

## ENTRY INTO CHINA AND MARKET INTELLIGENCE

## Machine Tool Exporters as a Case Study in Human Geography

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*This article presents the case study method as a pedagogical tool to study the geography and economics of Asia in middle school and high school classrooms, as well as in undergraduate courses, using the case of United States machine tool manufacturers in China. The case study method is generally associated with undergraduate and graduate business courses, although it is utilized in many disciplines and increasingly at various education levels. Case studies include detailed descriptions of scenarios as well as background information to encourage students to construct informed analyses. Through discussion, students arrive at an action plan based on knowledge gained from readings and lectures. Educators who are interested in learning more about the case study method should refer to the references listed in the first endnote.<sup>1</sup>*

#### Machine Tools and the Chinese Market

Students prepare by reading the case in advance, usually with the aid of a few directed questions. A series of prompts illustrate connections between case specifics and classroom concepts, and these prompts usually elicit a wide variety of responses. Objectives can then be established, such as:

1. Determining why the Chinese market is difficult to enter, yet critically important for exporters.
2. Understanding why the machine tool industry is a bellwether of manufacturing excellence.
3. Defining market intelligence and suggesting ways to improve information gathering in China.
4. Considering why a local presence is necessary to succeed in the Chinese market.

Entering a distant marketplace such as China presents difficulties for many firms, obstacles that set exporting apart from domestic business. Exporting most often takes place before expanding to other international activities, such as establishing branch plants.<sup>2</sup> Even exporting, however, is complicated for firms with little international experience. Roughly 36 percent of all manufacturing jobs in the United States are tied to exports, yet 99 percent of companies are not involved in international business.<sup>3</sup> This demonstrates that many firms have relied on a large domestic market and have little experience with working in international environments. A key challenge, then, focuses on how firms enter targeted markets, such as China.

China, because of its swift rise in manufacturing output, is now the world's largest buyer of machine tools. Machine tools can be defined as powered machinery that cut or shape metal, a category that includes lathes, grinders, and milling machines.<sup>4</sup> The change in volume and geography of machine tool purchases is indicative of transitions in global manufacturing, especially with regard to advanced production. The focus of this study is to show the efforts of manufacturers to gain market access, collect market intelligence, and reach potential customers in China. While any foreign market can provide challenges for most firms, China introduces a level of complexity not seen elsewhere in facets that include complicated business-government relations, language issues, and cultural differences between exporters and importers.<sup>5</sup>

Accessing international markets is difficult, or at the very least, more complicated than working within domestic markets, yet obtaining market intelligence is critical to export success. At the same time, collecting this

much-needed information on particulars such as market size, customers, and changing demands is challenging for most firms, especially those with limited financial resources or geographical scope. The export dilemma has shown that distance is an impediment for many exporters, complicating the process.<sup>6</sup> Distance, actual and cultural, between exporters and importers in the US and China increases the efforts and the costs required to access new customers. An example of a cultural difference often stems from the fact that many Chinese may have a longer frame of reference regarding time than their American counterparts. An American may view the sale or implementation of equipment as a short-term transaction, while a Chinese buyer may see the sale as a commitment with a longer time frame and may not initially be as willing to commit quickly to a sale, as might be expected by a US firm.

International market issues are additionally problematic when one examines the marketing of advanced manufacturing equipment like machine tools. Successfully executing the sale and startup of high-end manufacturing equipment is a complex process, with degrees of exporter involvement dependent on where the products are being implemented and sometimes based on the origin of the manufacturer. For advanced machinery, a physical presence is necessary for successful product installation, training, and after-sales service.<sup>7</sup> Essentially, for successful implementation of advanced machinery on a distant factory floor, the presence of personnel who represent the manufacturer is a necessity.

#### The US Machine Tool Industry and Exports to China

Technological and production success in the machine tool industry can be used as a measure of a country's overall achievement in manufacturing, given its impacts on numerous industries, including aerospace, appliances, automobiles, and medical equipment.<sup>8</sup> Japan and Germany, global leaders in machine tool production, confirm this relationship between this industry and excellence in related manufacturing sectors. These two countries developed and maintained this leadership for a number of reasons. The first was a long-term commitment to quality; Japan and Germany are known for extremely precise machine tools that translate into technical excellence in other industries, such as automobiles. Additionally, machine tools from both countries had wide commercial applicability, where for years, many of the best US machine tools were destined for defense industries. Another reason centers on a lasting commitment to exploring global markets and developing products suited for international customers.

