

The Era of Artificial Intelligence: Relationship Between Taiwan's Machine Tool International Trade Show Marketing and International Agents

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Abstract: The main purpose of this study is to explore the marketing techniques and agent characteristics of Taiwanese machine tool builders. Through in-depth interviews with machine tool manufacturers, the paper analyzes the operation and management of international large-scale machine tool enterprises and then discusses the development advantages and disadvantages of China's machine tools. The study results are summarized as follows: Under the trend of Industry 4.0, the manufacturing industry has shifted from product-centred to consumer-focused, from production-based to "production & service" or service-oriented. In addition, this research can be used as a marketing reference for the future of Taiwan's machine tool industry. This study suggests that companies must provide advanced prognostic maintenance systems and services in such a highly competitive environment to reduce downtime due to malfunction of machinery equipment.

Keywords: Strategy, Machine tool industry, Industry 4.0, Trade show marketing

Received: 12 April 2019 / Accepted: 23 May 2019 / Published: 30 June 2019



INTRODUCTION

The machinery industry is a fundamental industry. Countries with a highly developed machinery industry can effectively provide its other industries with the equipment required for machine production. The increase in industrial development in Taiwan over the past 40 years is closely related to the development of Taiwan's machinery industry. During this period, the development of other industries increased the market demand for machinery products and thus promoted the development of the machinery industry. This enabled the machinery industry to continually provide other industries with low-price and high-quality machinery equipment, thus improving the competitiveness of other industries and accelerating overall industry development.

Because central Taiwan exhibits convenient transportation, relatively low cost of land, and extensive consolidation of upstream and downstream firms, machine tool clusters have formed in this region, which has the highest density of machine tool clusters in the world.

Taiwan's machine tools are mainly exported, with the exports accounting for 80% of the total sales. The current marketing strategy of Taiwan machine tool companies is to participate in exhibitions to achieve promotional goals and establish partnerships with trade agents in target markets for the purpose of selling their products.

This study primarily discusses the marketing methods of Taiwan machine tool companies. The researchers conducted in-depth interviews with machine tool companies regarding their participation in large-scale international exhibitions as well as operating and management directions at large international machine tool companies. Through the interviews, this study identified current marketing trends and the characteristics of agents in various countries. Furthermore, this study simulates the application of integrated marketing to analyze the strengths and weaknesses of Taiwan's machine tools and thereby identify future development directions. This study aims to serve as a reference for the Taiwanese machine

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tool industry in adopting marketing tactics in the industry 4.0.

The demand side of the global machine tool market is rapidly changing. The production model that involves machine tool companies manufacturing all-purpose machines in mass quantity to sell them to clients at low prices and these clients adjusting their machine tools to produce products to compete in markets is gradually losing popularity. Future machine tool companies must adopt manufacturing approaches that feature quick customization and low volume with high variety of products to meet market demands.

Consumer-oriented customization production (intelligence of things, smart production, and smart factories) has become increasingly emphasized due to the combination of the following: increasing demand for mass customization, fast-track launch, and good value for money (consumer value); the rise of smartphones, social media, e-commerce, and consumer reviews (with the rise of the Internet); and excessive capacity and reduced demands derived from low birthrates (increasing competition).

Therefore, in such a highly competitive environment, companies must provide advanced prognostic maintenance systems and services to reduce the downtime due to malfunction of machinery equipment. To achieve success in the international market, companies should adopt the following strategies:

1. Implement global channel management and launch stores to obtain a greater understanding of the market and customer demands
2. ideally, launch regional company branches to monitor and make optimal use of dealers in each region
3. capitalize on regional dealers in response to the different lifestyle in mainland China as a result of its expansive landscape

North America also exhibits this geographical characteristic, and thus machine tool companies should establish branches in these regions to work with local dealers. Because European countries use various languages, Taiwan machine tool companies should collaborate with import agents and dealers in each country to sell products.

The future trend of the industry 4.0 emphasizes servitized and customized manufacturing. Therefore, the manufacturing industry has changed from product-oriented to customer-oriented manufacturing, and its focus has shifted from only production to production and service or only service.

