Global Competitiveness by the Maquiladora Manufacturing Program in North America

Dwight D. Ham
The Master's University, Santa Clarita, CA, USA
ddham@masters.edu

Katherine N. Yamamoto
Eastern Oregon University, Oregon, USA
yamamok@eou.edu

Robert A. Lloyd
Fort Hays State University, Kansas, USA
ralloyd@fhsu.edu

[**Abstract]** This qualitative case study interviews a U.S.-based company, which uses the Maquiladora manufacturing process in Mexico, to understand the benefits and challenges of using the Maquiladora program. The study found that the Maquiladora process is generally beneficial for this company to maintain its economic competitiveness globally. This study's limitation is that this is only one example out of many U.S.-based companies that use the Maquiladora process.

[Keywords] global supply chains, exports, manufacturing, Maquiladora, Mexico, United States

Introduction

Since the 1980s, governments worldwide have started to shift a broad scope of economics and political-administrative roles to local establishments (Heid, Larch, & Riano, 2013; Topal, 2015). Recently, a free trade agreement between Candana, Mexico, and the United States, the US-Mexico-Canada Agreement (USMCA), was developed in 2020 updating the North American Free Trade Agreement (NAFTA) (Office of the United States Trade Representative, 2020).

Mexico is a nation where decentralization policies have been utilized since 1983 (Heid et al., 2013; Topal, 2015). After the popular Bracero Program was discontinued, the Mexican government formed the Border Industrialization Program in 1965 from which the maquiladora program was formulated as a means to attract foreign investment and to employ Mexican labor (Hoffman, 1999, p. 2).

The term *maquiladora* is a Spanish term meaning "contract milling" (Vargas & Johnson, 1993, p. 17). *Maquiladora* also means factories located on the United States and Mexico border where raw materials and work-in-progress components are imported duty-free into Mexico temporarily in order to assemble or manufacture finished goods using Mexican labor, then exported with assessed duties based on value-added in Mexico (Heid et al., 2013; Topal, 2015). This program is often referred to as the in-bond or twin plants located in Mexico to process imported materials or commodities that are then re-exported to the United States (Hein & VanZante, 1991, p. 14).

Under the maquilas program, U.S. firms can export parts and materials to Mexico, duty-free; assembly, processing, and packaging provide the finished products that are imported back into the United States. As of 2011, maquilas accounted for 80% of Mexican trade with the United States and more than 40% of Mexico's total exports (Mesia & Seyoum, 2011, p. 35). Using the maquiladoras allows U.S. companies to access lower wage rates, special tariff treatment, easy access to U.S. transportation, communication facilities, and technical and managerial support services (Hein & VanZante, 1991, p. 14). The maquilas are economically attractive for both small and large U.S. firms as a means of establishing competitive pricing

for the international and domestic markets that are essential to maintaining and advancing product market share (Heid et al., 2013). Further, the program offers an attractive arrangement at the border for maquiladora products that favors U.S. manufacturers (Heid et al., 2013; South, 2016; Topal, 2015). Only the value-added at a Mexican facility is liable for tariff or duty. Taxes cover only the per-unit material, labor, and overhead costs incurred in Mexico (Hein & VanZante, 1991, p. 14). The provisions of maquiladoras help expand Mexican manufacturing operations using Mexican labor and strengthen the Mexican economy by providing jobs. Simultaneously, the United States benefits from lower costs that might otherwise be transacted in countries such as China, South Korea, or Vietnam. Further, some products may be eligible for reduced tariffs or exempt (Heid et al., 2013; Topal, 2015). The reduction may be due to establishing foreign trade zones by maquiladoras where taxes may legally be deferred or where the duty status can be favorably changed (Hein & VanZante, 1991, p. 16; South, 2016).