**Table 1. Leading machine tool exporters<sup>9</sup>**

Rank	Country	\$ billions
1	Germany	10.10
2	Japan	8.59
3	Italy	4.65
4	Taiwan	3.88
5	Switzerland	3.14
6	China	2.10
7	South Korea	1.91
8	United States	1.91
9	Spain	1.02
10	Belgium	0.95

Why is the Chinese market important to US machine tool makers? On balance, they have exported less than producers from other industrial economies, such as Switzerland or South Korea (Table 1). This can be partly attributed to the fact that, until it was supplanted by China in 2003, the US was the world's largest machine tool market (Table 2). In roughly one decade, China's market for machine tools has increased by a factor of six. Many US firms saw no need to explore internationally since most customers were proximate, given the large amount of domestic manufacturing that was still occurring. The strong US dollar of the 1990s also made exports relatively expensive. Given the shifts in the geographies of manufacturing that have occurred during the past decade, however, US machinery manufacturers are accessing international markets as a survival mechanism. The choice was simple; these manufacturers need to explore and succeed in the Chinese market.

**Table 2. Leading machine tool markets 1999 and 2009<sup>10</sup>**

Rank 1999	Country	\$ billions	Rank 2009	Country	\$ billions
1	United States	6.54	1	China	19.37
2	Germany	5.99	2	Germany	9.95
3	China	3.22	3	Japan	8.03
4	Italy	2.94	4	United States	6.76
5	Japan	2.62	5	Italy	5.81
6	Taiwan	1.32	6	South Korea	3.80
7	Canada	1.17	7	Taiwan	2.80
8	Mexico	1.09	8	Brazil	2.55
9	Spain	0.99	9	India	1.87
10	Brazil	0.96	10	France	1.77
11	South Korea	0.96	11	Mexico	1.67

As seen in Figure 1,<sup>11</sup> China has become an increasingly larger market for US machine tool exports, and as illustrated in Table 2, it has risen rapidly in purchases. To date, the largest markets remain Canada and Mexico, due to proximity and the North American Free Trade Agreement. Many US motor vehicle producers and their close suppliers are located in these two countries. Still, since the mid-1990s, China has become an increasingly larger export market for US machine tool producers. The US has a way to go to increase market share, fulfilling nearly 6 percent of the Chinese market set against almost 35 percent for Japan, about 20 percent for Taiwan, and 16 percent for Germany.<sup>12</sup> These numbers can be looked at in two ways. The US certainly has its challenges in this

market, yet China is one of a few manufacturing growth markets and the largest in terms of sales volume. Imports account for over 60 percent of total Chinese machine tool consumption, and on a wider perspective, note that five Asian countries are among the top ten consumers of machine tools.

### Entering and Maintaining Market Presence

How do firms successfully enter and maintain a presence in an international market? The Association of Manufacturing Technology (AMT) is a trade group representing US machine tool builders and related firms. We conducted a series of interviews during the summers of 2007 and 2008 at AMT offices in China. The AMT established its first offices in China due to the nation's growth as a global manufacturing center and its ascent as the largest machine tool buyer. As seen in Figure 2, there are currently AMT offices in Beijing, Guangzhou, and Shanghai.<sup>13</sup> These offices serve market research functions, essentially doing analyses for member firms looking to enter the Chinese market. An additional site in Shanghai serves as the Technology and Service Center for the AMT in China. This location acts as a showroom for members' products, the importance of which is described below. These services are especially important for smaller companies that may not have experience in China or the resources to explore this market. Companies such as Haas (one of the largest US machine tool firms) and Hardinge Lamb are now firmly established in the Chinese market. The former firm, notably, has had particular success in China, originally using AMT's services.

The AMT offices offer the full gamut of export information. This begins with a market planning review, where prospective China exporters contact the AMT to investigate possible markets, including types of customers and the regions in which they might be located. Moreover, arrangements can be made to visit prospective customer sites. The AMT staff assists in the hiring of local personnel, whether in the form of agents, direct sales staff, and/or service staff, and they also arrange for firms to attend trade shows held throughout China.

Working with the AMT helps firms benefit from economies of scale. Most of these manufacturers individually could not afford dedicated export departments or even specialized export personnel, but through the AMT, this is possible. A representative demonstrated this by showing a series of AMT-sponsored advertisements in a leading Chinese aviation industry trade journal. The AMT Shanghai technology office also provides for a number of other services, such as arranging legal representation—an important task in the Chinese market. The array of services provided to members extends even to website design. The Shanghai office located web designers to create websites for the local operations of US machine tool firms. The AMT China offices attempt to cover all parts of the export intelligence operation, important services in an unknown market for many small- to medium-sized manufacturers.

