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An Evaluation of American Companies that Outsource Manufacturing to China: Decision-Making and Performance

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AN EVALUATION OF AMERICAN COMPANIES THAT
OUTSOURCE MANUFACTURING TO CHINA:
DECISION-MAKING AND PERFORMANCE

by

Michael K. Favreau

A thesis submitted to the faculty of

Brigham Young University

in partial fulfillment of the requirements for the degree of

Master of Science

School of Technology

Brigham Young University

April 2007

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BRIGHAM YOUNG UNIVERSITY

GRADUATE COMMITTEE APPROVAL

of a thesis submitted by

Michael K. Favreau

This thesis has been read by each member of the following graduate committee and by majority vote has been found to be satisfactory.

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BRIGHAM YOUNG UNIVERSITY

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ABSTRACT

AN EVALUATION OF AMERICAN COMPANIES THAT HAVE OUTSOURCED MANUFACTURING TO CHINA: DECISION MAKING AND PERFORMANCE

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Master of Science

The topic of outsourcing ranks at the top of business issues for a wide variety of companies (Wery, 2004; Ezrati, 2004). The majority of American companies believe that offshore-related matters rank as the most strategic decisions that management is expected to make in the next 12 months (Wery, 2004). “Outsourcing in China can help many companies save money, but it can be very frustrating if not done right” (Ting, 2004). The perceived benefits of outsourcing production to China are tremendously enticing, but a lack of understanding of the total costs involved lures many companies into outsourcing when it is not necessarily the best decision. The question then arises and becomes the purpose of this study: How does a company decide if offshore outsourcing is the right decision and, if so, how do they do it properly?

The purpose of this research is to search for generally applicable information that can be utilized by American companies in deciding whether to outsource their production to China. The information regarding outsourcing overseas was collected from 22 American firms and 24 Chinese manufacturers to evaluate and provide insight into outsourcing arrangements. In the final chapter of this thesis, a summary is presented of the important findings regarding the purpose of the thesis study.

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1 Introduction

1.1 Background

1.1.1 Why Companies are Transferring Manufacturing Production Overseas

In an increasingly competitive global marketplace, many manufacturing companies are looking for some type of advantage over their competition. More and more companies are searching for a means of offering the lowest possible price to customers demanding the lowest price possible. American companies are finding outsourcing to other countries to be a viable option to create cheaper prices. Other companies are transferring production overseas simply because everyone else is doing it, including their competitors. The outsourcing of manufacturing to foreign countries continues to increase. “A survey from the Gartner Group indicates that some 80 percent of American boards of directors have discussed offshoring and more than 40 percent have completed some sort of pilot program” (Ezrati, 2004). According to the Department of Commerce, the United States imported \$243 billion in goods from China in 2005, up 24 percent over 2004 (Biederman, 2006). The question is no longer if and when foreign production is coming, but how to prepare for the new global economy in manufacturing.

For more than three decades, companies have been shifting production to foreign countries. In the sixties and seventies, companies moved to Japan for automation and lower labor costs. During the eighties, American manufacturers shifted production to Mexico to take advantage of reduced shipping costs, as well as lower labor costs. Today, companies worldwide may choose to outsource for several reasons. These reasons may include:

- Gaining operational or financial efficiencies
- Increasing management focus on core business functions
- Refocusing limited internal resources on core functions
- Obtaining specialized expertise
- Increasing availability of services
- Accelerating delivery of products or services through new delivery channels
- Increasing ability to acquire and support current technology and avoid obsolescence
- Conserving capital for other business ventures

The current strategy is to maximize the advantage of the objectives previously mentioned by transferring manufacturing outside the United States. The People's Republic of China has emerged as the preferred location for outsourcing work among both American and European firms (Arminas, 2005). Firms are recognizing that China is a dominant global player. The decision to outsource to China is creating its own momentum. Because of the large number of companies that are transferring production to

China, the hand of many companies is being forced to choose outsourcing in order to remain competitive in the market.

Labor-intensive industries are predictably the hardest hit by Chinese production, because labor costs represent a significant portion of product cost. With the exception of Bangladesh, Vietnam, and a few others, even developing economies cannot compete with the low wages in China, especially when accompanied by higher productivity and infrastructure (Shenkar, 2005). China provides so many benefits and incentives for manufacturers to outsource to their growing economy. Companies have found that it is relatively simple to shut down operations in the United States, so manufacturing operations can be moved more easily to China where production can be imported back into the U.S. (Shenkar, 2005).

Multiple reasons exist indicating that companies can expect benefits from outsourcing; however, companies may encounter potential pitfalls. The review of literature in the next chapter summarizes areas that might negatively affect a decision to move production overseas. In some cases the expected benefits outweigh the potential pitfalls of the arrangement, but it is not always the case. The potential pitfalls provide companies with reasons not to outsource offshore.

1.1.2 What is Outsourcing

Outsourcing is the switching of functions previously performed by a company in-house to another company. The idea of transferring functions encompasses a broad spectrum of industries. It is important to differentiate between the different types of industries and what is being outsourced. Business process outsourcing involves the migration of services to a third-party. Business process outsourcing includes the activities

of call centers, finance and accounting, human resources, back-office services, and transaction processing. The term ‘outsourcing’ is generic enough to also include the industries of manufacturing and information technology (IT). Outsourcing manufacturing is simply the shifting of production or assembly of a product to a contracted supplier. Outsourcing IT functions involves a third-party who is contracted to develop software or manage a particular application, including all related servers, networks, and software upgrades.

In all industries, outsourcing is the switching of certain functions to third-parties. However the term ‘outsourcing’ does not indicate whether or not the transference is done domestically or not. When the third-party resides overseas or in a country that utilizes a different form of currency, the change is known as offshore outsourcing. When the transference of performing functions is moved overseas, but remains under the management of the original company, the change is known as offshoring. A common misconception is that all offshoring involves outsourcing. The definition of offshoring includes organizations that build dedicated centers of their own in remote, lower-cost locations. Offshoring commonly refers to companies taking advantage of lower-cost labor in a different country.

In the manufacturing industry, both offshoring and offshore outsourcing are taking place. The average U.S. citizen has mixed emotions about manufacturing being done in other countries. Some effects of the transferring of manufacturing overseas, whether by offshoring or offshore outsourcing, are felt by many Americans. In 2002, a widely-referenced study on offshore outsourcing found that 3.3 million jobs would leave the U.S. by 2015 and 220,000 U.S. jobs would be lost during 2004 alone (Ericson, 2004).

However, according to the Organization for International Investment, foreign companies with operations in the U.S. employ a record high 6.4 percent of American workers (Emrich, 2004). The Center for Strategic and International Studies reported that in recent years, China, Japan, and Brazil each lost more manufacturing jobs than did the United States (Weidenbaum, 2005). Manufacturing is changing and changing America at the same time.

1.1.3 Changes in American Manufacturing

The ability to share and exchange information on a global level is the principal mechanism behind the growth in almost every industry. The manufacturing industry is no different. Manufacturers are consuming information technology (IT) products at an increasing rate as part of a survival strategy. The integration of powerful IT tools in manufacturing is not the first change in manufacturing; it is one of many continually shifting aspects in the industry. Throughout the two previous centuries, in what has been called the Era of Mass Production, manufacturing companies focused on reducing costs and increasing efficiencies. The focus shifted in the 1980s to the principles of total quality management (TQM), which stressed the importance of quality and continuous improvement through product design and process control. U.S. manufacturing was facing increasing competitive pressures from offshore producers, particularly the Japanese automobile and consumer-electronics companies, who had begun to focus on quality much earlier. Improved quality, when added to production efficiency, provided a competitive advantage.

As the quality level increased to a new level and flattened off, manufacturing companies changed their focus again toward streamlined production. This shift put

emphasis on just-in-time (JIT), kanban, supply chain management, and logistics. Learning from Toyota and other international competitors, manufacturers adopted methods and systems that supported the principles of lean manufacturing. The combination of increased quality and lean raised the competitive bar of the different manufacturing industries.

In addition to the operational changes, manufacturing has evolved to become an activity whose success depends largely on how well information is managed, communicated, and used. Manufacturing companies have been able to optimize manufacturing systems with the help of information technology systems in a lean manufacturing environment. The application of information technology in planning and managing the enterprise has improved organizational and personnel efficiency.

It can be summarized that manufacturing organizations are complex systems that consciously evolve in response to market needs, competition, and technology. They have responded to change effectively. The changes have enabled them to cope with the increased demand for shortened lead time for production, improved quality, presence in global market, faster response to market changes, and improved methods of transportation and communication. Directing these changes is a key management responsibility that involves making decisions about the configuration of the organization, to ensure lasting competitiveness and stability.

In a recent survey conducted by PRTM, a global management consultancy, and World Trade magazine it was found that offshore transfers and related outsourcing topics rank at the top of business issues for a wide variety of companies (Wery, 2004). Companies are aware of the shift in that manufacturing strategy and are adjusting their

own to match. PRTM and World Trade magazine also found that over 60 percent of respondents believe that offshore-related matters rank as the most strategic decisions that management is expected to make in the next 12 months (Wery, 2004). The Gartner Group indicates that some 80 percent of American boards of directors have discussed offshoring and more than 40 percent have completed some sort of pilot program (Ezrati, 2004). In summary, many groups believe that offshore outsourcing is a shift in strategy that will play out in the future for more U.S. manufacturers.

1.2 Objective

The purpose of this research is to provide insights that can be utilized by American companies in deciding whether to outsource their production to China. The information will be gathered using surveys and will then be developed into suggestions that can be applied to the decision of whether to outsource production to China. This study will also investigate and provide some insights into what works and does not work in arranging manufacturing overseas.

1.3 Problem Statement

Companies have been outsourcing production to China and then importing components and products back into the United States for several decades. The numbers are staggering and consistently increasing. In 2005 China made seven of every ten conventional toys in the world. Chinese-made furniture and bedding imported into the United States exceeds ten billion U.S. dollars, up from less than four billion dollars in 2003 (Shenkar, 2005). Passing the \$70 billion mark in 2002, China is now the number

one foreign source for the clothing sold in the United States. The American Textile Manufacturers Institute estimates that China will control more than 70 percent of the U.S. import market by 2006 (Shenkar, 2005). In addition to these standalone products, American manufacturers are outsourcing different parts and components of products that are later assembled outside of China.

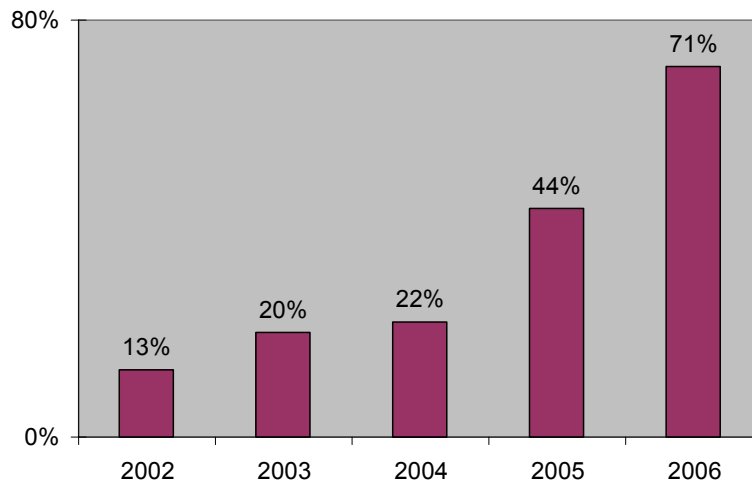


Figure 1-1. China's Projected Control of U.S. Textile and Apparel Import Market (Shenkar, 2005)

Chinese production and exportation has been increasing as many companies, foreign to China, change their production strategies to include offshore outsourcing. In some instances, the decision to outsource to China has become many executives' default solution to corporate problems. Should every company outsource to China?

Many companies that outsource have been rewarded with impressive cost reductions and extraordinary increases in efficiency. However, some companies have not benefited from outsourcing to China. The question then arises and becomes the purpose

of this study: How does a company decide if offshore outsourcing is the right decision and, if so, how do they outsource properly?

“Outsourcing in China can help many companies save money, but it can be very frustrating if not done right” (Ting, 2004). Some companies get so frustrated that they ultimately return to the U.S. for domestic production, while other companies continue to try to make it work overseas. The perceived cost and revenue benefits of outsourcing production to China are tremendously enticing, but a lack of understanding of the total expected outcome of outsourcing lures many companies into outsourcing when it is not necessarily the best decision.

1.4 Hypothesis

The hypothesis of this research is that many American companies have outsourced production to China without carefully studying all the issues that impact this decision. As a result, their financial and customer service performance expectations may not be met by the outsourcing arrangement.

1.5 Justification

The research of this thesis will provide useful information in deciding whether or not to outsource manufacturing to China. Each outsourcing arrangement is unique and each requires individual consideration. In order to make an educated decision whether or not to outsource, companies must formulate an expected outcome of a specific outsourcing arrangement. To produce an expected outsourcing outcome, companies perform research on a set of factors. Each factor researched by a company results in an

anticipated benefit or an understanding of a potential pitfall. This thesis will provide insights into which research factors must be researched and highlight the relationships of factors researched and anticipated benefits.

1.6 Methodology

The methodology selected for this report is primarily based on the use of two different surveys. One survey was administered to manufacturers based in China and another survey was given to American firms outsourcing to China. The companies surveyed in China were based in Guangdong Province, China. The goal of this research is to develop insights that can be utilized by American companies in deciding whether to outsource their production specifically to China. The data collected from the two survey types was analyzed to quantify and interpret the results.

The U.S. companies surveyed outsource production to China and the Chinese companies do contract manufacturing for American companies. Twenty two American companies were surveyed (Table 1-1). These American companies were found with the help of colleagues, university professors, acquaintances, and the Harris InfoSource business database. All American companies were surveyed on aspects of their outsourcing decision and subsequent experience. The survey asked specific questions about the organization's decision to outsource manufacturing and captured the performance of the company after transferring production to China.

Table 1-1. U.S. companies involved in the research

Company	Year the Company was founded	Year the Company began Outsourcing to China
AmSafe Aviation	1978	2001
Kalco Lighting LLC	1985	1990
Wolf Electronix	1996	1999
Orbit Irrigation Products Inc.	1980	1985
Wing Enterprises	1986	2003
Trek Bicycle Corporation	1976	2004
Back To Basics Products, Inc.	1972	2000
Accessories Marketing, Inc.	1989	1999
Ford Motor Company	1902	2003
Honeywell International	1936	1999
GoLite LLC	1999	1999
Russell-Newman, Ltd.	1939	1995
Ogio International	1987	1987
Cross, Inc.	2002	2004
Doskocil Manufacturing	1960	1990
Blackwood Industries, Inc.	1997	1997
Black & Decker Corporation	1910	1994
Danco, Inc.	1960	2000
Woolrich Inc.	1830	1994
Legacy Window Coverings	2001	2001
Katun Corporation	1979	2003
Amphenol Worldwide Interconnect Systems Operations (AWISO)	1932	1991

In addition to researching American companies, a list was generated of China-based manufacturers to include in the study. These China-based companies produce products directly for American companies as a result of outsourcing. To research and experience these China-based companies, I visited each one in June and July of 2005. For approximately five weeks, I surveyed 24 companies to try to understand the benefits and consequences of outsourcing to China (Table 1-2). The list of Chinese companies to be visited was limited to those organizations located in the Guangdong Province, China. At each company, I toured it's operations and conducted surveys and interviews with

management. The surveys were designed to help analyze the performance of the firms with regard to the products produced and exported to customers in the United States.

Table 1-2. Chinese companies involved in the research

Company	Year the Company began Exporting to the U.S.
TK International Ltd.	1983
Cathay Tat Ming Metal Mfy.,Ltd.	1970
Shenzhen Tong Chuangxin Electronics	2000
Shun Hing Plastic Mould Co., Ltd.	1995
Hai Xing Precision Machinery Co.,Ltd.	2001
Minglida Precision Machinery Co.,Ltd.	2001
Ten Tech Composites Technology Corp.	2003
ShiLeHe Machinery and Equipment Co.,Ltd.	2000
Cuo Sheng Precision	2001
Sino Mould	1987
SWE Plastic & Metal Co.,Ltd.	2001
Shenzhen Malata Mobile Communication Co.,Ltd.	2003
Shenzhen Huachi Science & Technology Co.,Ltd.	2003
Shenzhen Kingcera Electronics Co.,Ltd.	1999
Shenzhen Heweihong Anti-static Instrument Co.,Ltd.	2001
Yibang Precision	2000
Gatehill International Limited	1995
Shenzhen Weiming Plastic Manufacture Co.,Ltd.	1997
Shenzhei Hengtian Machinery Co., Ltd.	2004
Sun Yick Plastic Products (Shenzhen) Co.,Ltd.	1992
Silitech Technology Company	1978
Da Weiguang Stock Co.,Ltd.	1975
Liancai Science and Technology Co.,Ltd.	1997
Mustek	1988

1.7 Delimitations

All American companies studied, except for one firm, were outsourcing production to China during the timeframe of the study, creating survivorship bias. The

companies that attempted outsourcing and failed were not excluded from the study on purpose. These companies were excluded due to the fact that they no longer did business in China and they did not publicize their outsourcing failure. The survivorship bias may cause the results of this study to skew higher because companies with success in outsourcing were predominately included. All American companies studied were involved in outsourcing and outsource directly to Chinese, Hong Kong, or Taiwanese companies located in China. All American companies studied do not own any portion of the Chinese manufacturing operations. The Chinese companies studied ship directly to U.S. companies on American soil and are located in Guangdong province.

1.8 Definition of Terms

Communist Party of China (CPC, CCP for the unofficial name Chinese Communist Party) – The Communist Party of China is the largest political party in the world. Authoritarian in structure and ideology, it continues to dominate the government. In periods of relative liberalization, the influence of people and organizations outside the formal party structure has tended to increase, particularly in the economic realm.

Domestic production – The production of goods within the United States, as opposed to the production of goods outside that are imported into the United States.

International Organization for Standardization (ISO) – An international organization responsible for defining international standards.

Joint Venture (JV) –An arrangement where two or more parties work together in a limited and defined business undertaking. Ordinarily, all participants of the joint venture

contribute assets, share risks, and have mutual liability. The parties involved may be from different countries.

Just-in-time (JIT) – A pull system, driven by actual demand. The goal is to produce or provide one part just-in-time for the next operation. Reduces stock inventories, but leaves no room for schedule error. As much a managerial philosophy as it is an inventory system.

Kanban – Kanban in Japanese means, loosely translated, 'card or sign'. Stocking system using signals to make production systems respond to real needs and not predictions and forecasts.

Logistics – Management functions that support the complete cycle of material flow: from the purchase and internal control of production materials; to the planning and control of work-in-process; to the purchasing, shipping, and distribution of the finished product.

Original Equipment Manufacturers (OEM) – An original equipment manufacturer is a company that builds components that are used in systems sold by a value-added reseller (VAR). The practice of a VAR selling products with components from OEMs is common in the electronics and computer industry. An OEM will typically build to order based on designs of the VAR.

Offshoring – The relocation of operations to a foreign country. The performance of functions still considered to be administered in-house.

Offshore Outsourcing – Offshore outsourcing is the transference to third-parties in a foreign country, and the performance of functions previously administered by a company in-house.

Outsourcing – The transference to third-parties, the performance of functions previously administered by a company in-house. The third-party may be located in the same country or overseas.

Privately Owned Enterprise (POE) – A privately owned enterprise refers to ownership of a company in two different ways—first, referring to ownership by non-governmental organizations; and second, referring to ownership of the company's stock by a relatively small number of holders who do not trade the stock publicly.

Severe Acute Respiratory Syndrome (SARS) – First reported in China in November 2002, SARS is a contagious and sometimes fatal respiratory illness that has spread worldwide. Symptoms resemble pneumonia or influenza and include fever, headaches, body aches and dry coughing.

State Owned Enterprise (SOE) – A business owned and operated by the Chinese National Government.

Supply Chain Management – The delivery of customer and economic value through integrated management of the flow of physical goods and associated information, from raw materials sourcing to delivery of finished products to consumers.

Third-party - An outsider; a business or personal invitee or a party with absolutely no connection to the principals who are involved in the defined action.

Value Added Reseller (VAR) – A value-added reseller is a company that adds some feature(s) to an existing component or product, and then sells the product to end users.

2 Review of Literature

In an effort to understand the current literature dealing with the outsourcing decision and the execution of changing manufacturing to third-party offshore, the review of literature helped me to understand the current issues that companies are facing. Several electronic databases were queried for papers on offshore outsourcing and issues related to deciding to make a manufacturing change. Other sources include books and pamphlets recommended by colleagues and professional acquaintances made through research on the topic. Due to the novelty and evolution of offshore outsourcing, literature searches were limited to the last eight years. More than 90 articles and books were reviewed in total for this study.