Study Objective and Research Questions

This research aims to explore the benefits and challenges of using the Maquiladora manufacturing process in Mexico as a U.S.-based company through a qualitative case study. The maquiladora has offered an economic advantage to U.S. businesses that choose to participate in this process, but there are mixed outcomes reported by various researchers (Blyde, 2014; Castillo, 2018; Dowlatshaho, 2011; Garcia et al., 2010;). To address the gaps in the Maquiladora literature, the researchers developed the following research question to understand how a U.S.-based manufacturing business experiences the benefits and challenges of utilizing the Maquiladora process. The research question that guides this study is as follows:

RQ: How does the use of the Maquiladora manufacturing process in Mexico benefit a U.S.-based manufacturing company?

Literature Review

During the last two decades, the global market has experienced an increasing international manufacturing fragmentation (Blyde, 2014). The production of goods involves geographical separation across two or more countries. There is a general perception that Mexico participates in global supply chains as assembly operations as part of an international manufacturing network called the Maquiladora (Blyde, 2014). A majority of the maquilas plant facilities are located at the border between the United States and Mexico and often include twin plant facilities at such border sites as Ciudad Juarez–El Paso and Tijuana–San Diego (Canas et al., 2013). The U.S. interstate highway system is key to making access more accessible and allowing non-Mexican managers, technicians, engineers, and others involved in the Maquiladora to live on the U.S. side to help reduce problems associated with an international transfer (Garcia et al., 2010; Hein & VanZante, 1991, p. 16). Since 1994, the government of Mexico, with the state government's support, has been promoting maquiladoras away from the U.S.–Mexican border by offering incentives of reduced taxes (Blyde, 2014). According to Mexico's Commerce Ministry, this push resulted in 59% of all new maquiladoras being established in the interior of Mexico. These businesses typically require less skilled labor and are more labor-intensive in production (Castillo & de Vries, 2018; Yang, 1998, p. 271). Table 1 includes a listing of most maquiladoras located in six Mexican states that comprise 81% of all such facilities. Mexico is the fourth largest trading partner with the United States, China, Canada, and Japan. A majority of the trade volume with the United States originates from the maquilas (Mesia & Seyoum, 2011, p. 36).

Table 1
Maquiladoras Located in Six Mexican States

State	Number of maquiladoras
Baja California	903
Chihuahua	410
Tamaulipas	349
Coahuila de Zaragoza	218
Sonora	196
Nuevo Leon	186
Residents of Mexican states	541
Total	2803

Note: As cited in Mesia and Seyoum (2011, p. 36).

Table 2 shows the number of maquiladora plants by sector. The automotive industry is the largest, while the United States is the most active in adopting the maquiladora program with Mexico and, Canada, a member of the North American Free Trade Agreement (NAFTA), is the third most active (Castillo & de Vries, 2018). The maquiladora program has facilitated the regional integration of the U.S. and Mexican economies and has been further benefited by NAFTA (Castillo & de Vries, 2018). However, the integration of the two economies has not reached an apex in trade, and more will need to be accomplished with a more far-reaching immigration policy, a harmonization of laws and standards, and greater spreading of economic benefits throughout Mexico (Dowlatshahi, 2011). Findings after the implementation of NAFTA show that non-maquiladora sectors are growing at a faster pace. Non-U.S. foreign direct investment, especially from Asian and European sources, is the current trend in maquiladoras (Castillo & de Vries, 2018; Yang, 1998, p. 269).

Table 2
Number of Maquiladora Plants by Sector and Country

	Auto	Industrial	Service shelter	Electronics	Electrical	Medical	Total
United States	75	30	3	35	19	14	176
Japan	51	26		9	14		100
Netherlands				11			11
Germany				15			15
Canada	12			4			16
Singapore				2			2
Korea				2			2
Total	138	56	3	78	33	14	322

Note: As cited in Mesia and Seyoum (2011, p. 36).

While Mexico takes part in global supply chains with the U.S., the perception many have of Mexico's role is that it is the assembly operation of the global manufacturing network. Some research reports that Mexico's global supply chains add less than that of China's (Blyde, 2014). This study attempts to explore how a U.S.-based business experiences the benefits of using Mexico’s Maquiladora process compared to China’s global supply chain process.