According to conversations at the AMT offices, the market geography of machine tool purchases in China is important and often neglected by exporters. It is important for the member firms to understand even the geographical nuances of the Chinese market if they hope to succeed. In the north, there are mostly state-owned

enterprises (SOEs). Many SOEs are in heavy industry—enterprises that have their roots in Soviet-built firms over three decades old. These firms are often tied heavily to the state and are in dire need of renovation. The Shanghai region contains mostly multinational enterprises, many of which are in the motor vehicle industry. Volkswagen and General Motors are two examples of firms with joint ventures in this area. By their very nature, these firms are larger, and there is a market bias in these firms as nationality of ownership often predicts machine tool purchases.

A third region, in southeast China, in and around Guangdong Province (Figure 3), has investment that comes largely from Taiwanese, Hong Kong, and

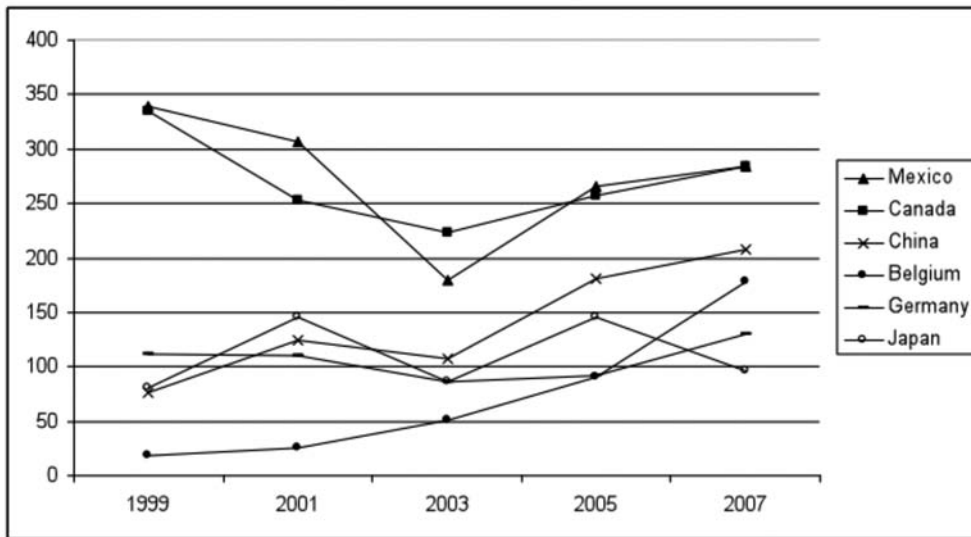


Figure 1. Leading export markets for US machine tool manufacturers (in millions of US dollars).

to lost revenue. The fact that a machine tool builder can rush someone to a manufacturing site to address a breakdown not only takes care of the present problem, but also bodes well for future purchases. A strategy that has worked for successful US firms has been to employ local personnel who immediately remedy any service issues that may occur. It was suggested that this has been a key strategy for export success.

Regardless of the services available and these strategies, firms still encounter problems. What are some of the common mistakes for firms entering the Chinese market? Many US machine tool exporters look to enter the market as, in the words of one representative, “selling out of a catalog,” rather than establishing a physical presence. This is a serious mistake in any market and an even

Japanese firms, and increasingly, a significant amount of internal Chinese investment. Guangdong Province is a critically important locale. In the estimation of an interviewee, this province now purchases more machine tools annually than Mexico—a comparison that is particularly illustrative given the boom in the past several decades of manufacturing in Mexico. The fact that one province alone generates this much manufacturing activity is noteworthy and provides an indication of the scale of manufacturing within China. Firms in Guangdong Province are much smaller (fewer than one hundred employees), many of which are part of the die and mold industry. Many are “mom and pop,” family-owned enterprises. Additionally, many of these firms are conservative, purchasing from the same suppliers that competitors and partner firms utilize. The social networks are so strong that manufacturers will follow the experience of others. The interviewee also said that firms in this region are “much more practical” with their business decisions, given the large presence of Hong Kong-based ownership. Successful firms have kept this market geography in mind when approaching prospective customers.

During the course of the conversations, the interviewees explained that prospective Chinese customers would not purchase machine tools for two primary reasons: if the machine tool makers are unknown in the Chinese market and if they cannot physically see and touch the product. Both firm-level personnel and products need to make a presence in China in order for successful sales and implementation. Obviously, manufacturers need to establish a physical presence in this market.