In the review of literature, the factors that influence the decision to offshore outsource will be presented and summarized. First, an analysis of the potential benefits and impending concerns that come from pushing manufacturing out to a foreign company are discussed. Second, the nature and characteristics of products that are successfully outsourced are addressed. The discussions of these issues help to generate an understanding of the previously researched aspects of offshore outsourcing and will help to direct and support the ultimate findings of the research.

2.1 Benefits of Offshore Outsourcing

Outsourcing to China is a recipe for disaster for the unprepared; however, the transference can breathe new life into product lines that might otherwise be facing extinction (Dastmalchi, 2004). The survival strategy of offshore outsourcing can help companies to reduce costs and increase their overall competitive advantage, but at what short-term or long-term cost? What tradeoffs exist in deciding to outsource? There is no right formula. Products are different. Each American company is unique and no Chinese supplier is alike. Every relationship is different. All the factors, both benefits and potential pitfalls have to be considered in the decision to outsource to a developing country, such as, China. Outsourcing involves substantial risk and effort. The potential benefits of the risk and effort include significant cost savings, profit growth, and competitive edge; getting the benefits, however, comes at a cost not everyone is willing to pay.

2.1.1 Labor Compensation

Improving the cost position of any company remains the major underlying driver for most offshore transfer decisions (Wery, 2004). Several studies, such as Abraham and Taylor, identified the top reason to be savings on wage and benefit payments (McCarthy, 2004). Drawn in by the lure of low labor costs, U.S. manufacturing companies are eager to take advantage of labor at a fraction of the cost associated with domestic production. Every company wants to produce the same amount of product for less, so companies have become fanatical about the idea of transferring production offshore. However, it

should be pointed out that labor is such a small percentage of total cost for many products that it should not be the only deciding factor in outsourcing (Tonkin, 1999).

The U.S. Bureau of Labor Statistics reported that in the United States, hourly compensation costs for production workers increased four percent in 2004, to \$23.17. Every year, the bureau publishes an International Comparison of Hourly Compensation Cost for Production Workers in Manufacturing. The latest report, USDL: 05-2197 released on November 18, 2005 shows the hourly compensation costs for production workers in 32 different countries. The compensation measures are computed in national currency units and are converted into U.S. dollars at prevailing commercial market currency exchange rates. They are appropriate measures for comparing levels of employer labor costs, but they do not indicate relative living standards of workers or the purchasing power of their incomes. Prices of goods and services vary greatly among countries, and commercial market exchange rates do not reliably indicate relative differences in prices.

Outside of Europe, the United States has the highest hourly compensation costs for manufacturing workers. The cost of hourly compensation in the Asian Newly Industrialized Economies (Asian NIEs) in comparison to the United States is shown in Table 2-1. Sri Lanka has the lowest hourly compensation of all countries included in the comparison of compensation. China was not included in the comparison done by the Bureau of Labor Statistics. Despite its role in world manufacturing, China is not included in the comparison because of the difficulties in obtaining and interpreting their data and because of concerns about the quality of the data.

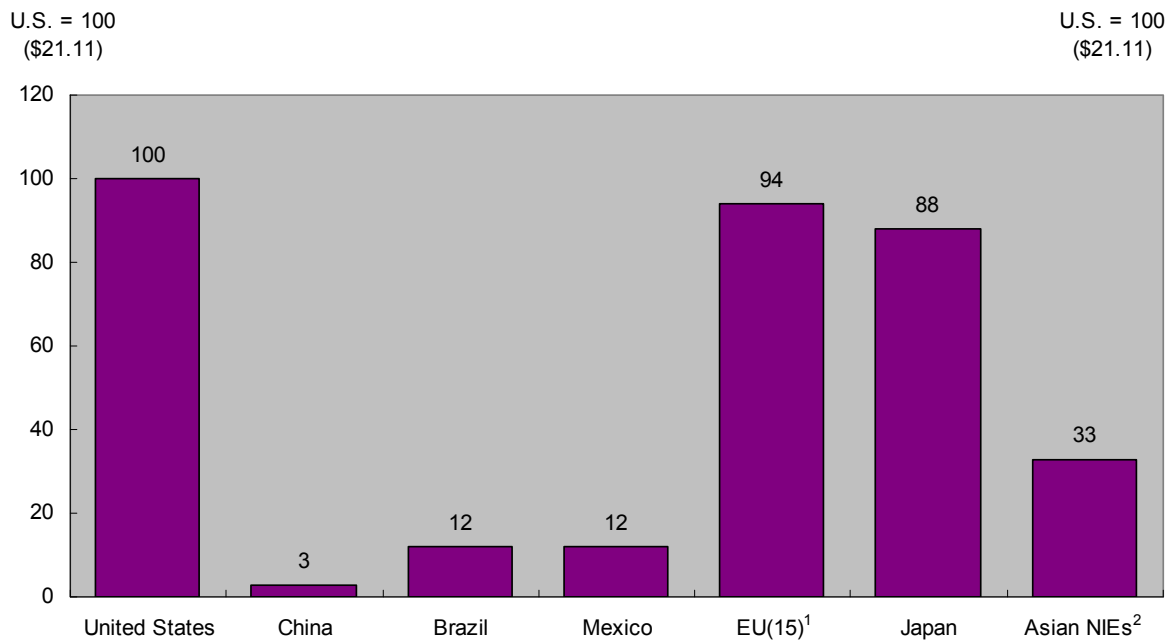
Table 2-1. Hourly compensation costs in U.S. dollars for production workers in manufacturing

Country	Hourly compensation 2002 (U.S. dollars)	Hourly compensation 2003 (U.S. dollars)	Hourly compensation 2004 (U.S. dollars)
United States	\$21.40	\$22.27	\$23.17
Hong Kong	\$5.66	\$5.54	\$5.51
Korea	\$8.77	\$10.03	\$11.52
Singapore	\$6.71	\$7.18	\$7.45
Sri Lanka	\$0.49	\$0.51	--
Taiwan	\$5.64	\$5.69	\$5.97

In China, earnings and other compensation data for manufacturing workers are poorly and partially reported, making it difficult to pin down the hourly compensation costs for production workers. The cost varies widely from region to region and for urban and rural workers. Different sources of literature indicate varying amounts for hourly compensation. Rates may range from as little as 33 cents per hour to \$3 or \$4 per hour (Hogan, 2004). Another source indicates that a manufacturer can save about 80 to 85 percent of direct labor costs moving production to China where the average direct labor hourly cost is US\$0.85 (Blackerby, 2003). A different source states that factory workers in China earn only 4.5 percent of the average U.S. factory wage (Tyson, 2005). Lastly, a different source indicates that the wage in China can start from as low as \$50 to \$60 monthly (Ting, 2004). It is hard to identify what region these authors are referring to and on what basis they make their compensation estimations.

In 2005, a commonly referenced article was published by the former head of International Programs Center at the U.S. Census Bureau, Judith Banister, indicating that compensation statistics were now available for the first time for the entire country of China. The statistics permitted the estimation of the compensation of manufacturing employees with some degree of precision for the year 2002. "Employees in China's city

manufacturing enterprises received a total compensation of \$0.95 per hour, while their non-city counterparts, about whom such estimates had not previously been generally available, averaged less than half that: \$0.41 per hour. Altogether, with a large majority of manufacturing employees working outside the cities, the average hourly manufacturing compensation estimated for China in 2002 was \$0.57, about three percent of the average hourly compensation of manufacturing production workers in the United States” (Banister, 2005).



¹EU(15) are the European Union member countries prior to the expansion to 25 countries on May 1, 2004.

²Asian NIE's are the newly industrialized economies of Hong Kong, Korea, Singapore, and Taiwan.

SOURCE: Bureau of Labor Statistics, "International comparisons of hourly compensation costs for production workers in manufacturing, 1975–2003," Nov. 18, 2004; on the Internet at <http://www.bls.gov/fls/home.htm>. For China, data are from this article and not from the BLS series. The data for China refer to all employees rather than just production workers.

Figure 2-1. Average hourly compensation costs of manufacturing workers, selected economies

The results found by Banister coincide with those found in interviews with manufacturers operating in China. Employees in city manufacturing received wages

similar to \$.95 per hour. Cliff Eagle, operations manager at Gatehill International said, “The minimum salary in Baoan, Shenzhen is RMB 580 per month [for production workers]. On top of this, [the company] also provides free meals, housing, and all social premiums required by local laws (pension, medical, etc.). Total cost to the company is about USD \$1 per hour [for production workers]” (Eagle, 2005).

In summary, direct labor savings is usually the primary motivation for offshore outsourcing. The amount of labor savings is significant, but steadily decreases as wages increase. “Previous studies show that outsourcing can result in cost savings of a least 50 percent over a domestically housed operation” (Mobley, 2004). The labor savings varies between different areas and regions of the world and China. The current cost of labor compensation in China is difficult or impossible to determine due to a lack of quality information.

2.1.2 Abundant Supply of Human Resources

Many times the resources of China are overlooked and misunderstood by management teams that focus solely on the low cost of manufacturing laborers. Management teams often fail to recognize that The People’s Republic of China is made up of over 1.3 billion people, a vast pool of human resources. The entire population is not employed in the manufacturing industry; however, China has the world’s largest manufacturing workforce, at more than 100 million (Banister, 2005). Some headlines and references point to a shortage in offshore labor, but it is unclear if the authors are referring to global labor or labor in other developing countries. The Indian government itself is predicting a shortfall in labor by 2009 (Coxon, 2005).

In addition to a large force of manufacturing laborers, the skill and education of the workforce is steadily growing. China has begun to manufacture products that require different kinds of moderately intensive skills. Large segments of China's young adults have at least a low middle school education and therefore are basically literate and numerate. Young people are eager to work hard in a disciplined manner for pay that is significantly higher than that of working in agriculture. "China also has millions of university-educated young adults who are especially competitive because they are good in engineering and technical fields, are hard working and motivated, and work for a fraction of the salaries received by equally capable young adults in developed countries" (Banister, 2005). In 2003, China had roughly 8.5 million young professional graduates with up to seven years' work experience and 1.6 million young engineers (Farrell, 2004). Chinese engineering schools produce 350,000 graduate engineers every year, compared to 90,000 for U.S. engineering schools. In China, a good manufacturing engineer's wages can start as low as US\$500 monthly, and a machinist can be half of that rate (Ting, 2004).

2.1.3 Raw Material Cost Savings

For many American manufacturers, reducing material cost is an important part of the offshore outsourcing survival strategy (Ting, 2004). Every product requires different raw materials and some raw materials can be purchased at a lower rate in Asia. The majority of the sources of literature available indicate a cost advantage for raw materials in China. The cost of material can be an advantage, but it can also be just as expensive as, or more expensive than, raw material purchased in the United States. The market price of raw materials is often determined by the market situation. For example, in 2003 and 2004 there was a high demand for steel in the Chinese automotive market that drove up the

local iron and steel prices considerably during those two years (Ting, 2004). The price of copper and different types of plastics provides an advantage in an outsourcing arrangement. The price of copper and plastics has risen in the past two years; however the current price is still less for materials purchased in America (Dewhurst, 2004).

The cost savings associated with the raw materials varies with the raw materials required to produce products. Many materials required for production are imported from countries outside of China. Certain types of materials are not available in the overseas markets and must be exported from the United States to the Chinese supplier for production (Dewhurst, 2004).

2.1.4 Manufacturing Overhead Savings

In both outsourcing and offshore outsourcing, manufacturing companies eliminate the variable overhead associated with manufacturing the product in-house. The savings is realized in maintenance and utility costs (gas, electricity, water) of the related production equipment, indirect labor costs (quality assurance inspectors, material handlers, maintenance technician, etc.), and the extra costs on direct labor (such as, social security taxes, medical insurance, 401(k) contributions, etc...) (Ting, 2004).

Outsourcing allows companies to reduce overhead expenditures, which creates flexibility, and transfers the uncertainty of demand to the outside company. On November 11, 2001, Microsoft launched their new video-game console, called Xbox. Ten days after the launch of the product, Microsoft had sold 556,000 units of the video-game console, despite the fact that Microsoft had never operated a single production facility. Microsoft outsourced manufacturing of the product to Flextronics, eliminating manufacturing overhead. Decreased turnaround time and greater flexibility are two

motivators behind the decisions to outsource manufacturing. By working with a contract manufacturer, American companies reduce overhead and can easily ramp up production rates for a successful product launch. Rather than be constrained by a major capital investment, American companies are only limited by the terms and conditions agreed upon in their contracts, and on the performance of the company they selected for manufacturing.

2.1.5 Focus on Core Capabilities

A common phrase throughout the business world is to outsource anything that is not considered a core competency of the company. Other companies, whether foreign or domestic, can probably perform certain activities faster and more efficiently, if the activity is a core competence of the third party. Companies should not outsource activities that are part of a company's core competencies or that are critical corporate assets (Arrunada, 2005). These core competencies help maintain a company's competitive advantage. If a firm can buy a certain good outside the firm at a lower cost and at least the same level of quality, then it should outsource; if not then the firm should produce the good in-house (Taylor, 2005).

Outsourcing activities that fall outside the scope of the core capabilities of the company may improve the performance of those activities, because other companies may specialize in those activities and offer superior performance. Asia's manufacturing operations have been shown to be capable of high levels of performance. "By moving such operations from North America to China, one large electronics company tripled its manufacturing productivity. Cycle times and defect rate fell" (Hagel, 2004). The

experience and capabilities of Chinese companies can easily increase the efficiency and performance of their American counterpart.

Outsourcing can also provide opportunities to use company knowledge and technology of existing capabilities to expand into new product markets. Hagel suggests that Gateway has established leadership in the plasma television market because it outsourced other products and could focus on expanding to other product areas. Hewlett-Packard has obtained a six percent market share in digital cameras, in the face of competition from Canon and Nikon. Dell has been encroaching on the television and smart phone markets when its core business is personal computers (Hagel, 2004).

2.1.6 East Asia Market Presence

“Aside from taking advantage of China’s low-cost labor, materials, and overhead, producing goods overseas establishes a presence from which American companies can market their products throughout East Asia” (Dastmalchi, 2004). China is a country of 1.3 billion people and foreign firms salivated for years at the thought of selling a toothbrush to every Chinese (Shenkar, 2005). The market potential for any product is enormous. China is becoming the world’s largest market for cars, appliances, cell phones, and more (Bremner, 2004). A recent editorial article in *Business Week* points out that there are massive benefits accruing from selling products in China to manufacturers and investors. “China is an extremely open market, and American multinational companies are making big profits selling products there.” Ultimately, big profits for companies in China raises American corporate returns on capital, which boosts share prices and benefits anyone with a 401(k) retirement account or an equity mutual fund (How America Can Meet ‘The China Price,’ 2004).

Marketing products for distribution within the boundaries of China may not be a short-term goal for American companies, but it should be a long-term target for companies wanting to grow and survive in a global marketplace. Many products have reached maturity in the United States and foreign markets are the only place for profitable growth.

2.2 Potential Pitfalls of Offshore Outsourcing

As with any endeavor that offers great benefits, there generally exists potential pitfalls that can be a detriment to the endeavor. The decision to outsource involves more than an analysis of the cost savings involved in hourly production labor or other benefits. One must also consider hidden costs and problems, such as country or political instability, loss of manufacturing control, theft and piracy, regional turmoil, unstable economies, poor infrastructure, lack of exposure to Western business culture, and data insecurity. Outsourcing can have hidden drawbacks that may take several years to emerge after deciding to transfer production (Anderson, 2000).

2.2.1 Decreased Productivity

“Many U.S. manufacturers have found their hourly wages are reduced 50 to 80 percent by producing in a third-world country, only to realize that it takes five times the number of hours to produce the same article (Forrest, 2005). “You simply cannot take a person in America and replace them with one offshore worker,” says Hank Zupnick, CIO of GE Real Estate.

2.2.2 Loss of Manufacturing Control

An essential task of any form of management is to control the processes on which the organization depends. The same is true for management of manufacturing firms and is also applicable when processes are outsourced, domestically or overseas. Oversight and inspection are required. Frequent visits are necessary to review material sources and specifications, evaluate compliance with production processes, ensure that products are made to specifications, and ensure compliance with local laws and regulations (Blackerby, 2003). A few hidden expenses are involved in controlling overseas manufacturing including travel expenses, travel time, local transportation, food, customs, interpreters, and post-return recovery time. Travel to Asia is strenuous. More than 20 hours is spent traveling, so American managers tend to maximize their trips by working extra hours and staying for an extended period of time, typically ten days.

Without regular visits to control manufacturing, communication and inspection is severely limited. The time zone difference between the east coast of the United States and China is 13 hours. The reality is that communication occurs early in the morning or later in the evening. Email messages are often unanswered until the next business day, or the response comes while an American worker is at home.

A couple of years ago China and other parts of Asia were hit with the unanticipated disease of “Severe Acute Respiratory Syndrome”, also known as SARS. Travel advisories announced by the World Health Organization and the Center for Disease Control led many U.S. companies to suspend travel to mainland China for two months (Blackerby, 2003). During that period of time, companies such as Dell, Eastman Kodak, Intel, and Wal-Mart were unable to send employees to China to perform on-site

inspections of facilities, thereby limiting their control of manufacturing results in China. This crisis limited the American firms abilities to ensure quality or provide oversight to the manufacturing operations they have come to depend on heavily for production of many of their products.

2.2.3 Political Instability

Despite its size, the People's Republic of China is organized along unitary rather than federal principles. As a socialist country, the government plays a predominant role in the economy of the country. Approximately 30 years ago, all businesses in China were owned and operated by the government. The Communist Party of China (CPC) had complete control of the government. Under the control of the CPC, the Chinese received no salaries for employment and the government theoretically provided for all the essentials, such as, housing, employment, education, and food ration coupons. In the late 1970s and early 1980s, Deng Xiaoping, leader of the CPC, initiated reform to bring China closer to capitalism. Economic reform consisted of opening trade with the outside world, instituting the household responsibility system in agriculture, by which farmers could sell their surplus crops on the open market, and the establishment of township village enterprises. The reforms of the late 1980s and early 1990s focused on creating a pricing system and decreasing the role of the state in resource allocations (Eagle, 2005).

The Chinese government still operates under a top down approach, taking all governing powers that are not explicitly delegated to lower levels. The power and control of the government is an intangible risk that is involved with manufacturing products within its borders. The political risk is the probability that the Chinese government may change, making manufacturing more expensive and/or more difficult to carryout

(Blackerby, 2003). The central question that remains unanswered is whether a new rule of law can be introduced before corruptions with the party destroys the relationship with the Chinese people to the degree that the people demand political change. Mikhail Gorbachev, former leader of the Soviet Union, added, “China will inevitably someday have to undertake political reform. It never works to have an open economic system and this kind of political system” (Murray, 2005). China is clearly being confronted with great challenges. Chief among them are the stability of its banking system, an undeveloped pension and welfare system facing an aging population, environmental degradation, and the reliability of energy and food supplies (Barton, 2004). McKinsey indicates that most banks are performing better today than they were a few years ago (Orr, 2004). The development of China is still in process. “If the Communist Party of China accepts freedom of the press, a new rule of law, and a certain degree of democracy, the development and growth of China will continue even faster than it is today. However if the CPC does not, things could go in the opposite direction” (Eagle, 2005).

In contrast, the political risks tend to be lower in democracies where the people rule. The reigning authority within China exercises absolute and centralized control, which can result in radical changes that can affect production and exportation of goods. These changes might include taxation, environmental regulations, tariffs, payroll duties, custom duties, and many additional governmental changes that affect business, especially foreign business.

Some of the changes affecting production and exportation may come from the United States in response to actions taken by the Chinese government. For example, in 2004, China was under pressure to change its existing exchange policy of fixing the value

of the Chinese yuan to the U.S. dollar. The government resisted change due to the benefits of having a weak yuan. Because the Chinese government was refusing to change its exchange rate policies, it might have increased the risk of actions by American policy makers to curb imports from China (Roberts, 2005). To curb imports, policy makers would have imposed a 27.5 percent tariff on Chinese imports (Tyson, 2005). A change in U.S. foreign policy aimed at Chinese exports would have negatively affected American companies who outsource their production.

In addition to governmental policies and regulations, political unrest can also prove to be costly for operations. “China has been plagued by repeated waves of labor demonstrations, involving over 10,000 protesters at a time, in 1999 and 2002. Issues include non-payment of wages, layoffs, contract disputes and conditions. An estimated 120,000 disputes took place in 1999, carried out in the form of demonstrations, strikes, and violent confrontations with law enforcement” (Blackerby, 2003).

2.2.4 Cultural Differences

The cultural differences of the People’s Republic of China and other nations are a result of the Chinese commitment to their traditions in troubled times. “China’s military defeats in the nineteenth and twentieth centuries exposed China’s technological weakness and revealed that the price to be paid for falling behind technologically in the new global era was enormous” (Shenkar, 2005). The Chinese people are keenly aware of their debility and recognize their need to learn from western countries in technological areas in which their country lags behind the rest of the world; however, the Chinese people have never felt the need for instruction from outsiders in the areas of decorum and protocol

(Seligman, 2004). It was necessary to learn, but it was vital that learning did not “contaminate” China’s culture and society in the process (Shenkar, 2005).