Garcia et al. (2010) reported that when Maquiladora facilities offered employee benefits exceeding those of the local law, applicants increased their pursuit to attain such positions. This study explores how a U.S.-based business observed employee reaction who used benefits for Mexican employees that exceeded the local regulations in the Maquiladora process.

Methods

This study uses the qualitative case study design to explore the benefits and challenges of using the Mequiladora process in Mexico as a U.S.-based manufacturing company. We interviewed a U.S.-based manufacturing business manager that uses the Mequladora process in Mexico to answer our research question. To maintain the confidentiality of paricipants and the identiy of the particular company, this study refers to the manager who answered our question as Participant A, and the company is referred to as Company A. This study's limitations are as follows: This study is a qualitative case study of one U.S.-based manufacturing business that uses the Mequiladora process. Thus, this study alone cannot be used to generalize the experience of all U.S.-based companies that use the Mequiladora process for their manufacturing operations.

Findings

Company A: A Participant in the Maquiladora Program

Company A, a California corporation, was headquartered in Valencia, California. Company A Mexico, a Mexico corporation, was 90% owned by Participant A and 10% owned by his partner, a Mexican national. The company engineered, designed, manufactured, and assembled multiple lines of chlorinated polyvinyl chloride and polyvinyl chloride plastic and copper tubing, valves, fittings, and assemblies. These high-reliability components were marketed to professionals in the pool, plumbing, and irrigation and landscape market segments, in addition to national retail accounts. Products sold under company brands accounted for the majority of revenue.

The company was formed in 1969 by Participant A and his brother in their garage, where light manufacturing took place, as well as sales. Participant A's brother took care of the business's marketing aspects, while his brother, Participant A, was the creator of new products and ideas and oversaw company operations. After receiving his doctorate in organizational leadership and spending 20 years in the business, Participant A's brother decided to pursue other interests and sold his half ownership to Participant A. The company continued to expand and experienced steady growth in sales of nearly 20% annually through Participant A's leadership and his son. Before being purchased in 2013, the company achieved more than $20 million in revenues, held numerous patents and registered trademarks, and operated out of a 75,000-square-foot facility in Valencia and another 30,000-square-foot facility in Limone Industrial Park in East Tijuana, Mexico.

The company's products were sold through an international network of distributors and independent hardware retailers. Approximately 30% of the company's products were sold to professionals and distributors in the plumbing sector. The pool and irrigation segment accounted for an equal percentage of sales. The company's revenue was derived from products sold through major home improvement chains and smaller retail accounts. The customer base exceeds 5,000. The largest customer accounted for approximately 15% of annual revenues and was one of the prime reasons for establishing a maquiladora. Company A's top six customers were Deere and Company, Ace Hardware, Orchard Supply Hardware, Menards, Lowe's, Inc., and Barnett and Orgill, Inc.

Five years after the NAFTA agreement went into effect, Company A established a maquiladora operation in Tijuana, Mexico, categorized as a business in the industrial sector. Participant A, founder and president of Company A commented that the Maquiladora was formed out of necessity. Two of their retail customers, ACE Hardware and Lowe's, were requiring each part to have a barcode label. Labor was too expensive in Valencia, California, to handle the labor-intensive task of sticking a barcode on each part that was uniquely shaped and packaged. The company was also experiencing difficulties with their assembly labor with high turnover, some legal filings, and low production.

Establishing a Maquiladora involved several steps. Participant A commented, Company A began by contacting an established maquilas umbrella service in Tijuana. We set up a factory under their maquilas license, and they handled all the import and export papers. We leased a building and provided a manager, but our employees worked for them and were on their payroll. We paid a monthly fee based on the number

of employees. (Participant A, personal communication, April 3, 2017). Company A established its operation in Mexico using a conduit until it was able to set up the maquilas under its operation properly. This required a Mexican citizen to have at least a minority interest in the Mexican corporation. The plant manager at Company A in Valencia was also a Mexican citizen, and he assumed 10% interest of Company A Mexico, while Participant A owned 90%. In the first year of operations, Company A Mexico operated under the umbrella license arrangement. During this time, the company was able to secure a Mexican accounting firm to set up the financial records and payroll system. Additionally, the proper U.S. authorities were contacted to complete the permit process to send the product across the border in-bond (duty-free) and have the product returned to the United States. After the paperwork was completed, ownership established, and operations intact, Company A Mexico began operations, and Company A left the umbrella maquila, having obtained the maquila license as Company A Mexico.