LITERATURE REVIEW

The relationship between international exhibition marketing strategy and firm's performance

Participation in international trade exhibitions is a crucial corporate marketing strategy. By participating in exhibitions, each exhibitor conveys messages, maintains consumer relationships, establishes its image, and achieves sales performance goals. By contrast, attendees participate in international exhibitions to acquire information on products, technology, and industry, visit clients, as well as attain practical procurement performance goals (Al Khuja & Mohamed, 2016; Chu, 2011). This perspective is consistent with the motivations for exhibition participation stated by Cunningham and White (1974), which are as follows:

1. to adapt to current competition conditions
2. to increase consumer interest and help consumers form their first impressions of the product
3. to discover potential clients
4. to directly interact with potential clients
5. to introduce new products to the market

The United States International Trade Commission (USITC) (1983) revealed three major marketing strategies adopted by the machine tool industry to increase product exposure and awareness, namely participating in international trade exhibitions, making routine business calls, and creating advertisements for machine tools. Furthermore, the presented order of the three strategies corresponded to the actual process of marketing: a company participates in international business exhibitions, in which it establishes relationship with potential clients, who the company will maintain contact with by making business calls, after which the company creates advertisements to maintain clients awareness of its products.

Cunningham and White (1974) also stated that attendance at exhibitions enables potential clients to make their first interactions with products, which is critical to drive clients purchase decisions. Aside from providing catalogs and business briefs, companies can participate in exhibitions to provide clients with actual experience and knowledge of the product. Therefore, exhibitions constitute a large-scale and experience-based form of advertisement that increases product exposure and contact with potential clients, thereby providing companies with additional product sales opportunities and improving firm performance.

The relationship between international agent relationship strategy and firm's performance

Small and Medium-sized Companies (SMEs) are fundamental to Taiwan industrial development and are renowned as the main driving force behind the Taiwan Economic Miracle. Taiwan's machine tool industry mainly comprises companies of such size. Despite current international trade developments promoting investment in overseas factories, machine tool companies encounter difficulties pertaining to factory construction costs and the acquisition of operating licenses. Therefore, most companies employ sales agents to conduct overseas investment, which further contributes to the development of the sales agent system. Local agents provide direct marketing communication on behalf of manufacturers with local users (Andersen & Co., 1987). However, the fact that an agent may be simultaneously responsible for the selling of similar or related products from numerous manufacturers engenders a manufacturer's relationship with its sales agent critical. Anderson and Narus (1990) indicated that a suitable partnership is a key factor for successful market strategies and technical activities in the consumer market. Mohr and Spekman (1994) discussed the key factors for a successful partnership and proposed adopting the sales amount sold by dealers in relation to the amount manufactured and the satisfaction level with collaboration as the performance appraisal criteria for partnerships. Baird, Lyles, and Orris (1994) suggested adopting the achievement rate of collaboration goals, partnership satisfaction level, and overall satisfaction levels as performance appraisal criteria. Companies generally engage in short-term collaborations to obtain profit through improved market trading efficiency and engage in long-term collaborations to acquire maximum and long-term profit (Ganesan, 1994). Therefore, companies commonly exert effort in maintaining or improving their partnerships with the aim of developing long-term partnerships and improving operation performance (Aulakh, Kotabe, & Sahay, 1996; Parkhe, 1993; Pandla, 2016).

Influence of relationships with international agents in international exhibition marketing and firm performance

The aforementioned literature portrays participation in international trade exhibitions as a method for increasing product exposure, reaching more potential clients, and providing customers with physical experience with products. After achieving product exposure and creating customer relationships, companies must maintain contact and relationships with potential clients. Because sales agents generally collaborate with numerous companies, establishing a strong partnership between a company and a sales agent is critical. Aside from improving firm performance through reaching potential clients, companies can further enhance their performance with the support of sales agents. This conclusion is consistent with that made by Anderson and Narus (1990), which indicated that a favorable partnership is the key to successful marketing strategy and technological activity in the consumer market. Furthermore, Kanter (1994) indicated that value-chain partnerships, such as supplier-client relationships, constitute the strongest type of collaborative relationship. By combining the diverse abilities and technological capacity of companies in different industries, the companies can generate value for end users while improving firm performance. Therefore, the relationships that companies have with sales agents play a key role in international exhibition marketing and firm performance.