Differences exist in every country and those differences can affect the productivity of relationships and business ventures. In order to successfully do business in China, Richard McCluney, vice president for E2Open says, “It is critical to have key people in the sourcing process—perhaps Chinese Americans—who know the local customs and can conduct [business] accordingly” (Forrest, 2005).

2.2.5 Reputation Risk

In years past, a negative sentiment existed for products produced in foreign countries. Americans took pride in products produced on American soil. That negative sentiment is slowly fading, as consumers benefit by purchasing quality goods at lower prices as a result of outsourcing. However, outsourcing is still a controversial topic. Some American citizens view outsourcing to countries overseas as an enormous problem in the United States and feel threatened by it. Other citizens see outsourcing as a threat not just to American jobs but to the entire U.S. economy. Several sources of literature indicated that a reputation risk exists for those companies outsourcing production, stating that consumers will buy domestic goods over those produced abroad.

2.2.6 Loss of Intellectual Property

Jon Doyle, a lawyer and a partner of White & Case LLP advises his clients not to share their coveted intellectual property and any other sensitive data with a company that does not comply with the privacy protection laws. Few companies, American or foreign,

are entirely compliant with the rapidly evolving privacy laws in the countries in which they do business (Rosenthal, 2005).

In an ongoing study for the Business Software Alliance, IDC (a global market research and forecasting firm) estimates China's software piracy rate to be 92 percent in 2003, resulting in loss of over 382.3 million U.S. dollars (Business Software Alliance, 2004). The protection of intellectual property is a challenge for China (Barton, 2004). China has clearly demonstrated their untrustworthiness in terms of software and entertainment assets. The Chinese do not have the cultural and legal recognition of intellectual property to make them an entirely trustworthy business partner. According to Cliff Eagle, operations manager at Gatehill International, the Chinese do not value ethical business practices. "The Chinese have a different value system than Americans. The Chinese value family, friends, and loyalty and therefore spend a great deal of time in establishing 'quangxi' or relationships with those that are likely to help them in the future. In general, the value system of the Chinese does not extend to general business or social ethics that American businesses would normally expect" (Eagle, 2005).

2.2.7 Inventory Expenses

Inventory is an expense to a company, and nearly all companies strive to maintain as little of it as possible. Inventory adds unnecessary costs without adding value to the overall product. "Overseas manufacturing increases inventory of products destined for domestic markets. Most of this inventory is due to the time spent in transit. Ocean shipping typically takes 3 to 4 weeks just in transit, and additional time is spent in docks, loading, inspections, unloading, storage, customs, reloading for overland transportation, etc... Finished goods are the most expensive form of inventory, because they have the

most investment tied up in materials, parts, labor, machine time, etc... (Forrest, 2005). A high volume of expensive finished goods can mean carrying a high inventory cost. Some manufacturers source component and subassembly in China and assemble the end product in Mexico to reduce the finished goods inventory costs (Ting, 2004). Ultimately, inventory reduces return on investment (ROI). Return on investment may be measured many ways, such as return on assets, return on equity, or return on invested capital. In all of these measures, inventory is included as an asset and decreases a company's ROI (Forrest, 2005).

2.2.8 International Freight

In addition to the increased inventory cost primarily due to longer shipping lead times, international freight costs and import duties can be expensive. The majority of shipping is done in large quantities on ocean liners. Besides the actual cost of manufacturing, shipping to and from China is one of the largest costs. Cargo containers travel for approximately 3 weeks before reaching port. "Regardless of how full the container is, the cost remains the same. Container cost averages approximately \$2,600 for shipping and duty. This figure excludes the cost of transport to and from the port in China, and to the customer or distributors within the United States. The additional cost of these two land transfers often equals the cost of shipping the product by sea" (Hogan, 2004). The entire process, from land transport in China, through unload and transport in the U.S., can take 4 to 6 weeks (Dewhurst, 2004).

In some rare instances products shipped by sea never arrive at their designated port. According to a CNN report, sea piracy hit a record high of 445 attacks on commercial ships in 2003. In addition to piracy, every year approximately 10,000

containers mistakenly fall overboard during shipment. Some drifting contents of lost containers include the following:

- 80,000 Nike® Cross Trainers fell into the Pacific Ocean
- 5 million plastic Lego® pieces
- 414 drums of arsenic fell overboard near New York City
- 29,000 bath time toys (including rubber ducks, frogs, plastic turtles, and beavers)
- 34,000 hockey gloves
- 500,000 cans of beer fell into the Pacific Ocean (Dewhurst, 2004)

2.2.9 Hidden Costs of Vendor Selection

The process of finding a reliable supplier is time consuming and costly. According to a survey study done at Missouri State University, the top identifiable success factors believed to ensure that outsourcing will successfully improve an organization's effectiveness include: suppliers' reliability, technical competence, manufacturing capability, and choosing the right supplier (Ehie, 2001). Although the process of finding the right supplier is time consuming and costly, it is absolutely critical.

“In the United States, the process of evaluating a manufacturing partner often begins with a quote package. This is not the case in China” (Dastmalchi, 2004). Establishing a viable, long-term relationship requires U.S. companies to initiate costly visits with contending contract manufacturers to select a company and begin to build a relationship. The selection costs include documenting product requirements, sending out requests for proposals and evaluating the responses, and negotiating a contract (Overby,

2003). “One rule of thumb suggested by the Gartner Group is that overhead costs associated with building a contract will run at least 5 percent of the first year price of the outsourcing deal” (Kelley, 2005). The selection of a vendor is expensive, but is necessary to mitigate risk and facilitate a successful experience in transferring production over to a China-based manufacturer.

Ron Kifer, President of Program Solutions and Management, spent several months selecting an offshore vendor before actually signing the dotted line of the contract. “There’s a lot of money wrapped up in a contract this size, so it is not something you take lightly or hurry with,” Kifer says. “There has to be a high degree of due diligence making sure the [offshore] company can respond to your needs” (Overby, 2003). Cliff Eagle, operations manager at Gatehill International said, “Getting to know and trust each other is very important to Chinese when making deals and no Chinese [company] would sign an agreement if you had not reached the ‘good friend’ status” (Eagle, 2005). Andrew Smith, partner at Morrison & Foerster, adds, “We spent a long time developing an understanding with our partner before we ramped up our offshore operations. It’s about choosing the right supplier and working with them in the right way. You have to work openly. Both organizations involved need to understand the potential pressure points and what they’re going to do about them before they arise.” Once a potential supplier has been selected, Smith recommends that companies give their contract careful deliberation.

2.2.10 Costs of International Assignments

It is critical for any American company doing business in China to have a trusted resource near their Chinese suppliers. “With the volume of business that is going

offshore, all Chinese entities change continuously. While you may have considerable influence with your manufacturing partner at the outset, conditions can change quickly if a new customer or competitor enter the picture” (Dastmalchi, 2004). In most cases, this requires different international assignments for American employees to monitor and aid Chinese suppliers. The costs involved in relocating an employee family in a foreign country are extremely high. A company generally provides a housing allowance, protection, local transportation, a cost of living allowance, a hardship allowance, home leave, schooling for children, and other allowances or bonus for the assignment.

2.3 Nature of Outsourced Products

The decision to outsource to China takes into account the suitability of the products being considered. The misinterpretation of the nature of a product can be a potential pitfall in outsourcing. “High-volume, labor-intensive, stable products are the most suitable for manufacturing in China. On the other hand, high complexity, low-volume products especially those based on new technology or undergoing significant engineering changes, are not suitable” (Dastmalchi, 2004).

The type of product is not necessarily an issue. A magazine for chief procurement officers and supply chain executives recently found the top ten products sourced from China by U.S manufacturers to be completely different – ranging from metal stamping, machine-shop products, fasteners, tool and die equipment and forgings and castings to iron and steel products, plastic products, fabricated metal products, nonferrous-metal products and electrical components. The remaining products that make up the top twenty-five found in the survey include builders’ hardware, machinery, semiconductors and

other components, rubber products, consumer electronic products, electrical equipment, paper packing materials, plastic packaging materials, motor vehicle parts, plastic resins, furniture, hand tools, chemicals, specialty metals and super alloys, and wood products (What and why buyers source, 2005). In summary, the Chinese manufacturers can produce just about anything.

2.3.1 Manufacturing Automation

Products that utilize highly automated processes are not good candidates for overseas manufacturing, according to a Boothroyd Dewhurst study (Forrest, 2005). Labor cost savings are driven in large part by products that are labor-intensive. Consequently, highly automated products may not show significant cost savings to justify the immediate transfer of manufacturing to China.

2.3.2 Product Life Cycle

Martin George, vice-president and managing director at Brecon Ridge Manufacturing, said, “Many firms have it in their head that China is the obvious place to be, but it is best for goods that involve high-volume production and need few technical and engineering changes” (Arminas, 2005). When a product is introduced to the market, sales are normally low until customers become aware of the product and the benefits it provides. Advertising costs are typically high during the early stages of the cycle in order to rapidly increase customer awareness of the product and to target the early adopters. During the first stages the company is likely to incur additional costs associated with the initial distribution of the product. These higher costs, coupled with a low sales volume, usually make the first stages a period of negative profits.

The future success of the product is unknown during the first stages of the product life cycle. Sales are normally low, so production is low-volume. Outsourcing is best for products that involve high-volume production (Arminas, 2005). During the early stages of the product life cycle, engineering changes are commonplace.

2.4 Summary

The previous sections of this chapter present summarized factors that influence an outsourcing decision according to the literature reviewed. Some of the research factors are expected to provide a benefit to companies, and other factors are evaluated to determine their potential negative affect on the outsourcing arrangement. Figure 2-2 graphically depicts how the research factors influence the expected outcome of outsourcing. The specific set of factors a company researches influences their expected outcome of outsourcing manufacturing to China. The affect of research factors on the expected outcome can generally be categorized into costs and revenues, as shown in Figure2--2. Factors that provide a benefit according to the literature are marked (+). Factors viewed by the literature as potential pitfalls in outsourcing are marked (-). The evaluation of positive and negative factors produces an expected outcome, which determines whether or not a company chooses to outsource.

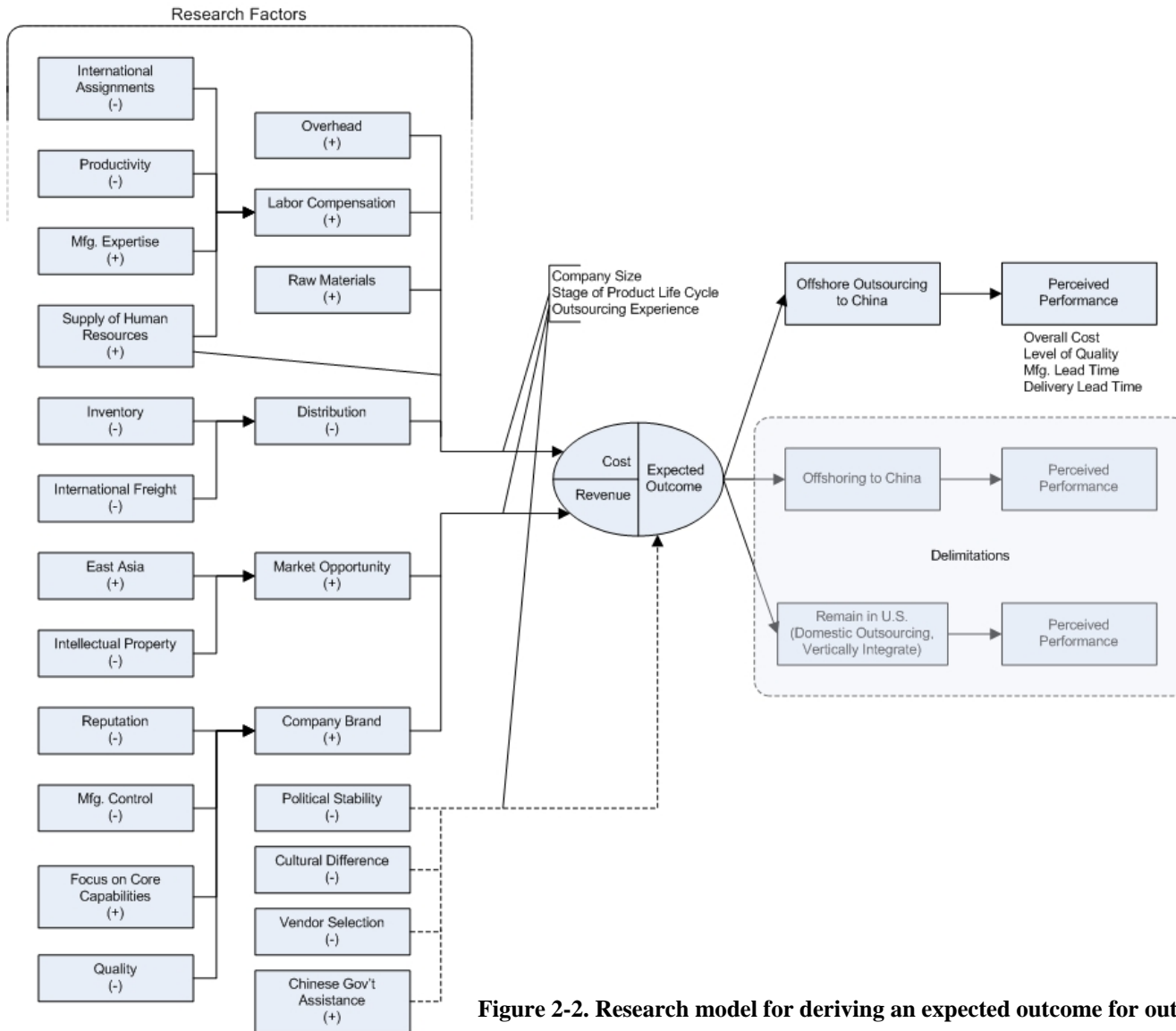


Figure 2-2. Research model for deriving an expected outcome for outsourcing

3 Research Methods and Procedures

The purpose of the study is to answer the question—Should an American company outsource to China and, if so, how should it proceed? The methods used to explore answers to these questions are described in this chapter. The search included the collection of information from both sides of the outsourcing arrangement, including both American and Chinese companies.

3.1 Survey Design and Development

The design and development of the surveys was imperative to the success of the research project. The literature reviewed in the previous chapter provided the basis for the design of survey questions. The literature indicated factors to consider in deciding whether or not to outsource manufacturing specifically to China. Each factor was viewed in the literature as either a positive benefit or a potential negative to the outsourcing arrangement, as shown in Figure 2-2. Survey questions were designed to test the factors found in the literature and their affect of the expected outcome of the outsourcing arrangement. Additional questions were added to help gain a better understanding of the outsourcing arrangement and possible factors influencing performance.

To develop an effective survey, research was performed on different aspects of survey design, such as: survey layout, question formulation, survey length and time

considerations, response rating, usability testing, etc... If the survey is ten pages or more, most respondents would give up before responding to a single question. The survey questions must be well thought out and designed to extract correct and pertinent information. The knowledge gained from researching survey design proved to be helpful in creating preliminary versions of the surveys. The iterations of reviews proved to also be invaluable to developing a strong survey.

The surveys were enhanced and changed by professionals in different fields of expertise. The surveys were reviewed by knowledgeable doctoral students and faculty at Brigham Young University. Those that reviewed the surveys were PhD students in Instructional Psychology and Technology, university professors from the Ira A. Fulton College of Engineering and Technology and the Marriott School of Management, and several business professionals with experience in manufacturing and outsourcing to Asian countries, including China. The review process went through several iterations. Each individual reviewed the surveys at least three different times and each provided invaluable suggestions to improve and enhance the quality of the questions and the overall survey design. Not all suggestions were used. The development process took more than four months to attain surveys ready for final distribution.

The surveys were specifically designed to collect information on outsourcing decision-making and performance. The information provided by the different questions was considered to evaluate the usefulness of the questions. If the information provided could not be justified as necessary, the question was not included in the survey. The temptation to include too many questions when developing surveys must be avoided. Each question must be chosen and stated perfectly. Questions had to be descriptive

enough so respondents could complete them without any assistance; however the surveys needed to be short and concise. Potential respondents would not complete a lengthy questionnaire.

The surveys also allowed for “Other” or “Unknown” responses to all appropriate questions. According to articles on survey design, respondents often do not complete surveys because they feel that they are being coerced into giving an answer they do not want to give. In some instances, “Other” or “Unknown” represent their most honest response and were therefore included in answer options.

The final step of the survey development process was the writing of an introduction or cover page for both of the surveys. The introduction indicated who was conducting the research and why the information was being collected. The goal of the introduction was to encourage the potential respondents to complete the survey and assist in the expansion of knowledge. A copy of the survey introduction can be viewed in 0.

3.1.1 Survey—Outsourcing Manufacturing to the People’s Republic of China

Two surveys were designed and developed, one for Chinese manufacturers and another for American firms that outsource to Chinese manufacturers. The survey to be completed by American companies was the first survey developed of the two. The survey was five pages in length and took approximately 10 minutes to complete. The layout of the survey was designed to have a distinctive flow—asking questions about the general background of the company, then questions about deciding to outsource, followed by questions about the nature of the outsourced products, and finally questions about the performance of outsourcing. A copy of the survey for American companies can be viewed in Appendix B.

3.1.2 Survey—Outsourcing Manufacturing from the United States of America

The survey to be completed by Chinese companies involved in production for American companies was derived from the first survey created for American companies. The Chinese survey was similar to the first; however it included more open-ended questions. Since distribution was done in person, more open-ended questions seemed acceptable, even necessary to learn more about the Chinese companies. The survey was not significantly longer than the American survey. The Chinese survey was five and a half pages in length.

After the survey for Chinese manufacturers had been carefully reviewed and edited in English, the survey was translated into Mandarin Chinese by a professional translator from China at Brigham Young University. The translated survey was then reviewed by a second native translator to verify clarity and translation accuracy.

An error in the Chinese survey was discovered while reviewing the first completed survey received while in China. The error was not a translation error, but was an error in the wording of the question. The question read, “What do U.S. companies demand from your company for you to receive their business? (Rank the responses below from 1 to 6. 1 being what companies demand the most from your company and 6 being what companies demand the least of from your company.)” Below the question on the survey was a scale which indicated the exact opposite of what was explained in the question, as shown in Figure 3-1. Since the survey was already translated and printed, the scale used by the respondent to answer the question was verified for each survey completed. The correct scale for question 11 of the China survey is shown in figure below (Figure 3-1). A copy of the survey in Mandarin Chinese can be viewed in

Appendix C. A copy of the survey for China-based companies in English can be viewed in Appendix D.

What companies demand the least of from your company			What companies demand the most from your company		
1	2	3	4	5	6

Figure 3-1. Correct question scale from the Chinese survey

3.2 Search for Chinese Companies

While developing surveys to collect valuable information, the crucial search for Chinese companies to study began. The companies had to meet certain criteria to fit the objectives of the project. The criteria included: products shipped directly to U.S. companies on American soil, company ownership from a Chinese speaking nation, and a facility located in Guangdong province. The companies had to ship directly to U.S. companies located in America to eliminate those companies that are not truly outsourcing, but selling product to companies located in China. Companies registered in Chinese speaking countries were selected for the research to control the nature and culture of the companies analyzed. Many U.S. and Japanese companies exist in China; however they operate under different rules and regulations, as well as different management styles. Finally, companies had to be located in Guangdong province to enable travel and a first hand experience of the production facilities of the China-based companies.

From the initial expectation of hundreds of companies, two dozen Chinese companies were found that met the selection criteria within the given time frame of a five week visit to the mainland of China. The selected Chinese companies were identified with the help of Gatehill International, professional acquaintances in China, and referrals from Chinese companies visited in China.

3.3 Search for American Companies

The process of searching for American contacts involved in outsourcing was time consuming and difficult. The number of companies involved in the outsourcing of production is significant, but finding the right person willing to participate in the research was an enormous task. The participant needed to be involved in outsourcing and the company had to outsource to Chinese, Hong Kong, or Taiwan companies and not have any portion of ownership in the China-based operations. Many American companies are only involved in offshoring, and own all or part of the China-based operations; therefore, they have more control and influence on production. To truly understand offshore outsourcing to Chinese companies, the U.S. companies studied could not own any part of operations in China.

American companies were identified with the help of university professors, colleagues, professional acquaintances, Harris InfoSource business database, internet search engines, referrals from the U.S. companies previously surveyed, and the Chinese companies previously surveyed.

3.4 Visiting Chinese Companies and Collecting Survey Information

Prior to each visit, a survey was electronically sent to each company to review and prepare for possible questions. In most instances the companies visited had completed the survey prior to our arrival. Each visit was coordinated with a member of upper management, a person involved with their U.S. customer(s). In most instances it was the president of the company that took the time to assist in the research project. A paid translator was always present to make sure that both parties could communicate and understand one another.

