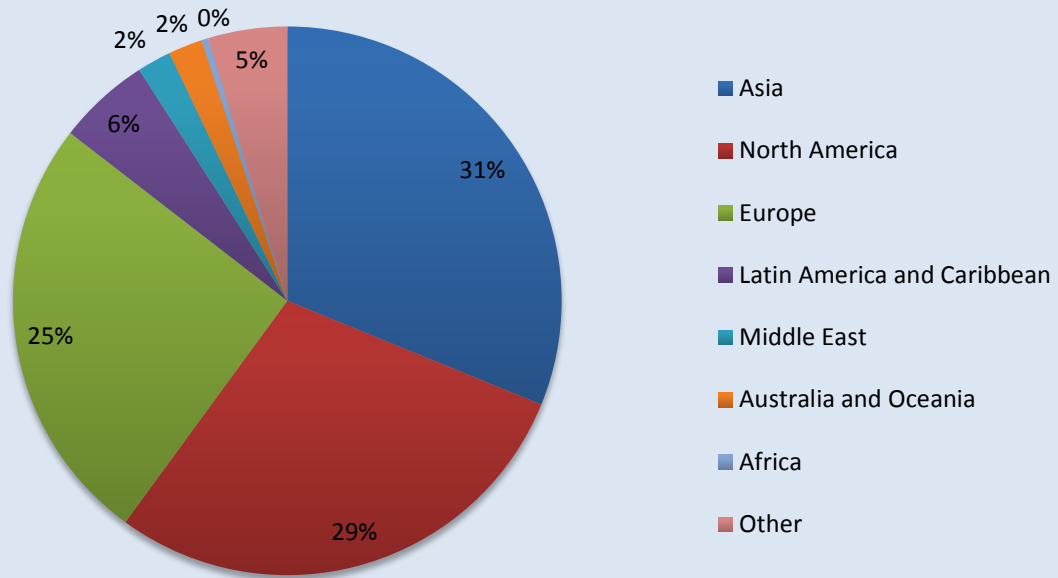
In 2015, U.S. exports of metal-cutting machine tools accounted for \$1.6 billion, the largest subsector in this Top Markets study. Sales were concentrated primarily in the Asia, Europe, and North America regions. China was the largest global importer; however, Mexico was the largest export market for U.S. companies, accounting for \$295.4 million in sales of U.S.-made equipment. The second and third largest U.S. export partners, China and Canada, accounted for \$221.3 million and \$168.2 million in sales, respectively.

For U.S. exporters, growth opportunities in the short term will likely be felt in smaller, but highly developed European manufacturing economies like Belgium and the United Kingdom, along with Asian markets like Singapore. The onset of the Chinese slowdown will likely hinder growth in the short term to China and its principle trade partners, South Korea and Taiwan, though opportunities will exist due to the sheer volume of new manufacturing in the region.

Challenges

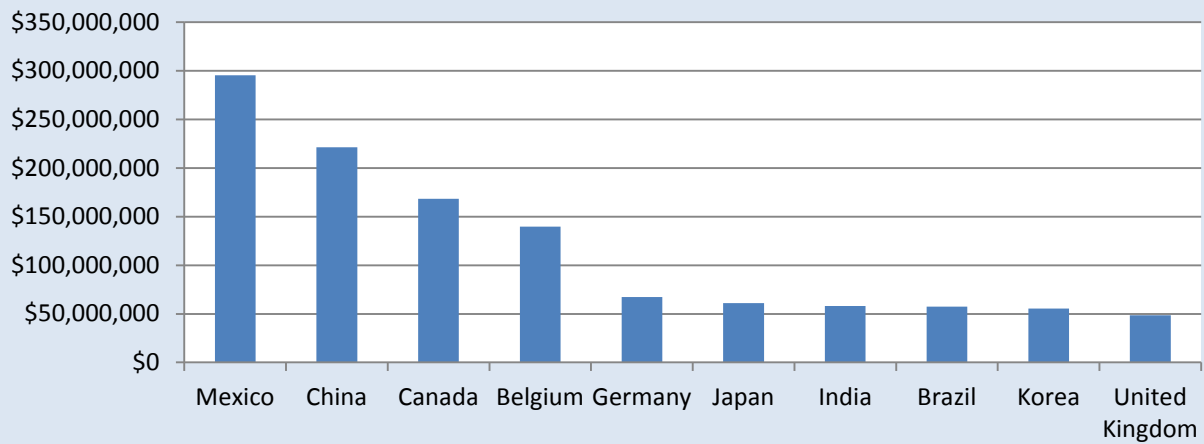
One of the largest challenges for metal-cutting machine tool exporters are meeting the requirements imposed by export controls, in particular to markets such as China, India and Russia. Export controls are used by the U.S. Government to restrict the sale of dual-use technologies for the purposes of national security and foreign policy. Dual-use technologies, or technologies that can serve a commercial as well as military use, often include precision manufacturing equipment like five-axis machining centers or precision measuring equipment. While the overwhelming majority of products will not require a license to be exported, the U.S. Commerce Department's Bureau of Industry and Security (BIS) requires licensure on certain products in order to enter certain markets. This is to ensure that dual-use products are not used for purposes contrary to the national security interest or foreign policy priorities of the U.S. government, including use in missile programs or in nuclear proliferation activities. As a result, exporters of precision machine tools should familiarize themselves with the Export Administration Regulations and any other relevant regulations, or contact the Bureau of Industry and Security for further questions.¹

Figure 1: U.S. Cutting Machine Tool Exports, 2015 (in USD Millions)



Source: U.S. Census Bureau Foreign Trade Division

Figure 2: Top Ten U.S. Cutting Machine Tool Export Partners, 2015



Source: U.S. Census Bureau Foreign Trade Division

ⁱ www.bis.doc.gov