METHODOLOGY

Taiwan's machine tools are predominantly exported, with exports accounting for 80% of the total sales. Additionally, the major marketing tactics adopted by Taiwanese machine tool companies are to participate in exhibitions to achieve promotional goals and establish partnerships with overseas sale agents

to sell products in target markets. Such tactics are adopted even by large-scale Taiwanese machine tool companies including Victor Taichung Machinery Works, Quaser Machine Tools, Yeong Chin Machinery Industries, Litz Hitech, Detron Machine, and Keyarrow. Because most companies adopt similar trade exhibition marketing approaches, a company's strategy for managing its relationship with a sales agent becomes a critical factor influencing firm performance. Figure 1 displays the research framework for this study.

In response to the arrival of the industry 4.0, this study primarily discusses changes in international exhibition marketing strategies and the influences of companyinternational-sales-agent relationship management on firm performance. Yin (1984) stated that case studies are empirical investigations of real events that provide substantial evidence. Yin (2001) further emphasized that aside from assisting researchers in collecting data, case studies can also refine data content and the data collection process. Simons (2009) also pointed out that case studies are in-depth discussions of multidimensional, complex, and unique objects, events, cases, and frameworks. This study adopted qualitative and quantitative research methods to collect case data and develop a comprehensive understanding regarding the influence of the industry 4.0 on the machine tool industry. Furthermore, the researchers developed a semistructured questionnaire and interviewed professionals in the industry to acquire and compile data pertaining to changes in the international exhibition marketing strategies of businesses in the machine tool industry and their strategies for forming relationships with sales agents.

This study was conducted on 2016, the following year of the establishment of the A-I-M Industrial Technique Alliance in December 2015. As the research focus, the A-I-M alliance was established by the Industrial Technology Research Institute, which integrated the Intelligence Team (I-Team), Machine Team (M-Team), and Aerospace Team (A-Team); the three teams respectively comprised manufacturers specialized in smart manufacturing, machine tool and component manufacturing, and the aerospace manufacturing. In Industry Technology Magazine, Chen (2016) stated that the A-I-M alliance combines expertise of three domains and employs technologies of the manufacturing 4.0 to guide the Taiwan machine tool industry toward smart manufacturing. The purpose of the A-I-M alliance is to enhance the competitiveness of the machine tool industry and achieve the industry's goals for cross-device communications and cloud network connections. By establishing common standard interfaces, the A-I-M alliance enables the machine tool industry to enter a AI era of cyber-physical system integration, thereby promoting the machine tool industry in manufacturing customized and high-quality equipment, developing mechanisms that facilitate high productivity, and providing customized remote services. In summary, the A-I-M alliance prompts machine tool manufacturers to enter the aviation industry supply chain for competing in the global high-end market (Business Next, 2016). Therefore, this study employs the A-I-M alliance as the case study subject to discuss the Taiwanese industrial environment constructed by the government and companies and clarify the international marketing strategies of Taiwanese machine tool manufacturers entering the industry 4.0. The core members in the A-I-T alliance are as follows. The A-Team comprises Aerospace Industry Development Corporation and Evergreen Aviation Technologies. The I-Team is composed of Industrial Technology Research Institute (i.e., The Mechanical and Mechatronics Systems Research Laboratories and the Intelligent Machinery Technology Center). The M-Team consists of large machine tool manufacturers including Victor Taichung Machinery Works, Quaser Machine Tools, Yeong Chin Machinery Industries, Litz Hitech, Detron Machine, and Keyarrow. Because this study focuses on the international marketing strategies of companies in the machine tool industry, the six companies in the M-Team are adopted as the main research subjects. Universal problems in the machine tool industry are that machines cannot self-monitor, report conditions and data, or provide real-time feedback on the on-site manufacturing data to improve the manufacturing process. Therefore, to successfully incorporate manufacturing 4.0 in the machine tool industry, the Ministry of Economic Affairs integrated expertise of the industrial, academic, and research sectors to establish five manufacturing 4.0 I-Team service groups, namely sensor and IoT, cyber-physical systems, smart machinery, big data, and lean management groups.