Upon arrival, every company visited extended a warm welcome and business cards were exchanged. A brief explanation of the research being conducted helped the host understand the nature of the visit. Each company provided a tour of the production facility. Companies gave detailed explanations of their operations and showed what products were shipped to companies based in the United States. After touring each facility, we would sit down with the host to review the completed surveys, ask follow-up questions, and discuss the purpose of the research.

Twenty-four Chinese companies met the established requirements and were surveyed as part of the research. These companies are listed in the table below (Table 3-1). In addition to the companies listed, several more companies were visited during the trip to China; however these companies did not fit the objectives of the research. The visits were still valuable and provided an understanding of companies based in China and their desire to acquire American customers in the future.

Table 3-1. Chinese companies involved in the research

Company	Year the Company began Exporting to the U.S.
TK International Ltd.	1983
Cathay Tat Ming Metal Mfy.,Ltd.	1970
Shenzhen Tong Chuangxin Electronics	2000
Shun Hing Plastic Mould Co., Ltd.	1995
Hai Xing Precision Machinery Co.,Ltd.	2001
Minglida Precision Machinery Co.,Ltd.	2001
Ten Tech Composites Technology Corp.	2003
ShiLeHe Machinery and Equipment Co.,Ltd.	2000
Cuo Sheng Precision	2001
Sino Mould	1987
SWE Plastic & Metal Co.,Ltd.	2001
Shenzhen Malata Mobile Communication Co.,Ltd.	2003
Shenzhen Huachi Science & Technology Co.,Ltd.	2003
Shenzhen Kingcera Electronics Co.,Ltd.	1999
Shenzhen Heweihong Anti-static Instrument Co.,Ltd.	2001
Yibang Precision	2000
Gatehill International Limited	1995
Shenzhen Weiming Plastic Manufacture Co.,Ltd.	1997
Shenzhei Hengtian Machinery Co., Ltd.	2004
Sun Yick Plastic Products (Shenzhen) Co.,Ltd.	1992
Silitech Technology Company	1978
Da Weiguang Stock Co.,Ltd.	1975
Liancai Science and Technology Co.,Ltd.	1997
Mustek	1988

3.5 Distributing Surveys to American Companies and Collecting Survey Information

The surveys for American companies were originally intended to be distributed by email to potential respondents. Attached to the email was a special Adobe® Acrobat® form file, which would allow respondents to send results by clicking a submit button at the end of the survey. The results would collect on a file server and could be downloaded when needed. The technology worked, but trial respondents struggled to submit their

responses. The technology required the installation of Adobe® Reader® on the computer and an updated version of the software to submit the results. Several business executives did not have the software installed on their machine or were operating on a version that was three or four years old. It was determined that executives preferred paper copies that could be handed to a secretary to be sent in; therefore a mailed paper survey or an emailed printable survey became the preferred method of distribution for American companies.

Potential respondents were contacted and asked what method of distribution was preferred. Those respondents that preferred mail as a method of distribution received a copy of the cover letter printed on official department letterhead, a copy of the survey, and a preaddressed envelope with paid postage. The remaining respondents received an email copy of the cover letter with the survey attached. The process took longer than anticipated and required telephone reminders to get the survey completed and sent back in.

Twenty-two American companies met the established requirements and were surveyed as part of the research project. These American companies are listed in the table below (Table 3-2). None of the American companies were visited as part of the research. We felt that visits were not required to understand those American companies involved in outsourcing,

Table 3-2. U.S. companies involved in the research

Company	Year the Company was founded	Year the Company began Outsourcing to China
AmSafe Aviation	1978	2001
Kalco Lighting LLC	1985	1990
Wolf Electronix	1996	1999
Orbit Irrigation Products Inc.	1980	1985
Wing Enterprises	1986	2003
Trek Bicycle Corporation	1976	2004
Back To Basics Products, Inc.	1972	2000
Accessories Marketing, Inc.	1989	1999
Ford Motor Company	1902	2003
Honeywell International	1936	1999
GoLite LLC	1999	1999
Russell-Newman, Ltd.	1939	1995
Ogio International	1987	1987
Crocs, Inc.	2002	2004
Doskocil Manufacturing	1960	1990
Blackwood Industries, Inc.	1997	1997
Black & Decker Corporation	1910	1994
Danco, Inc.	1960	2000
Woolrich Inc.	1830	1994
Legacy Window Coverings	2001	2001
Katun Corporation	1979	2003
Amphenol Worldwide Interconnect Systems Operations (AWISO)	1932	1991

3.6 Analysis of Surveys Completed by American and Chinese Companies

The data collected from survey participants was analyzed and compared to the responses of overseas survey participants. The data was analyzed by studying averages and responses percentages. The findings for specific questions are summarized in select tables and figures in Appendix E and Appendix F. The findings for each question are described in chapter four.

3.7 Regression Analysis

The objective of the regression analysis is to understand how the benefits react to the amount of research performed on different factors of outsourcing. Will a company claim a particular benefit if they research a specific outsourcing factor? To determine the association between benefits and factors researched, the statistical method of regression analysis was performed on survey responses. Regression analysis is a pervasive statistical technique used for investigating and modeling the relationship between a single dependent variable and one or more independent variables. In these particular regression analyses, the anticipated benefits are the dependent variables and the factors researched are the independent or predictor variables. The predictor variables are used to explain the single dependent variable. The results of the regression analyses for the U.S companies, Chinese companies, and combined U.S. and Chinese companies can be found in Appendix G and Appendix H. The four small Chinese companies were excluded from the regression analyses. These four companies seemed to be eliciting business when evaluating the benefits experienced by American firms in outsourcing.

The results of the regression analyses performed (Appendix G and Appendix H) are summarized in Table 4-27 through Table 4-35. These summaries combine and show multiple regression analyses in a single table. Each summary table displays the coefficient of the regression followed by the t-statistic, which is enclosed in parentheses. For example, in Table 4-27 the intersection of the first column labeled, “The abundant supply of production workers in China,” and the second row labeled, “The productivity of the production workers in China,” shows a coefficient of 0.699 followed by a t-statistic of 2.238. The values are in bold because the relationship of these two variables is

significant at the 90 percent confidence level. The regression analysis indicates that the more research on the productivity of production workers in China, the a company can anticipate a benefit from the abundant supply of production workers in China. The opposite is true for negative values in the regression summary tables. For example, in the same table, Table 4.27, the more research performed on the time required to manufacture products in China, the less a company can anticipate a benefit from the abundant supply of production workers in China. The intersection of these two variables shows a coefficient of -0.622 followed by a t-statistic of -2.514, which is significant at a 90 percent confidence level.

3.8 Confidentiality

All information collected from survey participants is confidential. The cover letter for surveys can be found in 0 and reads, “Only authorized persons from Brigham Young University involved in this research study will review your responses and will protect the confidentiality of the records. We guarantee that your responses will not be identified with you personally.” This section was added to the letter to address concerns about the sharing of sensitive information. The guarantee encourages participation in the research and also encourages accurate responses. The confidentiality of the information provided by survey respondents was maintained.

4 Research Results

Surveys were designed to capture information about the decision-making process and the overall performance of outsourcing from both the Chinese and American perspective. The surveys are divided into two sections: pre-outsourcing and execution of outsourcing. The pre-outsourcing section addresses the thoughts and activities used to make decisions about offshoring outsourcing. The execution section of outsourcing refers to the performance after the decision was made to move production overseas. The survey for American companies outsourcing to China has 21 different questions, with most questions including several parts. The first several questions on both American and Chinese surveys were used to gather demographic information about respondents participating in the research. Question number nine on the American survey asks when the company began outsourcing to China and divides the survey into the pre-outsourcing and execution of outsourcing sections.

The survey for Chinese manufacturers includes 18 questions, similar to the questions posed to American firms. Question number 13 divides the Chinese survey in half. The questions prior to number 13 deal with the thoughts and actions leading up to the outsourcing relationship with an American firm. The second half of the Chinese survey addresses the execution of outsourcing and result of the action. All the Chinese companies surveyed had a direct link to an American company and manufactured

products to ship directly to the U.S. based firm. All of the American companies surveyed outsourced production directly to a China based manufacturer.

4.1 Survey Participants Demographics

This section contains a brief description of the Chinese and American companies that participated in the research. Twenty-four companies based in China participated in our survey, where we attempted to gain an understanding of the manufacturer's perspective. Of the 24 companies based in China, 16 companies were incorporated in China, four companies in Hong Kong, and four companies in Taiwan. In the United States, 22 different American companies were surveyed.

4.1.1 Emergence of Chinese Companies

Starting in 1970, privately owned enterprises began to emerge within the borders of China. Prior to that point, all Chinese businesses were state-owned enterprises. "The Chinese government had complete control. Salaries were virtually non-existent, but the state theoretically provided housing, employment, education, and ration coupons for all essentials. In the late 1970's, Deng Xiao Ping initiated change and the trend continues [today]" (Eagle, 2005). For a period of approximately 25 years, the number of Chinese companies founded steadily increased, as seen in Figure 4-1. In 1983, the first company to incorporate in China emerged. Prior to 1983, as seen in Figure 4-1, the three companies previously founded were registered in Hong Kong and Taiwan; however, they were manufacturing in China. In 1995, only 25 percent of the companies studied were formed and in operation. Around that year, the growth of privately owned Chinese

companies dramatically increased. The remaining 75 percent of the Chinese companies studied were formed within a ten year period, ending in 2005.

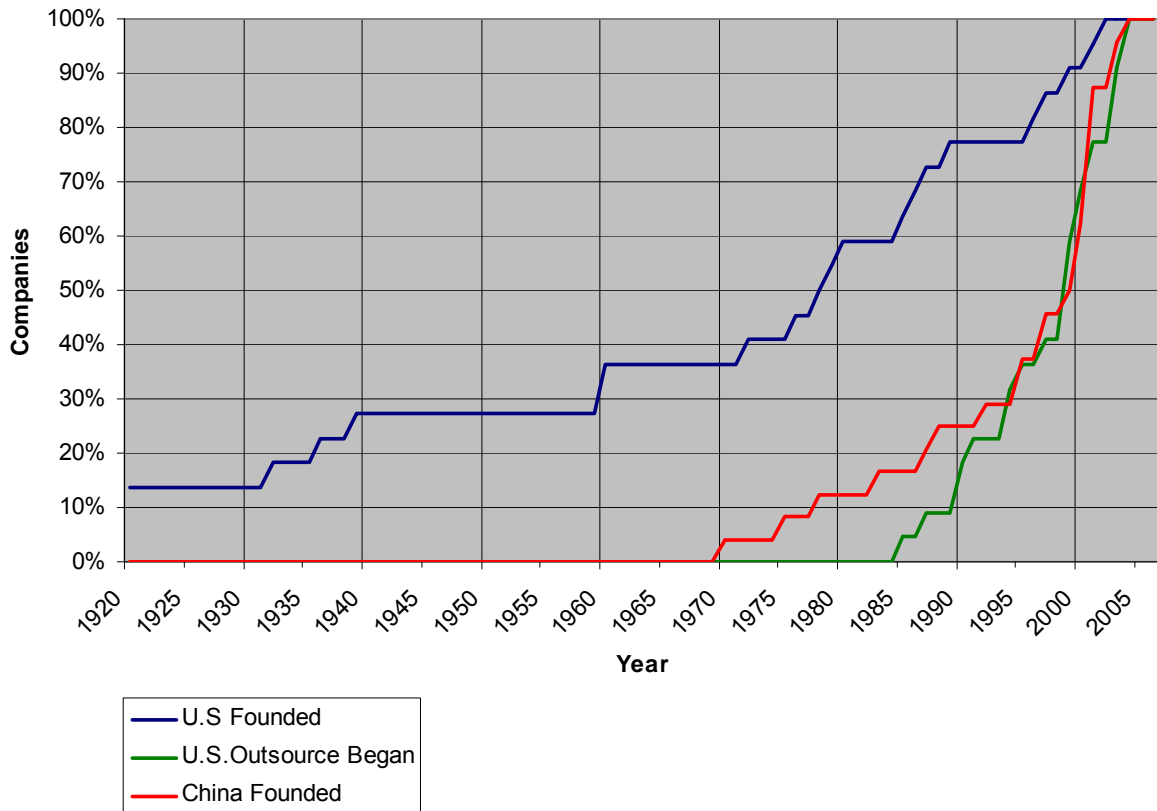


Figure 4-1. Companies emerge and begin outsourcing

4.1.2 U.S. Companies Begin Outsourcing

In the majority of the cases, American companies were founded and established years before their Chinese partner(s) were founded. Orbit Irrigation Products, Inc. was the first company of those American firms surveyed to outsource manufacturing in 1985. Since 1985, as shown in the Figure 4-1, the American companies surveyed began outsourcing production to private companies based in mainland China. There is no

significant relationship between the year the U.S. companies were founded and the year the company began outsourcing to China (Figure 4--2). Prior to 1995, 64 percent of the American companies surveyed were not involved with outsourcing. In 1995, the growth of the American companies outsourcing to China increased dramatically, as seen in Figure 4-1. Following 1995, this growth rate is extremely similar to the rate of start up Chinese companies involved in manufacturing for U.S. companies.

4.1.3 Company Size

A total of 46 companies participated in the research. Of the 46 companies, 22 were American companies that had previously outsourced some aspect of manufacturing to a China based firm. Of the 22 American firms surveyed, seven companies were small sized companies (employing less than 140 employees), six were medium sized companies (employing 141-499 employees), and the remaining nine companies were large firms (employing more than 500 employees).

Twenty-four Chinese companies participated in the study. These 24 companies manufactured goods and shipped them directly to American companies based in the continental United States. Four of the Chinese companies were small manufacturers (employing less than 140 employees), ten were medium sized companies (employing 141-499 employees), and the remaining ten enterprises were classified as large companies (employing more than 500 employees).

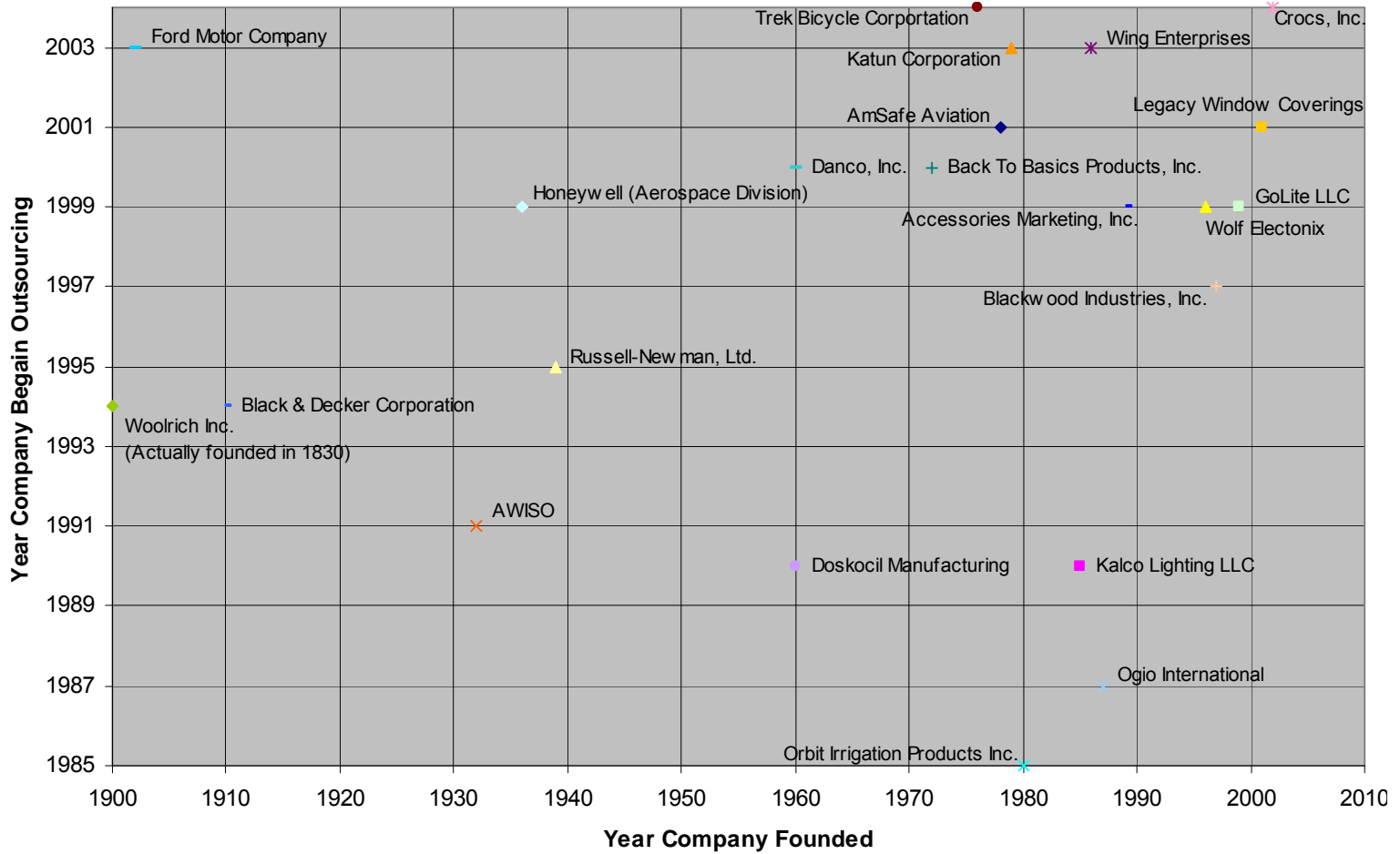


Figure 4-2. Year U.S. company founded and year company began to outsource to China

4.1.4 Company Revenues

On average, the Chinese companies studied took in US\$35,496,100 in revenues for 2004, as shown in Figure 4-3. The revenue for Chinese companies is based on an exchange rate of 8.2 RMB for one U.S. dollar. Revenues during 2004 for Chinese companies were less than half of one percent of what the American companies took in during the year. Figure 4-3 is a comparison of the Chinese and American companies on the basis of 2004 revenue. There is a giant difference in the revenues generated from business activities for companies in the two countries. The 75th percentile from the Chinese companies is more than five million U.S. dollars short of the 25th percentile of American companies. On average, the Chinese revenues were US\$18,850 per employee and U.S. were approximately US\$1,050,901 per employee.

Excluding the revenues in 2004 for Ford Motor Company, a publicly traded company who had the highest earnings of all the American companies studied, Chinese companies earned 3.54 percent of the revenues made by American companies. The revenue of Ford Motor Company in 2004 was an outlier in the data compared to the other U.S. companies studied. Table 4-1 shows the revenue figures for the American companies without the revenues of the Ford Motor Company.

Table 4-1. Total U.S. revenue for 2004, excluding Ford Motor Company

	U.S Revenue
25th Percentile	\$15,000,000
Minimum	\$2,000,000
Mean	\$1,003,349,412
50th Percentile	\$100,000,000
Maximum	\$10,000,000,000
75th Percentile	\$200,000,000

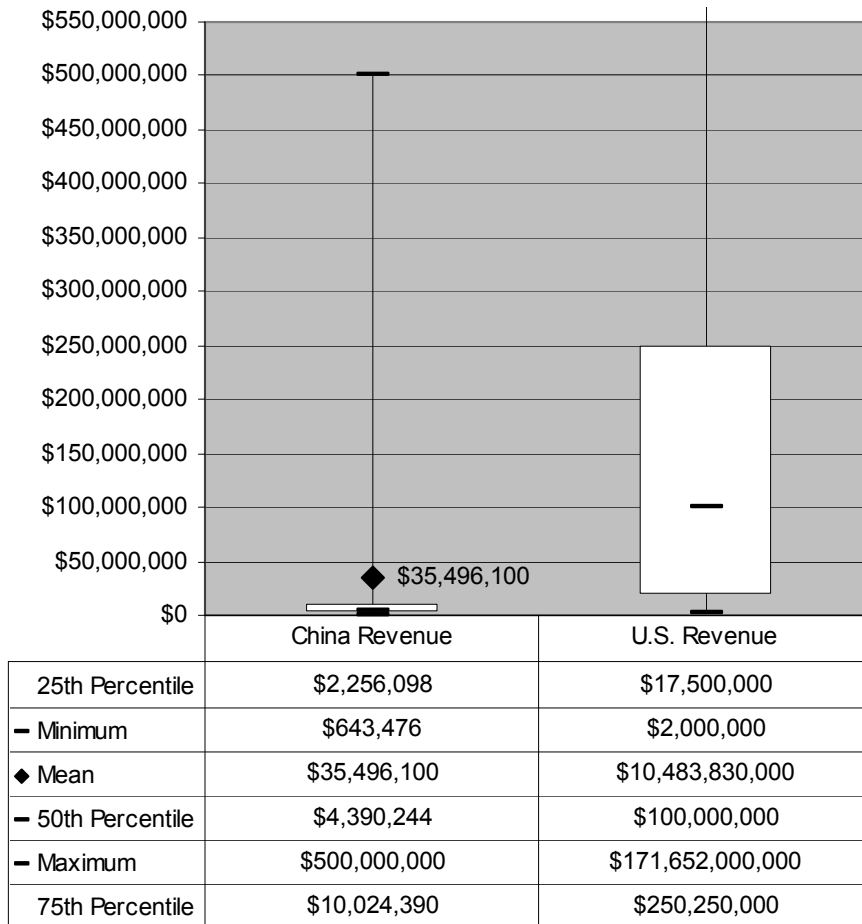


Figure 4-3. Total revenue for China & U.S. companies in 2004

4.2 Anticipated Benefits

The decision to outsource is a pursuit of benefits that will improve some aspect of the outsourcing company. Question five on both the American and Chinese surveys was designed to inquire about what benefits were anticipated from outsourcing. The benefit might be lower employee wages, lower cost of materials, elimination of overhead cost, or access to foreign markets for increased sales. All 22 American companies were asked to rate the anticipated benefits listed in the question below when outsourcing was first

considered in the company. All Chinese companies visited were asked a similar question about the benefits they thought U.S. companies received when outsourcing their manufacturing to them in China.