The existence of tight Chinese industrial-social networks can also backfire on new foreign firms that do break into the market. If there are problems with a firm’s machine tools, news about good or bad service usually moves quickly through Chinese service networks. Pursuant to this, the AMT has made efforts to have service personnel in the area that can immediately address any problems that may arise. After-market service is a topic that merits further mention. The world’s leading machine tool producer, Japan, partially owed its impressive rise during the 1970s and 1980s to its service excellence.<sup>14</sup> Given the lean operations of modern manufacturers, downtime leads

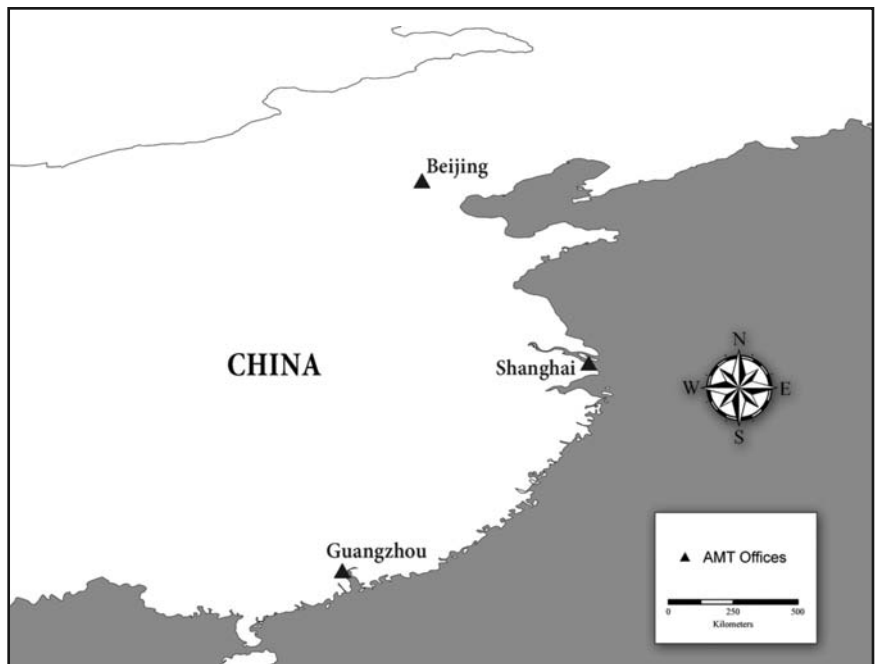


Figure 2. Office locations for the Association for Manufacturing Technology in China. Map created by Dawn M. Drake.

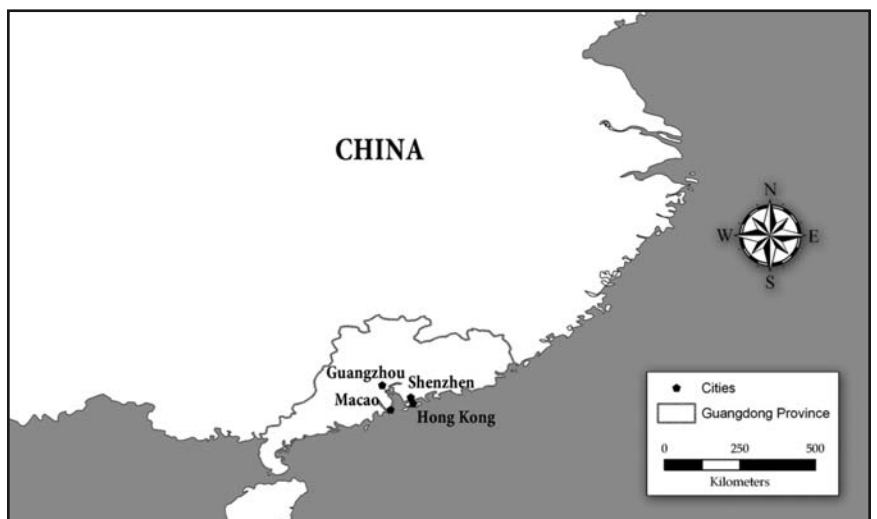


Figure 3. Guangdong Province. Map created by Dawn M. Drake.

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deeper mistake when taking into account the needs of advanced manufacturers in distant markets. A physical presence is imperative, a strategy that firms ignore at their own risk. According to the interviewees, a useful strategy for several smaller US firms was to display their machines at the AMT Shanghai center, where prospective customers could actually see and touch the machines.

Another problem concerns the fact that some US firms are still reluctant to invest in China. In essence, many US firms do not want to spend the time and funds that a long-term commitment to a new market would entail. Given the vast institutional (governmental and corporate) differences between North America and China, firms run the risk of becoming impatient. Many want to go to China and expect sales basically “to fall from the sky” instead of first completing market research on Chinese machine tool purchases and considering cultural differences, such as the need for in-person contact and regional variations within China. A successful business startup in China often requires a large up-front investment. Beyond spending time on carefully researching the Chinese market, companies should allot funds for visits to China to meet prospective customers. Machine tool firms that have succeeded in China have taken a longer-range approach, developing relationships with local companies and distributors, often at the expense of short-term sales. This strategy is joined with looking at the customer relationship beyond sales to include training and after-market service, strategies already employed by their international competitors.