Most studies employ return on assets to evaluate firm performance (Bashir, 2003; Charumilind, Kali, & Wiwattanakantang, 2006; Manos, Murinde, & Green, 2007; Widilestariningtyas & Karo, 2016). However, because most Taiwan machine tool companies are small and medium-sized or unlisted companies, most companies do not release their financial statements. Therefore, this study adopted the subjective evaluations of general managers regarding the financial performance of their respective companies to evaluate firm performance in percentage. This method was proposed by Fang, Wade, Delios, and Beamish (2007) and was proven to be feasible by Delios and Beamish (2001) and Isobe, Makino, and Montgomery (2000).

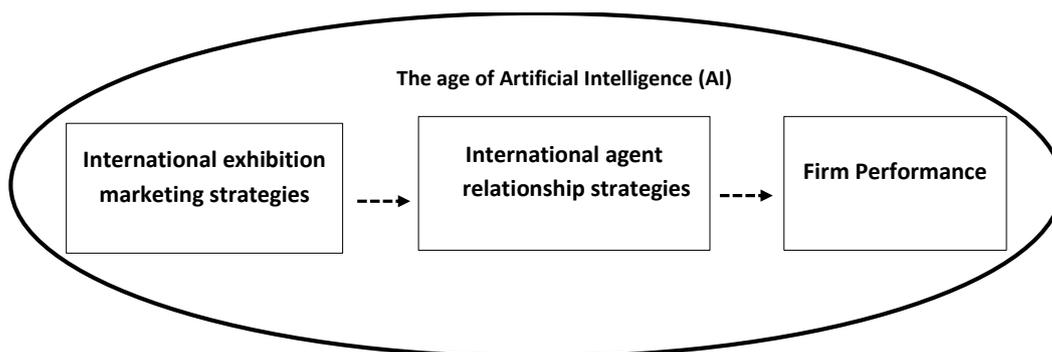


Figure 1. Research framework

RESULTS AND DISCUSSION

This study employs both qualitative and quantitative research methods. The qualitative data were collected by adopting a case study design and administering a semistructured questionnaire to managers at machine tool companies. The quantitative data were collected by quantifying questionnaire responses with dummy variables to further understand the correlations between strategies and corporate performance and examine the effectiveness of changes in strategies. Similar to the methods employed by Yin (2001) and Simons (2009), the study’s approach involved progressively revealing changes in international marketing strategies of machine tool companies against the background of rising AI applications.

The case study revealed that, facing the industry 4.0 and the rising applications of AI, the machine tool industry has gradually converted to servitized and customized manufacturing. In the past, manufacturers could sell a machine tool model for ten years without needing to change its design. However, consumers today emphasize the value of product customization and specialization. With the development of smart machinery, customers are demanding increasingly shorter delivery periods. This causes companies to suffer increasing costs due to extended delivery periods in the event of machine malfunction or downtime. Therefore, the quality and efficiency of a machine tool as well as its ability to control and recognize problems in the production process, predict its future operating conditions, and perform self-monitoring are critical. By enabling machines in a processing plant to upload real-time information to a cloud platform, machine tool companies can establish a support platform to provide spare parts and maintenance services in a timely manner, thereby effectively reducing delivery times and production costs. In summary, with the support of AI and industry 4.0 technologies, machine tool companies have switching from using a production-based model, mass production, to adopting to based on a combination of production and service or service alone.