Please refer to Appendix B to view the complete survey given to American survey participants. The results from all U.S. survey respondents to this question can be seen in Table 4-2. Please refer to Appendix C to view the complete survey given to participants translated into Mandarin Chinese or view Appendix D to view the same survey in English. The results from the Chinese companies can be found in Table 4-3 and the appendixes of this report.

4.2.1 U.S. Survey Question 5

5. When you first considered outsourcing, which of the following were **anticipated benefits** of outsourcing production to China? The higher the number, the greater the benefit.

Definitely Not An Anticipated Benefit						Definitely An Anticipated Benefit
1	2	3	4	5		
The abundant supply of production workers in China	1	2	3	4	5	
The low hourly cost for production workers in China	1	2	3	4	5	
An increase in the overall revenue of the outsourced product	1	2	3	4	5	
The closer proximity of manufacturing facilities to markets	1	2	3	4	5	
The low cost of raw materials for production	1	2	3	4	5	
The elimination of manufacturing overhead costs	1	2	3	4	5	
An increase of market presence in China	1	2	3	4	5	
An improvement in focus on your company’s core business functions	1	2	3	4	5	
The assistance of the Chinese govt. to help you outsource	1	2	3	4	5	
Other:	1	2	3	4	5	

4.2.2 China Survey Question 5

5. Which of the following are **benefits that you think U.S. companies receive** when outsourcing their manufacturing to your company? The higher the number, the greater the benefit.

	Little or No Benefit to U.S. Companies					Extremely Beneficial to U.S. Companies				
	1	2	3	4	5	1	2	3	4	5
The abundant supply of production workers				1	2	3	4	5		
The low hourly cost for your production workers				1	2	3	4	5		
An increase in the overall revenue of the U.S. company's product				1	2	3	4	5		
The closer proximity of manufacturing facilities to markets				1	2	3	4	5		
The low cost of raw materials for production				1	2	3	4	5		
The elimination of manufacturing overhead costs for the U.S. company				1	2	3	4	5		
An increase of market presence for the U.S. company in China				1	2	3	4	5		
An improvement in focus on the U.S. company's core business functions				1	2	3	4	5		
The assistance of the Chinese govt. to help the U.S. company outsource				1	2	3	4	5		
A high level of technical skill of your production workers				1	2	3	4	5		
Other:				1	2	3	4	5		

4.2.3 Analysis & Comparison

The results from the American company surveys showed an interest on the part of the large companies in moving manufacturing closer to potential global markets and in outsourcing to increase market presence in China, as seen in Table 4-2. A statistically significant difference exists in manufacturing closer to potential markets between large companies and small sized companies, and between large and medium sized companies. In both instances the test statistic was greater than the p-value with a 5 percent level of significance. In most cases, large established companies wanting to expand and grow

have to look outside the borders of the United States. The expansion of American companies into global markets is a vital target for long term growth. On the other hand, smaller companies are not as mature as most large companies and still have room for growth inside the United States. These companies might have untapped domestic markets and/or room to improve internally to maintain profitability on products. Small companies might not have the capital to expand into other markets. The results from the survey showed that small American companies hoped to enable improvement in order to focus on core company functions by moving activities overseas more than the medium and large American companies surveyed (Table 4-2).

On average, the Chinese companies did not rate any of the items lower than a three, the midpoint of the Likert rating scale, as shown in Figure 4-4. The majority of the Chinese manufacturers viewed all the items listed as benefits to American companies wishing to outsource to China. Clint Laurent, of Asian Demographics, notes that opinion surveys in China often need to be "taken with a grain of salt" because of a tendency among many Chinese to want to give positive replies. "Chinese are very nationalistic and they will be prone to come out with such high satisfaction scores because they are very proud of China," he said. "It would be seen as being disloyal to say you were not satisfied" (Greenless, 2005). Table 4-3 shows that a majority of the Chinese respondents gave the items favorable scores.

Table 4-2. Average responses to U.S. Survey Question 5

	Company Size		
	Large	Medium	Small
The abundant supply of production workers in China	3.70	3.50	3.71
The low hourly cost for production workers in China	4.70	4.83	4.43
An increase in the overall revenue of the outsourced product	3.80	3.83	3.43
The closer proximity of manufacturing facilities to markets	2* **	1.17*	1.29**
The low cost of raw materials for production	3.80	3.67	3
The elimination of manufacturing overhead costs	3.60	3.67	3.86
An increase of market presence in China	3* **	1.83*	1.71**
An improvement in focus on your company's core business functions	2.70	2.33	3.29
The assistance of the Chinese govt. to help you outsource	1.60	1.50	1

	Goods Outsourced			
	A	B	C	D
The abundant supply of production workers in China	3.75	3.40	3.50	3.78
The low hourly cost for production workers in China	4.75	4.90	4.83	4.61
An increase in the overall revenue of the outsourced product	2.75	3.50	3.83	3.72
The closer proximity of manufacturing facilities to markets	1.75	1.40	1.75	1.50
The low cost of raw materials for production	3.75	4.00	3.58	3.50
The elimination of manufacturing overhead costs	4.75	4.10	4.08	3.78
An increase of market presence in China	2.50	2.70	2.58	1.89
An improvement in focus on your company's core business functions	2.50	2.30	2.75	2.78
The assistance of the Chinese govt. to help you outsource	1.25	1.40	1.58	1.22

A-One component of a product to a single manufacturer

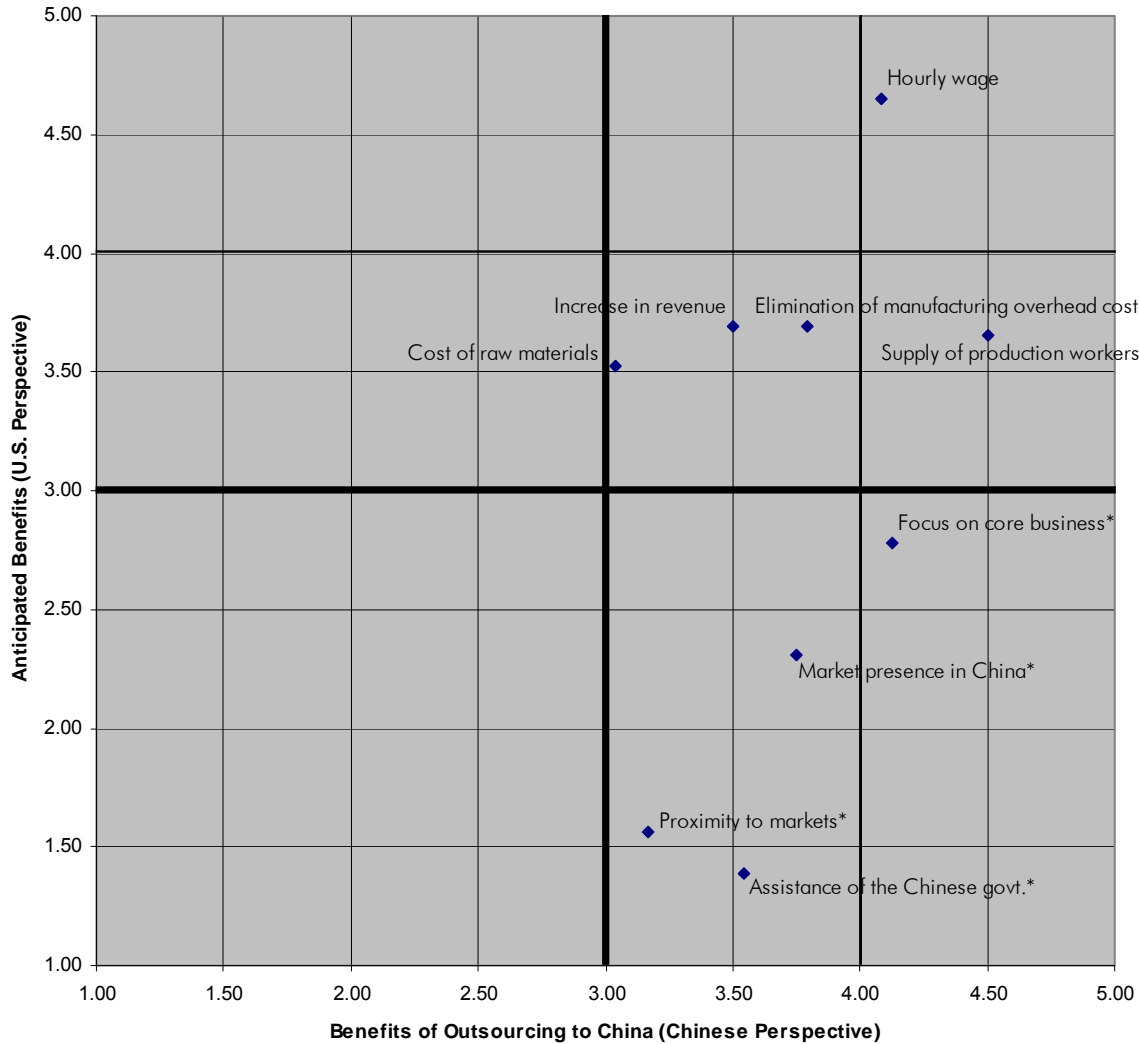
B-Multiple components of a product to a single manufacturer

C-Multiple components of a product to different manufacturers

D-Entire product to a single manufacture

* A statistically significant difference exists between the large and small sized American companies.

** A statistically significant difference exists between the large and medium sized American companies



* A statistically significant difference exists between the responses of U.S. and China respondents.

Figure 4-4. Comparison matrix of anticipated benefits of outsourcing to China

In Table 4-3 a statistically significant difference exists between companies in China on the cost of raw materials. In Figure 4-4 the Chinese firms, as a whole, rated the cost of raw materials to be the item least likely to benefit the U.S. companies. They indicated companies would benefit more from assistance from the Chinese government and proximity to other markets, than the cost of materials in and around mainland China. However, approximately 40 percent of the U.S. respondents rated the cost of raw

materials as a clearly anticipated benefit. The low Likert ratings from Chinese companies were collected from the large companies and those companies founded prior to 1989. Both groups had results with test statistics greater than the p-value in comparison to other sized companies and companies founded after 1990. The significant difference shows the large and established firms indicated that cost of raw materials is not a benefit of outsourcing to China. The newer Chinese companies may not be aware of the change in material demand and material prices. For example, in 2003 and 2004 there was a high demand for steel in the Chinese automotive market that drove up the local iron and steel prices considerably during those two years. The price of copper and different types of plastics has risen since 2004; however, the current price is still less than materials purchased in America (Ting, 2004). Several of the Chinese companies visited, such as Ten Tech Composites, import production materials from other countries. Ten Tech imports large rolled sheets of carbon fiber from Japan and the United States for manufacturing operations based in China. The cost of various raw materials has increased over the past several years. The demand for materials is still growing and the price of raw materials will probably continue to increase. Each individual product should be carefully evaluated and analyzed to determine the raw material cost benefits from production in China.

In comparison, the responses from the Chinese and American perspectives had more differences than similarities. More than half of the anticipated benefits had a statically significant difference between the two perspectives at a five percent level of confidence, as shown in Figure 4-4. The results did support several different studies, such as the Abraham and Taylor study that identified the top reason to be saving on wage and

benefit payments (McCathay, 2004). The comparison matrix in Figure 4-4 compares the averages responses from respondents, and indicates that the greatest anticipated benefit by both perspectives is hourly wage. The minimum salary in Baoan District, Shenzhen is RMB 580 per month or approximately US\$70 per month. Companies based in mainland China also normally provide factory employees with free meals, housing, and social premiums required by local laws (pension, medical, etc...). The average total cost, including benefits, to a Chinese company is approximately US\$1 per hour for production workers. The Chinese companies, however, responded that the supply of production workers is of greater benefit to American companies than low hourly wages of production workers.

The American companies, as a whole, viewed the possible assistance from the Chinese government as the least likely anticipated benefit of outsourcing to China. There is a statistically significant difference between the U.S. and Chinese results on government assistance. The survey findings support the idea of the Chinese government being a non-factor, rather than a potential benefactor. The government does not appear to provide benefit to American companies. The government is seen as a risk. The risk is the possibility that the Chinese government may change, making manufacturing more expensive and/or more difficult to carry out (Blackerby, 2003). The assistance of the Chinese government to initiate manufacturing in a developing country appears be a practice of the past experienced by a few large American enterprises.

Table 4-3. Average responses to China Survey Question 5

	China Company Size		
	Large	Medium	Small
The abundant supply of production workers	4.2*	4.6	5*
The low hourly cost for your production workers	4	4.1	4.25
An increase in the overall revenue of the U.S. company's product	3.4	3.3	4.25
The closer proximity of manufacturing facilities to markets	3.2	2.7	4.25
The low cost of raw materials for production	2.1* **	3.5**	4.25*
The elimination of manufacturing overhead costs for the U.S. company	3.8	3.6	4.25
An increase of market presence for the U.S. company in China	3.1* **	4.1**	4.5*
An improvement in focus on the U.S. company's core business functions	4	4.2	4.25
The assistance of the Chinese govt. to help the U.S. company outsource	2.9*	3.9	4.25*
A high level of technical skill of your production workers	3.7*	3.6	4.5*

	China Company Founded		
	-1989	1990-1999	2000-
The abundant supply of production workers	4.17	4.33	4.75
The low hourly cost for your production workers	3.83	4.5	4
An increase in the overall revenue of the U.S. company's product	3.67	2.67***	3.833***
The closer proximity of manufacturing facilities to markets	3.5	2.83	3.17
The low cost of raw materials for production	1.67* **	3**	3.75*
The elimination of manufacturing overhead costs for the U.S. company	3.33	3.83	4
An increase of market presence for the U.S. company in China	3.5	3.17***	4.17***
An improvement in focus on the U.S. company's core business functions	3.83	4***	4.33***
The assistance of the Chinese govt. to help the U.S. company outsource	3	3.67	3.75
A high level of technical skill of your production workers	3.83	3.17	4.08

* A statistically significant difference exists between the large and small sized American companies.

** A statistically significant difference exists between the large and medium sized American companies

* A statistically significant difference exists between companies founded before 1989 and from 1990-1999.

** A statistically significant difference exists between companies founded before 1989 and after 2000.

*** A statistically significant difference exists between companies founded from 1990-1999 and after 2000.

4.3 Reasons for Outsourcing to a Foreign Country

In question five for American companies, respondents rated a predetermined list of common anticipated benefits found in literature on outsourcing. In order to openly inquire about alternate reasons or motivations for deciding to outsource manufacturing, question six asked respondents for a written response as to their reason for outsourcing.

4.3.1 U.S. Survey Question 6

6. In addition to the anticipated benefits of outsourcing to China, what were your **reasons for outsourcing** to a foreign country, in general?

4.3.2 Analysis

The responses of the American companies are shown in Table 4-4. The names of the respondents have been removed from the table to maintain the confidentiality of the research participants. The responses from respondents varied. Several of the respondents simply referred back to the anticipated benefits and listed lower cost of goods produced in China. In addition to the overwhelming response that low cost is the reason to outsource manufacturing overseas, some survey respondents provided alternative reasons for deciding to outsource abroad. Three additional themes emerged from the responses as reasons for outsourcing:

1. Customers want lower prices and drive manufacturers to move production,
2. Key supplier is located overseas. Costly to ship product from key supplier back to America for production/assembly, and
3. Competition has already outsourced offshore.

Table 4-4. Written responses to U.S. Survey Question 6

Customers were/are applying price pressure. We need to reduce costs to maintain margins.
It also allowed us to learn and maintain an understanding of what China's capabilities were and how they progressed to be as time went by. Also, since many manufacturers are producing in China, it allows us to see the industry trends first hand before the end products actually hit the retail market in the U.S.
Lower labor, overhead. Increased margins, profitability
Meet product cost reduction needs in order to compete with our major competitors who were also going offshore or to Mexico.
Key suppliers had also moved to Mexico, then on to China. This made retaining production in North America even more costly.
The ability to lower our cost of goods and provide our customers with competitive pricing while maintaining a good profit margin for our company.
Cost! Commodity products. Lower price for finished/packaged goods.
First and foremost lower cost without the sacrifice of quality. Corporate decision to move significant amounts of components to low cost country regions in the world.
Closer alignment of manufacturing with customers. Leverage investments in PPE to secure additional business in the region.
There were three main reasons to outsource: <ol style="list-style-type: none"> 1. To remain competitive in the face of world competition required cost basis that could not be obtained in the USA for apparel production 2. The ability to use the companies financials to concentrate on design, delivery, and brand development 3. To have the ability to grow rapidly, as apparel production was almost impossible to attract skilled workers in the USA
None really. It needs to be done to be price competitive, because all our competitors do the same thing.
Lower cost of finished goods, China has much faster ramp up time than in other countries, proximity to European, Canadian, and Mexican markets, reduced import tariffs.
<ol style="list-style-type: none"> 1. Improve profit margins by lowering product costs 2. Improve competitiveness with other companies outsourcing to low-cost areas 3. Broaden product line w/o investing in additional domestic manufacturing equipment, capacity, and resources
Cost of product. Quality of product.
The nature of our product and channels we serve dictate a need to have world class cost position. This drove us to look outside the U.S. and western Europe.
Low cost of goods is the primary driver.
In order to be price competitive in our market we were forced to outsource to areas with lower manufacturing costs.
It is not our goal to outsource to a foreign country. Rather, in some cases, it is required, in order to get the most competitive costs for select products.
Low cost labor, low cost materials, low cost overhead support, required by customers who had already located to China, local China market opportunity.

4.4 Reasons for Outsourcing to China

All of the American companies surveyed have outsourced manufacturing to China, but why did they select China? Question number seven on the U.S. survey was designed to extract why the American companies chose China over other industrialized countries. The Chinese companies were asked a similar question on why American firms choose China over other countries, but they could select only one answer. Selection was limited to the top reason why American companies outsourced to China, because of the national pride of the Chinese people. As seen in the previous question, the Chinese respondents have a tendency to select all the available options in ranking China. In addition to checking the boxes to the question below, all respondents were given the opportunity to comment on the question and provide answers.

4.4.1 U.S. Survey Question 7

7. What were your reasons for outsourcing to China, as opposed to other countries?
(Check all that apply)

- Chinese Americans available to mediate relations with Chinese
- Good work ethic of the Chinese
- High education of the Chinese
- Chinese government bends over backwards to help more than other countries
- Cost of labor compared to other countries
- Positive experience in working with Chinese in the past
- Negative experience in working with another country
- Relationship already established with Chinese company
- Recommendation of others
- Availability and options for product shipping
- Other:
- Unknown

4.4.2 China Survey Question 6

6. What is the top reason why U.S. companies should outsource to China, as opposed to other countries? (Select one)

- Chinese Americans available in U.S. to mediate relations with Chinese
- Good work ethic of the Chinese
- High education of the Chinese
- Chinese government willing to help more than other countries
- Cost of labor compared to other countries
- China recommended by other companies
- Availability and options for product shipping
- Technical skill of the Chinese
- Other:
- Unknown

4.4.3 Analysis and Comparison

Only two of the 22 American companies surveyed, as shown in Table 4-5, did not select the cost of labor compared to other countries as a reason for choosing China for outsourcing. Both companies were small, and both companies selected positive experience in working with the Chinese in the past and an established relationship with Chinese companies as their reasons for selecting China for third party manufacturing. By contrast, all the large and medium American companies indicated the cost of labor was a reason for selecting China in Table 4-5.

In Table 4-5, 40 percent of the large American companies indicated the Chinese government bends over backwards to help, much more than other countries. None of the medium and small sized companies thought the Chinese government was more helpful than other possible countries. These results are of note in comparison to the question of anticipated benefits where U.S. firms, as a whole, rated the Chinese government as the lowest possible benefit (Figure 4-4). Although the Chinese government is not viewed as an aid in outsourcing, the government is more favorably viewed by larger American firms

in providing government assistance for outsourcing. The large American companies also recorded a higher value in work ethic and high education than the medium and small sized firms.