The researcher asked Participant A about finding management for the 150 employees in their maquila operation. Participant A discussed the legal qualifications necessary in Mexico for prospective managers to pass a certification test to be licensed by the Mexican government. The 10% owner of Company A Mexico was chosen to be the manager and was given the charge to pass the needed classes to obtain the license. Participant A was a 15-year veteran of Company A in Valencia, so he was familiar with the products and manufacturing processes unique to the company and had established his integrity and competency with Participant A to take on the critical management role.

In addition to management's legal requirements to be certified, Mexico has particular requirements for maquila employees. Participant A stated, "The maquila must pay for the employees' transportation to work, their medical insurance that is provided by the government, their medical prescriptions, their lunches while at work, as well as the established minimum wage." Company A had to invest in training management and employees as part of the maquila program's capital requirement. Other obligatory fees paid to the Mexican government included set-up fees, payroll registration, toxic waste fees, and other ancillary business licenses.

The Mexican government authorities required regular reports on the maquila operations that involved payroll records for each employee, inventory on hand to tax, and the import-export activity taking place with the United States. The Mexican government conducted regular audits for all records to be sure they were being reported properly and interviewed employees to be sure they were being treated fairly and according to Mexican law. Company A Mexico hired an outside accounting firm in Mexico specializing in maquilas to handle all statutory requirements and government audits. Hiring a Mexican accounting firm helped ensure that the Mexican operations stayed within all legal boundaries for maquila programs.

The net result for Company A Mexico was an annual savings to Company A in Valencia of $1 million, or about a 5% savings to their cost structure. Participant A stated, "Without the maquila program, we would not have been able to offer barcoded parts to our retail customers. The Chinese competition was offering barcodes on every part, and we would have been priced out of the market without the maquila" (Participant A, personal communication, April 3, 2017).

One of the frustrations experienced with the maquila program was the inefficiencies of dealing with the Mexican government. Their processes were slow, sometimes deliberately so, as some officials wanted bribes, which are illegal for American businesspeople to oblige under the Foreign Corrupt Practices Act. Participant A never considered participating in bribery or being forced to participate.

In Mexico, maquila employers are required to work with either a union or a syndicate to represent their employees' grievances. Participant A explained, "A syndicate is a third party firm paid by the employer to represent the employees' grievances independently. The employer calls them when a grievance is filed and they talk to the employee and employer and come to an agreement." Participant A found that this system worked very well for both the employees and Company A Mexico, as they paid the syndicate, and it was motivated to be proactive in settling employee-employer disputes. The company was never unionized by the employees, although a few had discussed forming a union. However, Company A Mexico paid higher than average salaries and provided many employee perks that were appreciated by the employees and were beyond the legal Mexican government requirements for the maquila program. Many employees did not find forming a union a necessity.

Company A Mexico did experience other challenges associated with the maquila program. They had high employee turnover rates due in part to the seasonality of the business. This required management to put forth better production scheduling to even out the manufacture of parts and labeling. The operation sometimes worked around the clock to get orders processed in Mexico and returned to Valencia in time for shipping to the customer. One of the maquila program criticisms is the high turnover, which sometimes reaches 35% to 40%. Simultaneously, costs associated with training are estimated to be at least $333 per employee, as reported in the *New York Times* (as cited in Hein & VanZante, 1991, p. 16).