Machine tool companies attend exhibitions to meet requirements for maintaining product quality and implementing remote diagnostic systems, remote monitoring systems, and post purchase cloud service platforms. Some machine tool companies directly connect their machines to the controller of controller companies at exhibitions. This indicates a shift in the focus of business models toward service and problem-solving models.

Despite the ability to meet with numerous clients at exhibitions and the fact that most Taiwan machine tool company representatives can understand English, Taiwan machine tool company representatives commonly encounter communication problems due to differences in English accents and cultures. This creates a trade obstacle between the suppliers and clients and often impedes the understanding

that machine tool company representatives have of the clients actual thoughts and needs. However, if regional sales agents are present, then this problem can be resolved. Regional sales agents can directly communicate with clients in the clients preferred language, thereby reducing trade obstacles for Taiwan machine tool companies. After compiling the method employed by each machine tool company for establishing partnerships with clients, this study advises machine tool companies to frequently visit their sales agents to passively monitor agents, host dinner banquets, make welcoming arrangements, and keep contact with agents by e-mail to maintain relationships, thereby bridge the gap between machine tool companies and agents. After such a partnership reaches a certain level, the sales agent will increase its emphasis on this partnership and thus put more effort in strengthening its relationship with buyers.

CONCLUSION AND RECOMMENDATIONS

Against the background of rising AI applications, this study discussed changes in the international exhibition marketing strategies of machine tool companies and the influence of companies' relationships with international sales agents on firm performance. Additionally, this study discussed changes in the marketing strategies of machine tool companies in the rapid growth of applications of AI and smart technology. Taiwanese machine tool companies commonly open international sales agent offices to extend their global layout. However, because each international sales agent generally serve multiple companies, the strategy that a machine tool company adopts for forming and maintaining their relationship with a sales agent is critical.

By discussing current international exhibition marketing tactics, characteristics of agents in various countries, the partnerships of companies with sales agents, this study simulates integrated marketing models, analyzed the strengths and weaknesses of Taiwan's machinery companies, and identified a promising direction for the future development of the machine tool industry. Additionally, this study aims to serve as a reference for future Taiwan machine tool industry companies when developing marketing tactics in the industry 4.0.

Taiwan machine tool companies comprise mostly small and medium-sized companies or companies that do not rely on investment funding. Therefore, most of these companies are not listed. Because collecting information on unlisted companies is relatively difficult, this study employs a case study design and quantitative research methods to overcome this obstacle. Additionally, this study reveals progressive changes in the international marketing strategies adopted by companies in the machine tool industry.

Furthermore, this study can serve as reference for Taiwan machine tool companies when confront market changes in the industry 4.0 and develop international exhibition marketing strategies. International exhibition marketing is a type of international marketing strategy. Therefore, the successful methods for Taiwan machine tool companies to attract potential clients, and increase participation efficiency in exhibitions in the AI era is obviously crucial. Practically speaking, however, higher levels of exposure do not directly translate to higher levels of efficiency. By conducting a case study and interviewing managers at different machine tool companies, the researchers revealed that the purpose of participating in exhibitions is to obtain opportunities for directly communicating with clients; additionally, such participation was revealed to play a key role in driving the purchase decisions of potential clients. This conclusion is consistent with that concerning the relationship between international exhibition marketing and firm performance. By increasing the number of communication opportunities, companies can further educate customers on products and thereby increase the probability of closing deals. For example, companies commonly hire promotional models to perform at their booths for the purpose of attracting potential customers before demonstrating their familiarity with smart concepts by presenting their use of smart technology. By connecting their products and smart technology, Taiwanese machine tool companies can establish initial relationships with customers and provide them with positive first impressions.

A mediator, namely international agent relationships, can enhance the effect of international exhibition marketing strategies on firm performance. Companies should manage agents with a similar attitude they hold in consumer relationship management because sales agents are a crucial medium for companies to extend their reach in international markets. By conducting a case study and interviews, this study revealed that increased loyalty and values of sales agents was associated with increased influence to

international markets. This result is consistent with that reported by Anderson and Narus (1990), which indicated that establishing favorable partnerships is the key to success in consumer markets.

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