Table 4-5. Average responses to U.S. Survey Question 7

	U.S. Company Size		
	Large	Medium	Small
Chinese Americans available to mediate relations with Chinese	30%	0%	14.29%
Good work ethic of the Chinese	70%	50%	42.86%
High education of the Chinese	40%	16.67%	0%
Chinese government bends over backwards to help more than other countries	40%	0%	0%
Cost of labor compared to other countries	100%	100%	71.43%
Positive experience in working with Chinese in the past	60%	50%	42.86%
Negative experience in working with another country	10%	0%	0%
Relationship already established with Chinese company	30%	16.67%	71.43%
Recommendation of others	10%	0%	14.29%
Availability and options for product shipping	10%	33.33%	0%

	Goods Outsourced			
	A	B	C	D
Chinese Americans available to mediate relations with Chinese	25%	10%	16.67%	16.67%
Good work ethic of the Chinese	50%	50%	66.67%	44.44%
High education of the Chinese	0%	20%	25%	5.56%
Chinese government bends over backwards to help more than other countries	25%	20%	16.67%	11.11%
Cost of labor compared to other countries	100%	100%	100%	88.89%
Positive experience in working with Chinese in the past	50%	40%	66.67%	44.44%
Negative experience in working with another country	0%	0%	0%	5.56%
Relationship already established with Chinese company	50%	30%	25%	44.44%
Recommendation of others	0%	0%	0%	11.11%
Availability and options for product shipping	0%	10%	0%	16.67%

- A-One component of a product to a single manufacturer
- B-Multiple components of a product to a single manufacturer
- C-Multiple components of a product to different manufacturers
- D-Entire product to a single manufacture

More than 91 percent of the American firms indicated that the low cost of labor was the top factor for outsourcing to China. Seventy-five percent of the Chinese participants, as shown in Figure 4-5, selected the low cost of labor as the top reason to outsource specifically to China; however, a few survey participants selected good work ethic and high education of the Chinese over other industrial countries. Not a single Chinese participant selected one of the following four answer options:

- Chinese American available to mediate relations with Chinese
- China recommended by other companies
- Availability and options for product shipping
- Technical skill of Chinese

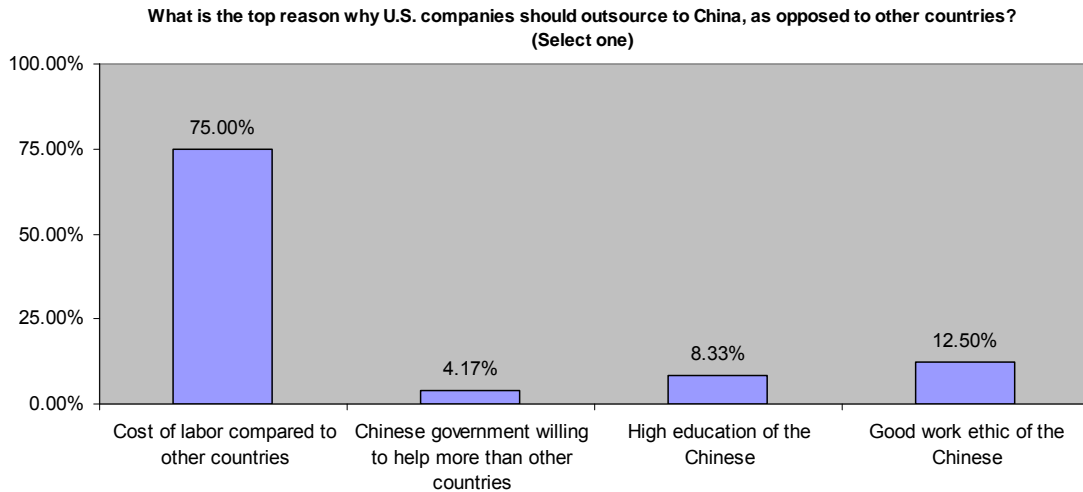


Figure 4-5. Results to China Survey Question 6

Not selecting any of the listed answer possibilities in Table 4-6 does not mean Chinese manufacturers do not value or have technical skill or available shipping options. The results of the question simply identify that the Chinese view the biggest differentiator between them and other countries to be the low cost of labor.

Table 4-6. Average responses to China Survey Question 6

	China Company Size		
	Large	Medium	Small
Chinese Americans available in U.S. to mediate relations with Chinese	0%	0%	0%
Good work ethic of the Chinese	30%	0%	0%
High education of the Chinese	0%	20%	0%
Chinese government willing to help more than other countries	0%	10%	0%
Cost of labor compared to other countries	70%	70%	100%
China recommended by other companies	0%	0%	0%
Availability and options for product shipping	0%	0%	0%
Technical skill of the Chinese	0%	0%	0%

	China Company Founded		
	-1989	1990-1999	2000-
Chinese Americans available in U.S. to mediate relations with Chinese	0%	0%	0%
Good work ethic of the Chinese	33%	17%	0%
High education of the Chinese	0%	0%	17%
Chinese government willing to help more than other countries	0%	0%	8%
Cost of labor compared to other countries	67%	83%	75%
China recommended by other companies	0%	0%	0%
Availability and options for product shipping	0%	0%	0%
Technical skill of the Chinese	0%	0%	0%

4.5 Locating & Contacting Chinese Manufacturer(s)

A common question asked on the topic of outsourcing, for those hoping to outsource in the future, deals with how to find and contact manufacturers based in China. Many panel sessions and roundtable discussions are dedicated to the topic of how to start outsourcing. Question seven was included in the China survey to learn how Chinese companies have been found and contacted in the past by companies wanting to offshore outsource.

4.5.1 China Survey Question 7

7. Which of the following are **methods that U.S. companies use to locate and contact your company** for a quote on manufacturing their product? The higher the number, the more often that method is used to request a quote.

Never Used	Extensively Used				
1	2	3	4	5	5
U.S. company finds your company through some form of advertisement and contacts you directly for a quote	1	2	3	4	5
U.S. company finds your company on the internet and contacts you directly for a quote	1	2	3	4	5
U.S. company is referred to your company by a Chinese company and contacts you directly for a quote	1	2	3	4	5
U.S. company is referred to your company by a U.S. company and contacts you directly for a quote	1	2	3	4	5
U.S. company works through a U.S. company that specializes in outsourcing and contacts your company for a quote	1	2	3	4	5
U.S. company works through a Chinese company that specializes in outsourcing and contacts your company for a quote	1	2	3	4	5
U.S. company works through the Chinese government and contacts your company directly for a quote	1	2	3	4	5
Other:	1	2	3	4	5

4.5.2 Analysis

No definitive answer about how to find Chinese manufacturers was revealed from the survey responses of the Chinese manufacturers, as shown in Table 4-7. There is a statistically significant difference between the small sized companies receiving references from U.S. companies compared to the large and medium companies. The large and medium companies receive significantly more business from references from American firms. It is also clear from Table 4-7 that little or no American customers are brought to Chinese manufacturers through the Chinese government. On average the highest rated

means of locating and contacting a Chinese business was through the internet, as seen in Figure 4-6. These findings appear reasonable due to the large number of Chinese firms that do have internet sites published in their printed materials. Most of the internet sites contain English translations, descriptions of capabilities, and contact information.

Table 4-7. Average responses to China Survey Question 7

	China Company Size		
	Large	Medium	Small
U.S. company finds your company through some form of advertisement and contacts you directly for a quote	2.3	3	2.75
U.S. company finds your company on the internet and contacts you directly for a quote	3.4	3.4	3.75
U.S. company is referred to your company by a Chinese company and contacts you directly for a quote	3.2	3.1	4
U.S. company is referred to your company by a U.S. company and contacts you directly for a quote	3.1*	3.2***	2* ***
U.S. company works through a U.S. company that specializes in outsourcing and contacts your company for a quote	2.3	2.2	2.25
U.S. company works through a Chinese company that specializes in outsourcing and contacts your company for a quote	1.8	2.8	2.3
U.S. company works through the Chinese government and contacts your company directly for a quote	1.6	1.4	1

	China Company Founded		
	-1989	1990-1999	2000-
U.S. company finds your company through some form of advertisement and contacts you directly for a quote	2.17	3	2.75
U.S. company finds your company on the internet and contacts you directly for a quote	4	3.5	3.17
U.S. company is referred to your company by a Chinese company and contacts you directly for a quote	3.17	3	3.5
U.S. company is referred to your company by a U.S. company and contacts you directly for a quote	3	3.17	2.83
U.S. company works through a U.S. company that specializes in outsourcing and contacts your company for a quote	2.17	2.83	2
U.S. company works through a Chinese company that specializes in outsourcing and contacts your company for a quote	1.67	2.83	2.33
U.S. company works through the Chinese government and contacts your company directly for a quote	1.5	1.5	1.33

* A statistically significant difference exists between the large and small sized American companies.

*** A statistically significant difference exists between the medium and small sized American companies

Which of the following are methods that U.S. companies use to locate and contact your company for a quote on manufacturing their product? The higher the number, the more often that method is used to request a quote.

77

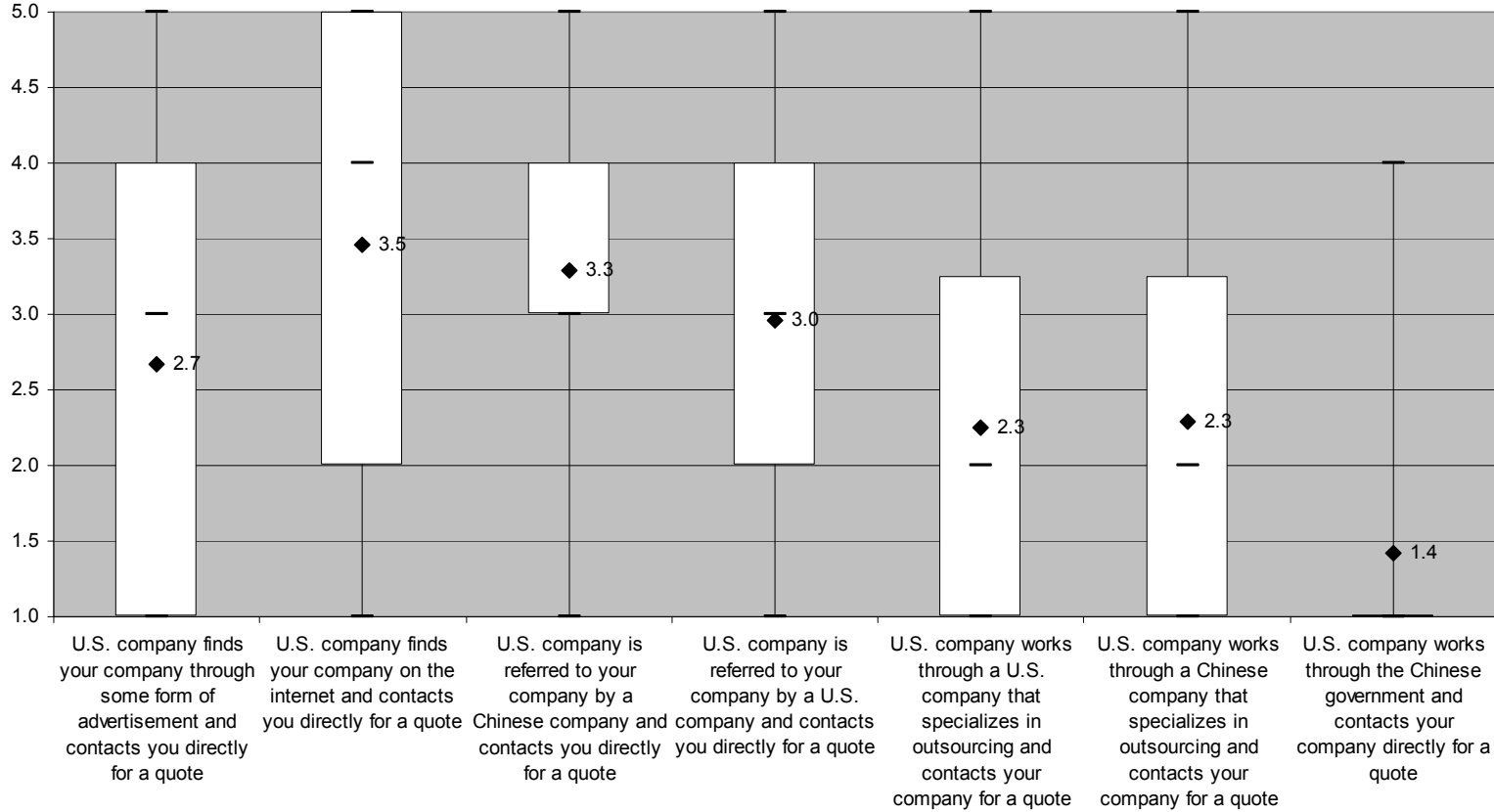


Figure 4-6. Results to China Survey Question 7

4.6 Researching & Analyzing in Making a Decision to Outsource

As previously seen, American companies anticipated receiving several benefits from moving production activities to a third-party manufacturer based in China, but what do U.S. companies do to validate anticipated benefits? How do they know if the benefits outweigh the costs of outsourcing? Outsourcing can be so confusing that some managers tend to focus solely on direct costs, such as material and labor savings (Chin, 2004). Survey question eight on the U.S. survey and question ten on the China survey were used to discover what kinds of things companies research and analyze in making their decision to outsource to China.

4.6.1 U.S. Survey Question 8

8. Which of the following factors were **researched and analyzed** in making your decision to outsource production to China? The higher the number, the more the factor was explored and evaluated in your decision to send production to China.

Did Not Research or Analyze	Extensive Research and Analysis Performed				
1	2	3	4	5	
The nature of the manufacturing of your product (i.e. automated, semi-automated, labor-intensive, etc...)	1	2	3	4	5
The supply of production workers in China	1	2	3	4	5
The productivity of the production workers in China	1	2	3	4	5
The achievability of the quality required from subcontractors in China	1	2	3	4	5
The hourly cost for production workers in China	1	2	3	4	5
The stability of the subcontractor's management in China	1	2	3	4	5
The ability to control manufacturing operations in China	1	2	3	4	5
The overall revenue of the outsourced product	1	2	3	4	5
The time required to manufacture products in China	1	2	3	4	5

The overall production costs of manufacturing in China	1	2	3	4	5
The time required to ship products from China	1	2	3	4	5
The stability of the Chinese government	1	2	3	4	5
The manufacturing overhead costs	1	2	3	4	5
The cultural difference between China and the United States	1	2	3	4	5
The change of market presence in China	1	2	3	4	5
The protection of intellectual property	1	2	3	4	5
The cost of raw materials for production	1	2	3	4	5
The cost of shipping products from China	1	2	3	4	5
The change in focus on your company's core business functions	1	2	3	4	5
The cost of inventory for production in China	1	2	3	4	5
The assistance of the Chinese govt. to help you outsource	1	2	3	4	5
The cost of selecting a subcontractor in China	1	2	3	4	5
Other:	1	2	3	4	5

4.6.2 China Survey Question 10

10. Which of the following factors do U.S. companies **research and analyze** in making the decision to outsource production to your company? The higher the number, the more the factor is explored and evaluated by U.S. companies in making their decision to send their production to your company.

	Did Not Research or Analyze				Extensive Research and Analysis Performed
	1	2	3	4	
Your supply of production workers	1	2	3	4	5
The productivity of your production workers	1	2	3	4	5
The ability of your company to achieve the quality required by the U.S. company	1	2	3	4	5
The hourly cost for your production workers	1	2	3	4	5

The ability of your company's management	1	2	3	4	5
The ability of the U.S. company to control manufacturing operations with your company	1	2	3	4	5
The lead time required for your company to manufacture products	1	2	3	4	5
The overall production costs of manufacturing with your company	1	2	3	4	5
The time required to ship products from your facilities to the U.S. company	1	2	3	4	5
The stability of the Chinese government	1	2	3	4	5
The cultural difference between China and the United States	1	2	3	4	5
The protection of the U.S. company's intellectual property with your company	1	2	3	4	5
The cost of raw materials for production	1	2	3	4	5
The cost of shipping products from your facilities	1	2	3	4	5
The cost of additional inventory for production due to the time required to ship products to the U.S. company	1	2	3	4	5
The assistance of the Chinese govt. to help them outsource	1	2	3	4	5
The total cost of outsourcing production to your company	1	2	3	4	5
Other:	1	2	3	4	5

4.6.3 Analysis & Comparison

The decision to outsource includes research and analysis to validate the anticipated benefits of moving production overseas to China. Table 4-8 shows several statistically significant differences in the responses from different sized American companies in what factors are researched and analyzed in deciding to outsource to China.

Table 4-8. Average responses to U.S. Survey Question 8

	U.S. Company Size		
	Large	Medium	Small
The nature of the manufacturing of your product (i.e. automated, semi-automated, labor-intensive, etc...)	4.1	4	3.86
The supply of production workers in China	3.7	3.83	2.86
The productivity of the production workers in China	3.8	3	3.43
The achievability of the quality required from subcontractors in China	4.1	4	4.43
The hourly cost for production workers in China	4.9*	4.33	3.29*
The stability of the subcontractor's management in China	3.6	3.5	2.57
The ability to control manufacturing operations in China	4*	3.83	3*
The overall revenue of the outsourced product	3.7	3.5	3.43
The time required to manufacture products in China	3.9	3.83	4.14
The overall production cost of manufacturing in China	4.9	4.17	4.71
The time required to ship products from China	4.2**	2.83**	3.71
The stability of the Chinese government	3.5	3.33	2.71
The manufacturing overhead costs	4.3* **	2.167**	3*
The cultural difference between China and the U.S.	3.2*	2.17	1.57*
The change of market presence in China	2.7	2.83	2.71
The protection of intellectual property	3.9*	3.50	2.43*
The cost of raw materials for production	3.9	4.0	4.29
The cost of shipping products from China	4.4**	3** ***	4.14***
The change in focus on your company's core business functions	3.1	2.83	3
The cost of inventory for production in China	3.7	2.83	2.86
The assistance of the Chinese govt. to help you outsource	2.5	2.33	2
The cost of selecting a subcontractor in China	3.3	3.33	3.14

* A statistically significant difference exists between the large and small sized American companies.

** A statistically significant difference exists between the large and medium sized American companies.

*** A statistically significant difference exists between the medium and small sized American companies.

The significant differences in the table above indicate a difference in approach of companies deciding to outsource production. The large U.S. firms researched the change in manufacturing overhead costs more than the medium and small sized companies. The transfer of production allows firms to eliminate overhead costs and save cash. The savings is realized in maintenance and utility costs of the related production equipment and facilities, indirect labor costs (production workers, quality assurance inspectors,

material handlers, maintenance technician, etc.), and the extra costs on direct labor (such as, social security taxes, medical insurance, 401(k) contributions) (Ting, 2004).

The American firms which outsourced one aspect of a product to a single manufacturer performed extensive research and analysis prior to outsourcing. This group has the highest ratings in 12 of the 22 categories in Table 4-9. It is a conservative move to outsource one aspect of a product and conduct extensive research prior to outsourcing.