The experience of Company A Mexico with the maquila program underscored the importance of good management. Maquilas either succeed or fail due to the manager of the operation. Participant A commented that there are so many records that have to be kept, especially on freight returning to the United States. Trucks returning to the United States had to have the same items as were on the documents. If they were off by one part, the truck was red-flagged, which required the truck to be fully unloaded so every item could be recounted. Also, the Mexican manager must know the ins and outs of working with the different government levels involved in operating a maquila. Mexican governmental departments levy hefty fines on U.S. maquila operations for any infractions they discover, so managing the accounting functions is critical to smooth relations with the Mexican government.

Company A Valencia was sold in 2013 to two major competitors of Company A; each bought a different business segment: plumbing and irrigation. Neither company chose to continue with the maquila program established by Company A Mexico. The sale of Company A Valencia that did not include Company A Mexico required the maquila to close operations. The paperwork required to shut down the business was immense; high severance packages were offered to employees and local, state, and national government offices, which required audits before the corporation could be permanently closed. The closing of Company A Mexico was expensive and time-consuming to effectuate. When the researcher asked Participant A if he would establish a maquilas operation today, he said, without hesitation, “Given the same circumstances, my answer would be absolutely yes.”

Discussion

The operational experience of Company A Mexico in the maquiladora program was not too dissimilar to other maquilas companies. Vargas and Johnson (1993) assessed off-shore manufacturing's operational experience within the U.S.–Mexico region fundamental organizational issues, technical and nontechnical challenges, performance-enhancing programs, and the long-term strategic advantages and difficulties present in the Maquiladora program (p. 17). Vargas and Johnson did not cite a single dominant element or function considered key to the maquilas' success. Aspects such as training, scheduling, simplification, flexibility, and gainsharing were necessary for attaining organizational and manufacturing success (Blyde, 2014; Dowlatshahi, 2011). Some of the methodologies and technologies of manufacturing management were transferable across cultures and required for company achievement (Blyde, 2014; Dowlatshahi, 2011; Vargas & Johnson, 1993, p. 17).

Some of the issues cited in Vargas and Johnson (1993), as well as by other scholars (Blyde, 2014; Dowlatshashi, 2011; Garcia et al., 2010), related closely to the experience at Company A. Skilled personnel with qualified work experience were difficult to find for Company A. Fixing the skill shortage required training and education. While Company A’s manufacturing function required low skills, training was still required for all the employees to ensure quality control. When evaluating key strategic challenges in the operational start-up, companies found the Mexican government to be inefficient and venal, with too many regulations, and found their U.S. managers tend to be unwilling to live in Mexico (Blyde, 2014; Dowlatshashi, 2011; Garcia et al., 2010; Vargas & Johnson, 1993, p. 29). Company A was fortunate to find a general manager who spoke fluent Spanish and English, was a citizen of both the United States and Mexico, understood the culture and people of Mexico, and was willing to live in Mexico. Managers at Company A Valencia went to Mexico and stayed a few days to train and assist with operations but would cross back over the border at night to lodge in the United States due to border accommodations and fear of safety, or they would only visit for one day at a time.

Companies surveyed in Vargas and Johnson's (1993, p. 30) study chose to operate under the direct ownership option, even though 65% had no prior experience working in Mexico. Participant A decided to set up a Mexican company and gave 10% ownership to the general manager to establish the maquila. Having Mexican ownership was helpful to some degree with the Mexican workers and government officials. The general manager took responsibility for working with the government to iron out difficulties that would arise and relate well to the workers. Companies in search of cost competitiveness in a maquiladora venture found they could innovate and find new processes from which to implement the innovations. Company A Mexico applied its engineering skills to develop better systems and procedures that would assist with the more efficient labeling of products. Finding efficiencies and using less expensive labor helped to decrease operating costs by 5%.

Most of the companies experienced problems with having operations in Mexico, but the problems were seen as short-term and involved performance issues to schedule, asset utilization, and product and process quality (Blyde, 2014; Dowlatshashi, 2011; Garcia et al., 2010). However, these were all rectified satisfactorily (Vargas & Johnson, 1993, p. 31). Company A Mexico had issues with production slowing down. When this happened, the Mexican operations and managers' general manager from engineering to production quickly analyzed the problems and made recommendations for improvement. The problems were usually short-lived, and solving each issue helped the company improve its output and quality.