### Conclusion

This case study offers material that one can introduce in geography and economics classes that assist students in gaining specific insight into some of the factors that are important for a particular industry in its quest for success in a foreign market. The case of US machine tool manufacturers entering China demonstrates the importance of three strategies: local personnel versed in the regional business environment, a local presence for sales and training, and service after sales. Reflection upon this case study confirms the value of the long-term view toward business relationships present in much of Asia. It also assists students in drawing connections between the general state of the world economic downturn and the fortunes of one industry. In recent years, the rapid growth of Chinese machine tool demand has been a boon for firms seeing stagnant sales in North America and Europe. The fact that China has weathered the global downturn in a better position than most industrialized economies bodes well for the potential of this market. For students, this case study demonstrates the importance of China to US manufacturers and to the world economy, while also illustrating the difficulties in penetrating this large market. ■

### NOTES

1. Case study references include Alan Jenkins, “The Relationship between Teaching and Research: Where Does Geography Stand and Deliver?,” *Journal of Geography in Higher Education* 24, no. 3 (2000), 325–351; Connie Gabel, “Using Case Studies to Teach Science,” in *Proceedings of the Annual Meeting of the National Association for Research in Science Teaching* (Boston: National Association for Research in Science Teaching, 1999), 2–6; See Marcel Jerrard, 2005, for examples of case studies in economic geography; see Ron Knapp, “Standard 11: Patterns and Networks of Economic Interdependence” in *East Asia in Geographic Perspective: China, Japan, Korea, and Vietnam*, accessed January 25, 2011, [http://afe.easia.columbia.edu/geography/lesson\\_plan.html](http://afe.easia.columbia.edu/geography/lesson_plan.html). Although the topic of the curriculum guide is US History and not Asia, readers interested in designing their own case studies that integrate economic

concepts into a wide variety of topics should consider Mark Schug, Jean Caldwell, and Tawni Ferrarini’s excellent and case-study oriented *Focus: Understanding Economics in U.S. History* (Council on Economic Education, 2006).

2. Peter Dicken, *Global Shift: Reshaping the Global Economic Map for the 21st Century*, fifth edition (New York: Guilford Press, 2007).
3. Progress Report on the National Export Initiative, The White House at [http://www.whitehouse.gov/sites/default/files/exports\\_progress\\_report.pdf](http://www.whitehouse.gov/sites/default/files/exports_progress_report.pdf); “Export or Die,” *The Economist*, March 31, 2010, <http://www.economist.com/node/15793128>.
4. *Economic Handbook of the Machine Tool Industry* (McLean, VA: Association for Manufacturing Technology, 2004).
5. John Child and David K. Tse, “China’s Transition and Its Implications for International Business,” *Journal of International Business Studies* 32, no. 1 (2002), 5–21.
6. Paul D. Ellis, “Distance, Dependence and Diversity of Markets: Effects on Market Orientation,” *Journal of International Business Studies* 8, no. 3 (2007), 374–386.
7. Méric S. Gertler, “‘Being There’: Proximity, Organization, and Culture in the Development and Adoption of Advanced Manufacturing Technologies,” *Economic Geography* 71, no. 1 (1995), 1–26.
8. J. Graham, “Firm and State strategy in a Multipolar World: The Changing Geography of Machine Tool Production and Trade,” in *Trading Industries, Trading Regions*, eds. H. Noponen, J. Graham, and A. Markusen (New York: Guilford Press, 1993), 140–174.
9. *World Machine Tool Output & Consumption Survey*, accessed February 22, 2011 (Gardener Publications, Inc. 2011), <http://www.gardnerweb.com/consump/survey.html>.
10. *Ibid*; *Economic Handbook of the Machine Tool Industry* (McLean, VA: Association for Manufacturing Technology, 2000).
11. *Economic Handbook of the Machine Tool Industry* (McLean, VA: Association for Manufacturing Technology, 2008).
12. *Ibid*.
13. The Beijing office was established in 1993; Shanghai (1998); and Guangzhou (2004). In 2004, the Shanghai Technology and Service Center was also opened.
14. Masatsugu Tsuji, “Technological Innovation and the Formation of Japanese Technology: The Case of the Machine Tool Industry,” *Proceedings of the IEEE International Conference on Management for Innovation and Technology* (IEEE, 2000), 174–179.

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