Table 4-9. Average responses to U.S. Survey Question 8 (Continued)

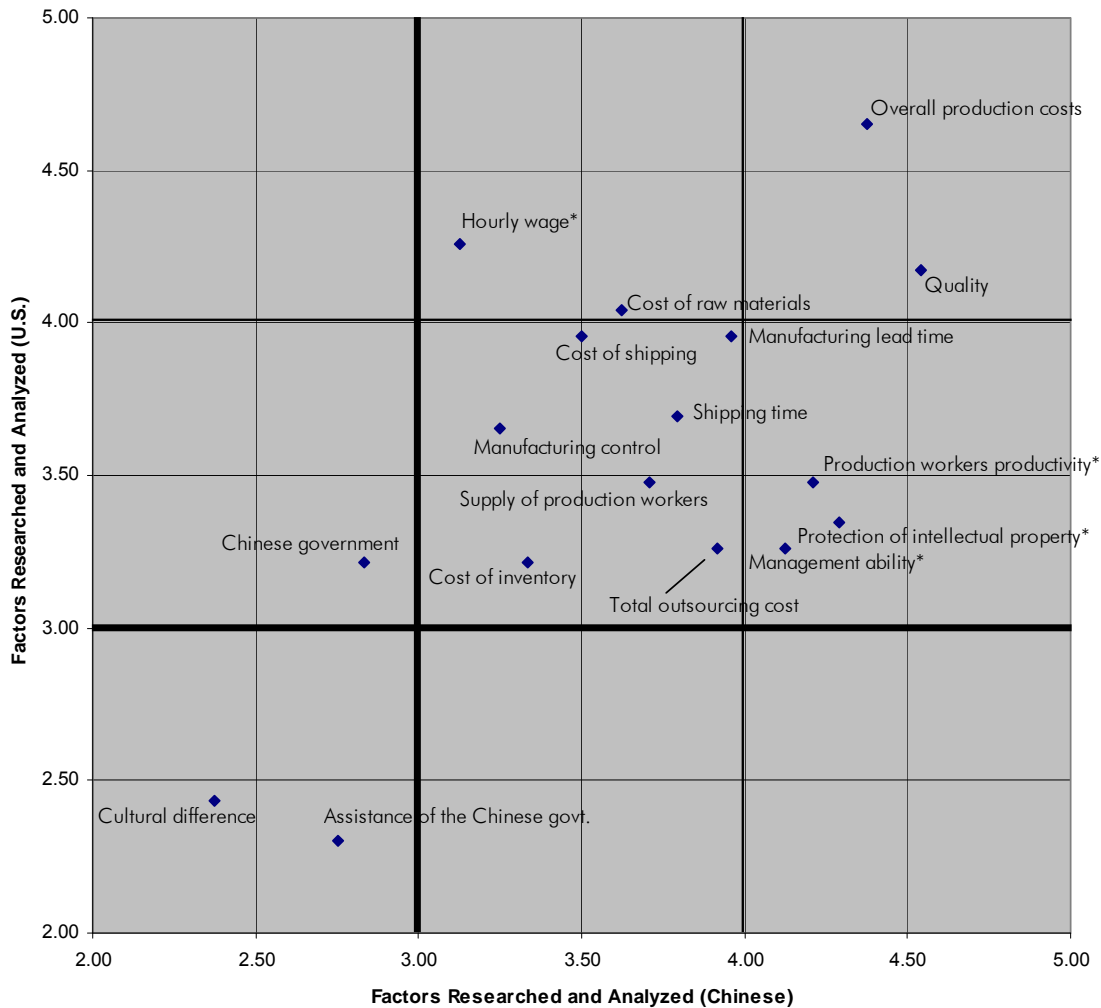
	Goods Outsourced			
	A	B	C	D
The nature of the manufacturing of your product (i.e. automated, semi-automated, labor-intensive, etc...)	4.75	4.3	4.33	3.89
The supply of production workers in China	4.5	3.8	3.67	3.39
The productivity of the production workers in China	3.75	3.4	3.67	3.28
The achievability of the quality required from subcontractors in China	4	4.2	3.92	4.22
The hourly cost for production workers in China	4	4.1	4.17	4.11
The stability of the subcontractor's management in China	3.75	3.5	3.33	3.17
The ability to control manufacturing operations in China	4.25	3.9	4	3.50
The overall revenue of the outsourced product	3	3.6	3.75	3.44
The time required to manufacture products in China	4	4.5	4.33	3.78
The overall production cost of manufacturing in China	4.75	4.5	4.58	4.56
The time required to ship products from China	4.5	3.6	3.42	3.72
The stability of the Chinese government	3.5	3.6	3.08	3.22
The manufacturing overhead costs	4.25	3.1	3.5	3.06
The cultural difference between China and the U. S.	3.75	2.9	3.17	2.22
The change of market presence in China	2.75	3.1	2.92	2.61
The protection of intellectual property	3.5	3.8	3.67	3.17
The cost of raw materials for production	4	4.4	3.83	4.17
The cost of shipping products from China	4.75	3.8	3.83	4.06
The change in focus on your company's core business functions	3.25	2.8	3	2.94
The cost of inventory for production in China	4.25	3.2	3	3.17
The assistance of the Chinese govt. to help you outsource	2	2.5	2.25	2.22
The cost of selecting a subcontractor in China	3.25	3.9	3.67	3.11

- A-One component of a product to a single manufacturer
- B-Multiple components of a product to a single manufacturer
- C-Multiple components of a product to different manufacturers
- D-Entire product to a single manufacture

In comparison with the results from the Chinese companies, as a whole, the American firms share a similar view of what is researched and analyzed prior to outsourcing. Figure 4-7 shows a comparison matrix of factors researched and analyzed before outsourcing to China. The figure generally follows a trend from the bottom left of the figure to the upper right hand corner. The overall production cost is shown to be the factor most researched. Although the overall production cost is the closest to the upper right hand corner, the Chinese firms indicated quality as the factor most studied by American firms interested in outsourcing. It is interesting to note that quality was the third highest factor from the U.S. perspective. As will be discussed later and in more detail, quality is not necessarily a benefit of outsourcing, but it is a prerequisite to outsourcing. Firms do not want quality to decrease when transferring production to a third-party.

Four of the factors plotted in Figure 4-7 are significantly different from the responses of the other perspective. The hourly wage of production workers is one of the factors showing a statistical difference. The wage of workers is shown in the figure as the second highest factor researched by American firms. Chinese rated the hourly cost of production workers as the top reason to outsource production to China, as opposed to other countries (Figure 4-5). The literature indicates that the primary driver for outsourcing manufacturing is the low cost of labor; therefore, most people know that labor is cheap in China. The U.S. Census Bureau reported the employees in China's city manufacturing enterprises received a total compensation of US\$0.95 per hour, while their non-city counterparts averaged less than half that: \$0.41 per hour (Banister, 2005). Although most people know labor is cheap in China, American firms could be concerned

about the cost of labor increasing. Several reports and personal interviews indicate concern about an increase in labor costs in China. American firms may research labor costs to establish an understanding of the primary benefit of offshore outsourcing.



* A statistically significant difference exists between the responses of U.S. and China respondents.

Figure 4-7. Comparison matrix of factors researched before outsourcing to China

In Figure 4-7 the overall response from Chinese and American firms on the research of raw material costs is similar; however Table 4-10 shows a significant difference between all three sizes of Chinese companies on cost of materials. Table 4-11

also shows a statistical difference between all the comparison groups. A similar phenomenon occurred in the previous question regarding anticipated benefits. Large Chinese manufacturers indicated the cost of raw materials is not a benefit and the American firms generally do not research the cost of raw materials. The small companies indicate the cost of raw materials is researched, but the small companies rated every factor higher than the medium and large companies.

Table 4-10. Average responses to China Survey Question 10

	China Company Size		
	Large	Medium	Small
Your supply of production workers	3.8*	3.2***	4.75* ***
The productivity of your production workers	3.9*	4.2	5*
The ability of your company to achieve the quality required by the U.S. company	4.3*	4.6	5*
The hourly cost for your production workers	2.5*	3.1***	4.75* ***
The ability of your company's management	4.1	4	4.5
The ability of the U.S. company to control manufacturing operations with your company	3.5* **	2.6** ***	4.25* ***
The lead time required for your company to manufacture products	3.9*	3.7	4.75*
The overall production costs of manufacturing with your company	4	4.6	4.75
The time required to ship products from your facilities to the U.S. company	3.3*	4	4.5*
The stability of the Chinese government	2.8	2.6	3.5
The cultural difference between China and the United States	2.8**	1.7** ***	3***
The protection of the U.S. company's intellectual property with your company	4.5	4	4.5
The cost of raw materials for production	2.5* **	4.3**	4.75*
The cost of shipping products from your facilities	3*	3.6	4.5*
The cost of additional inventory for production due to the time required to ship products to the U.S. company	2.9	3.5	4
The assistance of the Chinese govt. to help them outsource	2.4*	2.6	4*
The total cost of outsourcing production to your company	3.2* **	4.3**	4.75*

* A statistically significant difference exists between the large and small sized American companies.

** A statistically significant difference exists between the large and medium sized American companies

*** A statistically significant difference exists between the medium and small sized American companies

Table 4-11. Average responses to China Survey Question 10 (Continued)

	China Company Founded		
	-1989	1990-1999	2000-
Your supply of production workers	4.17	3.33	3.67
The productivity of your production workers	4.5	3.5	4.42
The ability of your company to achieve the quality required by the U.S. company	4*	4.5	4.83*
The hourly cost for your production workers	2.33*	2.67***	3.75* ***
The ability of your company's management	3.83*	3.83	4.417*
The ability of the U.S. company to control manufacturing operations with your company	3.33	3.33	3.17
The lead time required for your company to manufacture products	4.33	3.33	4.08
The overall production costs of manufacturing with your company	4.33	4	4.58
The time required to ship products from your facilities to the U.S. company	3.33	3.5***	4.17***
The stability of the Chinese government	2.83	2.67	2.92
The cultural difference between China and the U.S.	3.17* **	2**	2.17*
The protection of the U.S. company's intellectual property with your company	4.5	3.67	4.5
The cost of raw materials for production	2.17* **	3.5*** ****	4.4167* ****
The cost of shipping products from your facilities	3	3.17	3.92
The cost of additional inventory for production due to the time required to ship products to the U.S. company	3.17	3	3.58
The assistance of the Chinese govt. to help them outsource	2.5	2.17	3.17
The total cost of outsourcing production to your company	3*	4	4.33*

* A statistically significant difference exists between companies founded before 1989 and from 1990-1999.

** A statistically significant difference exists between companies founded before 1989 and after 2000.

*** A statistically significant difference exists between companies founded from 1990-1999 and after 2000.

4.7 Securing Business from American Customers

Questions 11 and 12 were given to Chinese manufacturers to find out what American companies are looking for in a third-party manufacturer based in China. The purpose of question 11 is what American companies demand from Chinese companies to secure future business. The factors demanded by American firms are important to their

decision to outsource. The follow up question to the demands of American companies in question 12 is used to openly determine the limits of a Chinese company to surrender to the demands of the normally larger American firm.

Question number 11 on the survey for Chinese companies contained an error in the ranking scale. Please refer to page 44 for a complete explanation of the error and the resolution. The error has been fixed in question 11 shown below.

4.7.1 China Survey Question 11

11. What do U.S. companies demand from your company for you to receive their business? (Rank the responses below from 1 to 6. 1 being what companies demand the least from your company and 6 being what companies demand the most of from your company.

What companies demand the least of from your company	1	2	3	4	5	6	What companies demand the most from your company
---	---	---	---	---	---	---	---

- Lower quote than all other companies
- Competitive quote, but not necessarily the lowest price of all other companies
- Consistent manufacturing lead times
- Ability to maintain high quality
- A surety that your company can protect intellectual property
- Good references in manufacturing from other U.S. companies

4.7.2 Analysis

Although American firms do not necessarily anticipate a benefit in product quality from outsourcing production overseas, the ability of Chinese manufacturers to produce quality products is vital to outsourcing. So much of the idea of outsourcing offshore deals with cost savings, although the lowest quote by Chinese manufacturers

does not secure American business (Figure 4-8). The idea of outsourcing offshore depends on maintaining quality. Another way to view the results of question 11 is: once U.S. companies decide to outsource, the basis of their decision of who to source to deals with quality. Every group of respondents rated quality as the thing most demanded, except for one group (Table 4-12). The Chinese companies founded prior to 1989 showed a statistically significant difference in comparison to companies founded after 2000. Companies started prior to 1989 indicated that U.S. companies demand a competitive quote, ranking this response higher than the ability to maintain high quality.

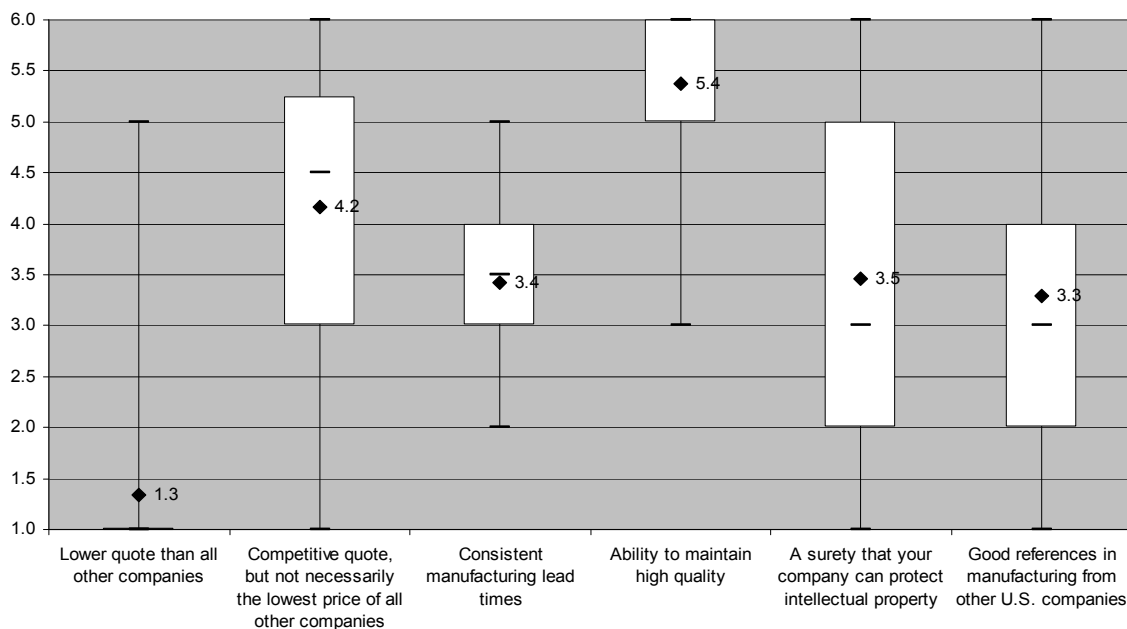


Figure 4-8. Results to China Survey Question 11

To be successful in outsourcing offshore, companies must be sure product quality is not compromised by the production or assembly of the third-party overseas. In an effort to safeguard against poor quality, frequent visits are necessary to review material sources and specifications, to evaluate compliance with production processes, and to

ensure that products are made to specifications (Blackerby, 2003). “Accurately assessing both the current quality level of suppliers and their potential for achieving the quality requirements of U.S. firms is difficult and often unscientific” (Hawks, 2005).

Table 4-12. Average responses of China Survey Question 11

	China Company Size		
	Large	Medium	Small
Lower quote than all other companies	1.2*	1.6***	1* ***
Competitive quote, but not necessarily the lowest price of all other companies	4.5	3.4***	5.25***
Consistent manufacturing lead times	3.2	3.6	3.5
Ability to maintain high quality	5.3	5.3	5.75
A surety that your company can protect intellectual property	3.1	4	3
Good references in manufacturing from other U.S. companies	3.8*	3.1	2.5*

	China Company Founded		
	-1989	1990-1999	2000-
Lower quote than all other companies	1.17	1.83	1.17
Competitive quote, but not necessarily the lowest price of all other companies	5.17	3.67	3.92
Consistent manufacturing lead times	3.5	3.17	3.5
Ability to maintain high quality	4.83*	5.33	5.67*
A surety that your company can protect intellectual property	2.67	3.5	3.83
Good references in manufacturing from other U.S. companies	3.83	3.5***	2.917***

* A statistically significant difference exists between the large and small sized American companies.

*** A statistically significant difference exists between the medium and small sized American companies

* A statistically significant difference exists between companies founded before 1989 and from 1990-1999.

*** A statistically significant difference exists between companies founded from 1990-1999 and after 2000.

4.7.3 China Survey Question 12

12. What limit would your company go to in order to secure the business of a U.S. company?

4.7.4 Analysis

American companies are interested in quality, but most business decisions tend to involve money. The responses for how far Chinese companies would go in order to secure the business of American firms are shown in Table 4-13. In Table 4-12 Chinese manufacturers indicated that the lowest quote was required to secure American business, but the open responses from question number 12 (Table 4-13) show several companies willing to “give up anything until the sale price is less than the cost.”

Table 4-13. Written responses to China Survey Question 12

Our company will not give up generally on the price and payments. We satisfy our customers with after-sale service.
They would give up anything until the sale price is less than the cost.
Our company will try to achieve win with our customers and satisfy their requirements under law. Reasonable profit.
The limit of some profit for the company.
Favorable price and willing to store some finished goods to make sure of prompt delivery.
It depends what the company asks us to change in order to secure their business. So far nobody has asked us to change anything in our operations.
Within the limit that the company costs can accept.
Reasonable price and date of delivery.
It is difficult to say at the moment.
Low profit.
Based on cooperation, our company will try to satisfy all the reasonable requirements with a rigorous attitude.
We promise a good price, but we will not give up anything without promised orders.
It all depends on the potential for our company to make profits.
We can accept everything on condition that our company will not get a loss. For example, we can guarantee the quality of product with the lowest price.
Achieve the lowest profit rate of 5 percent.
Profit margin about 15 percent
Profit must be over 20 percent
We make sure that we get about 30 percent profit.
Minimum order about 10,000 items.

4.8 Numbers of Overseas Suppliers & Companies Supplied

Chinese manufacturers appear eager to do business if they are willing to do anything until a loss in profit is incurred. According to the Department of Commerce, the United States imported \$243 billion in goods from China in 2005, up 24 percent over 2004. The questions below were used to find out how many companies are involved in outsourcing and how diversified companies are in their involvement in outsourcing.

4.8.1 U.S. Survey Question 10

10. To how many different Chinese companies does your company outsource production?

1 2 3 4 5 6 7 8 Other:

4.8.2 China Survey Question 13

13. How many different U.S. companies does your company manufacture products for?

1 2 3 4 5 6 7 8 Other:

4.8.3 Analysis & Comparison

The large U.S. firms outsource, much more than smaller firms, to companies based in China (Table 4-14). The results trend downward exponentially as the size of the companies decreases. The same phenomenon exists in Table 4-15 with the Chinese companies manufacturing for American companies. The companies in existence longer tend to have more American business; however, the differences between the groupings of respondents are not statistically different.

Table 4-14. Average results to U.S. Survey Question 10

	U.S. Company Size		
	Large	Medium	Small
To how many different Chinese companies does your company outsource production?	9.50	6.33	5.71

	Goods Outsourced			
	A	B	C	D
To how many different Chinese companies does your company outsource production?	6	6.1	8	8

A-One component of a product to a single manufacturer

B-Multiple components of a product to a single manufacturer

C-Multiple components of a product to different manufacturers

D-Entire product to a single manufacture

Note: The table above does not include the results of Black & Decker, an outlier in the data collected.

Table 4-15. Average results to China Survey Question 13

	China Company Size		
	Large	Medium	Small
How many different U.S. companies does your company manufacture products for?	7	5.1	3.5

	China Company Founded		
	-1989	1990-1999	2000-
How many different U.S. companies does your company manufacture products for?	7.83	5.50	4.58

4.9 Aspects of Product(s) Outsourced by American Companies

Companies outsource in different ways. Some American firms diversify their outsourcing to several different manufacturers to protect the final product from duplication. Other companies have a commodity product and outsource the entire product to a single manufacturer. Since the product can be made by anyone, as a commodity, the fear of duplication or copy is very low. The question below was used to discover what

type of outsourcing American firms are involved in with Chinese manufacturers. Since most of the companies surveyed have multiple product lines, the respondents checked all the situations that might apply.

4.9.1 U.S. Survey Question 12

12. What does your company outsource to China? (Check all that apply)
- One component of a product to a single manufacturer
 - Multiple components of a product to a single manufacturer
 - Multiple components of a product to different manufacturers
 - Entire product to a single manufacturer
 - Other:

4.9.2 Analysis

The results shown in Table 4-16 and Figure 4-9 show most American companies outsource most, if not the entire product to a single manufacturer in China. Approximately 78 percent of the companies surveyed outsource an entire product to a single Chinese manufacturer. One hundred percent of the small American companies outsource the entire product to a single Chinese manufacturer. These findings suggest that either American companies are outsourcing an entire product with low margins in the commodity market or companies are not concerned about the copying of products. The literature advises companies to diversify the components of a product to keep a single company from understanding the entire product, avoiding possible duplication and the creation of a potential competitor. The findings from the survey do not support the previous findings of product diversification.