Personnel at Company A Mexico were predominantly low-skilled workers. The surveyed companies found that it was challenging for maquiladora firms to handle the high turnover rates of 8-12% monthly (Participant A, personal communication, April 3, 2017). A typical maquiladora company would endure a 100% turnover rate for low-skilled workers in a year and, for those in the management and professional level, the turnover was about 40-50% a year (Garcia et al., 2010; Vargas & Johnson, 1993).

Company A Mexico experienced the same issue and tried to handle it by awarding higher wages and benefits to help keep workers. Although exact turnover rates were not available, Company A Mexico's turnover was less than the averages cited. Personnel management in the maquilas study put greater emphasis on labor flexibility (98.2%) than on fixed assignments (77%) and tight methods (66.1%) when compared to repetitive options. Vargas and Johnson (1993) concluded from these findings that periodic training of the workforce and constant process simplification was necessary. Furthermore, when referring to the quality inspection of work performed, they found extensive use of employee involvement was 80%, close supervision was 88%, preventive maintenance programs were 96.6%, and process simplification was 96.2% (Vargas & Johnson, 1993, p. 31). These quality inspection elements were key to managing for quality and continuous improvement over time (Dowlatshashi, 2011; Garcia et al., 2010; Vargas & Johnson, 1993, p. 31). Quality issues were paramount to Company A's operations. Its retail customers' precise demands required accurate barcode labels on products with no room for error. This was the mandate for Company A Mexico to carry out.

One last comparison and noted difficulty with maquiladoras is transportation. Long transportation lines across the border at Tijuana were always a concern at Company A Mexico. Runs over the border had to be established more frequently to fend off the product's problems, not making it either to or from the maquiladoras in time to supply customer demand. Companies surveyed noted this issue and found it to be exacerbated by limited carrier options in Mexico. Company A would run a truck to Mexico regularly owned by the business sidestepping the carrier's need. On rare occasions, a carrier was used on large orders when the one truck was not sufficient, or the number of runs was limited to the scheduling.

Conclusion

As stated as the limitations of this study, this study is only one U.S.-based company that used the Mequiadora program, and this study alone cannot be used to generalize the trends for all other U.S.-based businesses that utilize the Mequiadora process in Mexico. A larger sample size may be required to draw a more generalizable conclusion. Future scholars may interview more than one manager from multiple business organizations that participate in the Mequiadora program in Mexico to understand the benefits and challenges of using the Mequiladora as U.S.-based companies. Additionally, the impact of the recently developed free trade agreement between Canada , Mexico, and the United States, the US-Mexico-Canada

Agreement (USMCA) (Office of the United States Trade Representative, 2020) on the U.S.-based businesses and the Maquiladora program are unknown; thus, future researchers can design qualtiative stuides to explore such impacts.

The maquiladora program was established before formulating NAFTA and positively impacted providing inexpensive labor for U.S. companies. In the case of Company A, the maquiladora program helped the company to maintain a strong competitive presence in the U.S. and foreign markets. Not all businesses desiring to establish themselves in Mexico will adopt the maquiladora program. Sometimes, these economies of scale are realized without as much government red tape as Mexico's case. NAFTA has increased trade in North America and has provided a competitive advantage for each nation to build international trade. The maquilas were not always successful in helping wage earners in Mexico increase their standard of living, and the borders were not necessarily the best place for a predominant number of the maquilas. The program's expansion to include other nations has generally helped the Mexican economy by establishing maquilas in other Mexican states. With other industries setting up production in Mexico, workers are improving their skill levels to meet the demands of existing jobs. Company A used the maquiladora program to improve its ability to penetrate new markets for its products to satisfy customer demands. The maquiladora program was successful for Company A and many manufacturing businesses. Challenges remain, but progress toward real integration of economies through a program of robust trade continues.

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