Table 4-16. Average results to U.S. Survey Question 12

	U.S. Company Size		
	Large	Medium	Small
One component of a product to a single manufacturer	20%	16.67%	14.29%
Multiple components of a product to a single manufacturer	30%	83.33%	28.57%
Multiple components of a product to different manufacturers	60%	66.67%	28.57%
Entire product to a single manufacture	60%	83.33%	100%

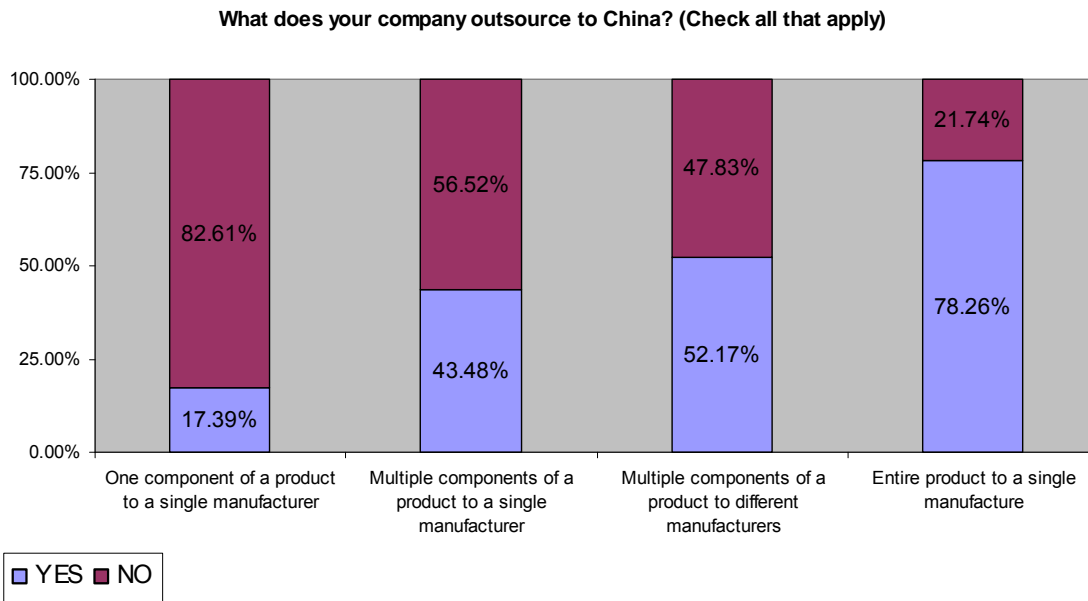


Figure 4-9. Average results to U.S. Survey Question 12

4.10 Company Changes Due to American Companies

American companies are eager to outsource manufacturing to a third-party in China to cut costs and/or improve revenue. Chinese manufacturing companies are anxious to secure the business of the powerful American companies. American companies appear to wield the power in the relationship according to the literature found on the topic. Question number 15 in the survey given to Chinese companies was used to

find out what Americans want changed or improved, according to the China based manufacturers. The question was an open response question, so no predetermined answers were provided to survey respondents; however, some examples were provided in the question for clarity in question response.

4.10.1 China Survey Question 15

15. What specific adjustments did your company make as a result of U.S. companies outsourcing production to your company? (i.e. processes, quality, training, customer communication, customer relationship, technical skill)

4.10.2 Analysis

Almost every respondent mentioned the need for stricter quality control. Those respondents that do not directly mention quality control could be interpreted to mean or include the need to change quality measures and practices. Several respondents mentioned the International Organization for Standardization (ISO) quality certification they are currently in the process of receiving. The ISO standards have helped enable companies to adopt a more common approach to managing and measuring the quality of manufacturing operations. The written responses in Table 4-17 shows responses from all the companies surveyed. In addition to quality, the responses also mention the need for improvement of communication between the American and Chinese companies and training of employees.

Table 4-17. Written responses to China Survey Question 15

Keep improving quality, training employees to have the sense of serving and strengthening the customer communication.
Increase closer communication with the customer. Be aware of the customer requirements and fulfill all requirements. Stricter quality control. Human first strategy, continuous improvement by scientific measurement.
In order to do business with American company, our company takes some measures as: communicating with clients, adjusting processes, etc. Doing these things to meet different product techniques and requirements.
Build quality system, hold training for all staff, continue improvement of production processes, strengthen communication with customers to make sure of changes in information.
We train employees to be aware of quality. We emphasize the critical dimension, make specific float for production technology and quality control procedure.
Customer relationship and customer communication. Improved the internal management process, delivery time, and keeping promises that are made in contracts with customers. "The U.S. companies have higher requirements than other companies, so other companies are impressed if you do business with them." Better reputation.
Increase capacity. In the process of becoming ISO9001 certified, expecting approval in August 2005.
Strict control on quality. Strengthen communication.
Quality, technical abilities, training, and customer communication.
Quality, training, customer communication, customer relationship, skill/ability.
Quality, customer communication, and skill/ability.
We make adjustments to satisfy our customers' in every aspect.
We made specific adjustments on quality, training, skill, and customer communication, etc.
On the perfection of quality system and the improvement of skill and ability.
To meet the needs of our customers and the changing market, our company holds different kinds of training every year. Such as, we have training on production quality, management, customer communication, and relationship maintenance, etc. Besides, we produce various kinds of products according to different requirements for our customers and we try our hardest to satisfy them with all
Adjust the processing, quality, and redo qualification standards. Train operators again and strengthen on-time communication with customer.
New process lines, ISO9001, ISO14000, service hot line
We can have customers buy products which satisfy them with low price and good quality. Furthermore, the skill and ability of our factory will not make our customers disappointed.
Quality, technical skill, customer communication, training
Additional processes, technical skill
Quality certification and TS16949 certification
Quality certification, TS16949 certification
Quality certification and TS12946 certification
Quality certification, QS9000/ISO 14000

4.11 Level of Automation Used in Outsourced Production

The literature indicates high-volume, labor-intensive, stable products are the most suitable for manufacturing in China. On the other, hand products with high complexity, low-volume products (especially those based on new technology or undergoing significant engineering changes) are not suitable for outsourcing (Dastmalchi, 2004). Question 13 in the American survey and number 16 in the Chinese survey were used to find out the level of automation used in products outsourced. Since labor seems to be the primary driving force in outsourcing production to China, automation does not capitalize on the low cost of labor.

4.11.1 U.S. Survey Question 13

13. How would you rate the amount of automation involved in the production of the component(s) or product(s) that you outsource to China? The higher the number, the more automation used in production.

No Automation Involved, Labor-Intensive Production					Highly Automated Production
	1	2	3	4	5

4.11.2 China Survey Question 16

16. How would you rate the amount of automation your company uses in manufacturing products for U.S. companies? The higher the number, the more automation that is used in your manufacturing processes.

No Automation Involved, Labor-Intensive Production					Highly Automated Production
	1	2	3	4	5

4.11.3 Analysis & Comparison

The average responses to the question on level of automation in Table 4-18 are less than or equal to the middle point of the Likert scale. The companies outsourcing an entire product, as opposed to one component or aspect of the product, tend to have the highest level of automation involved; however, the difference is not statistically significant at the 95 percent level. This level of automation is consistent with personal observations in more than 30 manufacturers visited in Guangdong Province, China. Of the four manufacturers building circuit boards, three companies had automated machines picking and placing the components on the board. One manufacturer had an assembly line of workers placing the components in the board.

Table 4-18. Average responses to U.S. Survey Question 13

	U.S. Company Size		
	Large	Medium	Small
Amount of automation involved in the production of the component(s) or product(s) that you outsource to China?	2.80	2.67	3.00

	Goods Outsourced			
	A	B	C	D
Amount of automation involved in the production of the component(s) or product(s) that you outsource to China?	2.25	2.6	2.67	2.78

- A-One component of a product to a single manufacturer
- B-Multiple components of a product to a single manufacturer
- C-Multiple components of a product to different manufacturers
- D-Entire product to a single manufacture

The Chinese rated the level of automation used in production of goods for American companies (Table 4-19) higher than respondents from American firms (Table 4-18). As seen in Figure 4-10, more than 54 percent of the Chinese manufactures rated

automation closer to highly automated production than no automation involved in the production. On the other hand approximately 26 percent of the American firms rated the level of automation to be a four or five on the Likert scale. According to a study done by Boothroyd Dewhurst, products that utilize highly automated processes are not good candidates for overseas manufacturing (Forrest, 2005). Labor cost savings are driven in large part by products require labor-intensive processes. Consequently, highly automated production processes may not show significant cost savings to justify the immediate transfer of manufacturing to China. The findings from these survey questions show more than only labor-intensive processes being performed in the Chinese factories.

Table 4-19. Average responses to U.S. Survey Question 16

	China Company Size		
	Large	Medium	Small
Amount of automation your company uses in manufacturing products for U.S. companies?	3.7	3.2	4

	China Company Founded		
	-1989	1990-1999	2000-
Amount of automation your company uses in manufacturing products for U.S. companies?	4	3	3.58

4.12 Product Life Cycle of Product(s) Outsourced

Many American firms have it in their head that China is the obvious place to be, but it is best for goods that involve high-volume production and need few technical and engineering changes” (Arminas, 2005). Question 14 on the survey for American firms was inserted to find out in what stage of the product life cycle are products outsourced overseas. The four stages of the product life cycle are introduction, growth, maturity, and

decline. In the product introduction, the product is a problem solution and prices are high, margins are high and order volumes are low. As consumer acceptance of the product grows, the prices and margins start to come down while product volume increases. The volume normally peaks during the maturity stage of the cycle and drops until production is terminated.

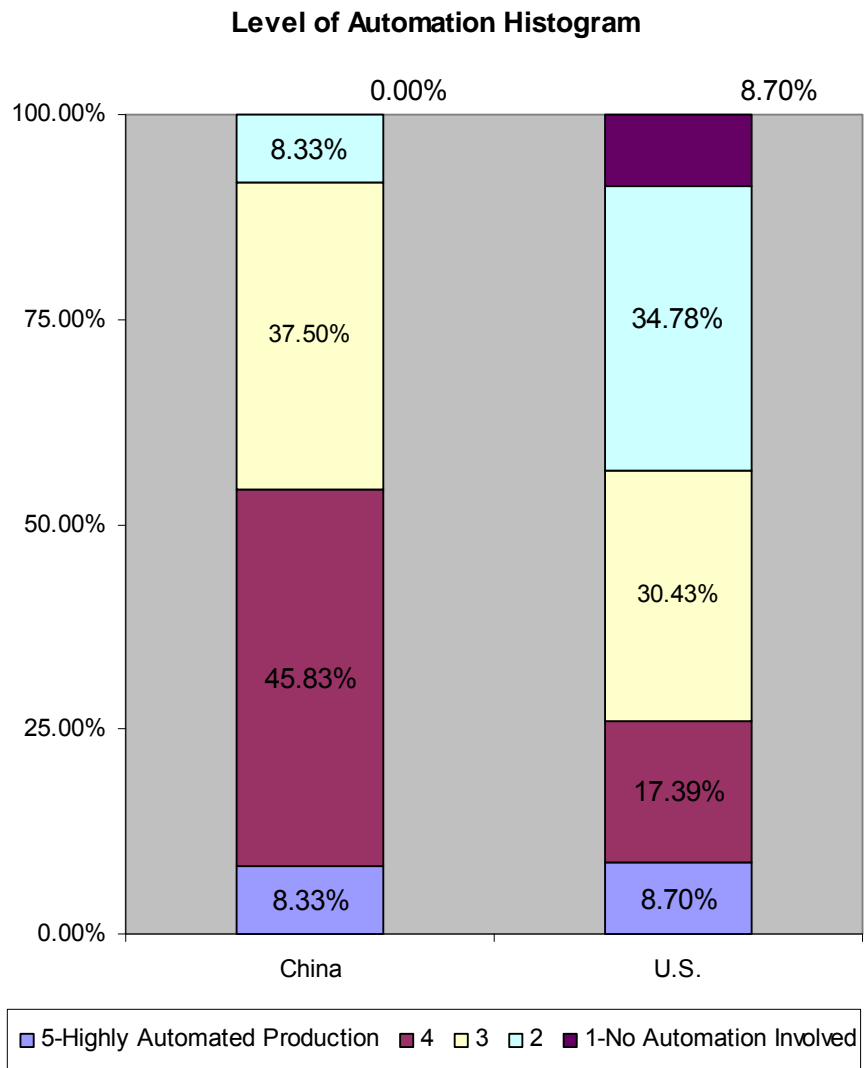
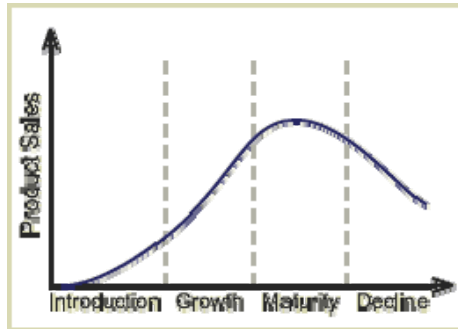


Figure 4-10. Results to U.S. Survey Question 13 & China Survey Question 16

4.12.1 U.S. Survey Question 14

14. In what stage of the product life cycle is the product that you outsource to China?

Introduction	Growth	Maturity	Decline
--------------	--------	----------	---------



4.12.2 Analysis

The initial phase of the product life cycle is where production volume is the lowest. During the first stages of the life cycle the future success of the product is unknown. Product sales are normally low, so production is low-volume. Outsourcing is best for products that involve high-volume production (Arminas, 2005). Forty-three percent of the U.S. respondents have products in the first stage of the cycle, as shown in Figure 4-11. The results follow the normal trend of the production life cycle. The highest percentage of products is in the maturity stage; however, the percentages of U.S. companies with products in the introduction and growth stages are higher than suggested. Table 4-20 shows more than 71 percent of small American firms reported having outsourced products in the introduction stage of the product life cycle.

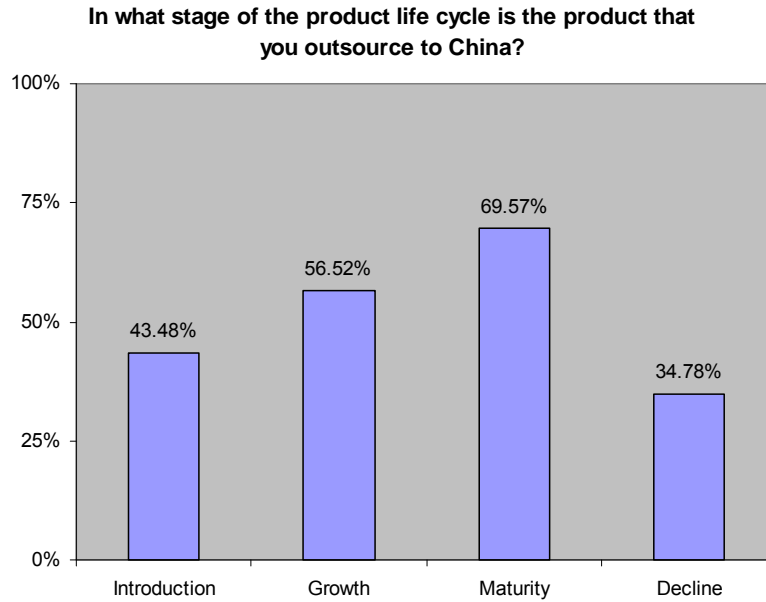


Figure 4-11. Results to U.S. Survey Question 14

Table 4-20. Average responses to U.S. Survey Question 14

	U.S. Company Size		
	Large	Medium	Small
Product(s) outsourced in the introduction state of the product life cycle to China?	30%	33.33%	71.43%
Product(s) outsourced in the growth state of the product life cycle to China?	60%	50%	57.14%
Product(s) outsourced in the maturity state of the product life cycle to China?	70%	83.33%	57.14%
Product(s) outsourced in the decline state of the product life cycle to China?	30%	33.33%	42.86%

	Goods Outsourced			
	A	B	C	D
Product(s) outsourced in the introduction state of the product life cycle to China?	75%	70%	50%	50%
Product(s) outsourced in the growth state of the product life cycle to China?	75%	70%	66.67%	55.56%
Product(s) outsourced in the maturity state of the product life cycle to China?	75%	90%	75%	72.22%
Product(s) outsourced in the decline state of the product life cycle to China?	75%	70%	50%	38.89%

- A-One component of a product to a single manufacturer
- B-Multiple components of a product to a single manufacturer
- C-Multiple components of a product to different manufacturers
- D-Entire product to a single manufacturer

4.13 Perceived Outsourcing Performance

The purpose of this research is to develop guidelines or practices that can be utilized by companies in deciding whether or not to outsource production to China. All respondents have been asked questions about the benefits anticipated from a decision to outsource production. The companies responded to questions about elements involved in the process of deciding to outsource, such as, the factors researched and the nature of the products. To evaluate their experience with outsourcing to China, American companies were asked to rate their perceived performance in survey question number 15. The question for American firms included a Likert scale for a performance rating in different areas. If the performance was approximately the same as prior to outsourcing, American respondents could choose rating three on a scale of one to five. The Chinese companies were asked to rate their actual performance in the same areas in question number 17.

4.13.1 U.S. Survey Question 15

15. How would you rate your **actual performance** in the following areas after outsourcing production to China? The higher the number, the better the performance.

	Very Poor		The Same		Excellent
	1	2	3	4	5
The overall cost (i.e. raw materials, overhead, labor, shipping, inventory costs, etc...)	1	2	3	4	5
The quality of the product	1	2	3	4	5
The manufacturing lead time (i.e. time required to manufacture the product)	1	2	3	4	5
The delivery lead time (i.e. time required to ship the product)	1	2	3	4	5

4.13.2 China Survey Question 17

17. How would you rate your **actual performance** in the following? The higher the number, the better the performance.

Very Poor						Excellent
1	2	3	4			5
The overall cost (i.e. raw materials, overhead, labor, shipping, inventory costs, etc...)	1	2	3	4	5	
The quality of the products that you manufacture	1	2	3	4	5	
The manufacturing lead time (i.e. time required to manufacture the product)	1	2	3	4	5	
The delivery lead time (i.e. time required to ship the product to the U.S. company)	1	2	3	4	5	

4.13.3 Analysis & Comparison

All the American companies surveyed indicated the overall cost of the products outsourced to China was either the same or better than before outsourcing to China, as seen in Figure 4-12. The overall cost of outsourcing was rated as the most improved aspect of performance. The responses from American survey participants on performance in the areas of quality and manufacturing lead time ranged from two to five on the Likert scale; however, the mean value of the quality of the products outsourced was higher than the mean of manufacturing lead time. The mean value on quality performance was close to the mean of the overall cost. American companies saw an improvement in the quality of the products as a result of transfer production to China.

In Figure 4-12 survey participants selected the entire range of options for the performance of delivery lead time. All three groups, large, medium, and small American companies, in Table 4-21 viewed the delivery time as the same as before outsourcing. Those American companies that outsource one component of a product to a single

manufacturer indicated a significant decrease in the performance on delivery lead time as a result of outsourcing. All groupings in Table 4-21 viewed the overall costs of outsourcing similarly at the highest level of performance improvement.

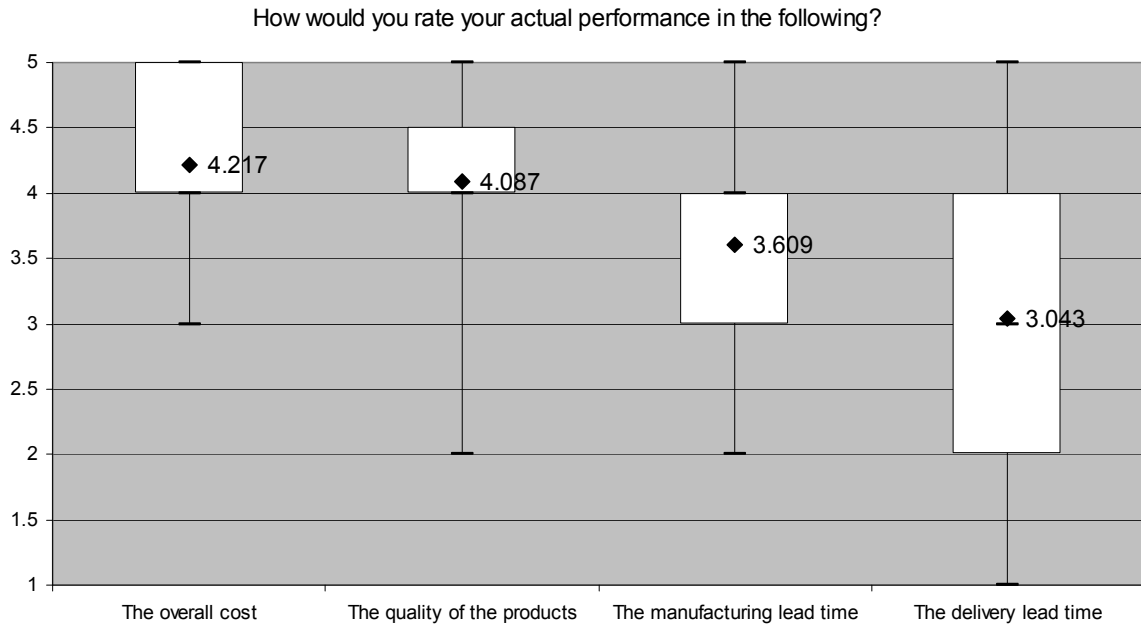


Figure 4-12. Results to U.S. Survey Question 15

The responses from Chinese manufacturers on performance raise some speculation, especially from the small companies. Table 4-22 indicates a statistically significant difference in the responses from the small firms in comparison to half of the medium companies and all of the large companies' responses. Personal visits to the factories render the results shown in the table below difficult to believe. In most cases the large and medium companies had superior levels of performance from personal observations and interviews.

Table 4-21. Average responses to U.S. Survey Question 15

	U.S. Company Size		
	Large	Medium	Small
The overall cost (i.e. raw materials, overhead, labor, shipping, inventory costs, etc...)	4.3	4.17	4.14
The quality of the product	4	3.83	4.43
The manufacturing lead time (i.e. time required to manufacture the product)	4**	2.833**	3.71
The delivery lead time (i.e. time required to ship the product)	3	2.83	3.29

	Goods Outsourced			
	A	B	C	D
The overall cost (i.e. raw materials, overhead, labor, shipping, inventory costs, etc...)	4.25	4.3	4.08	4.33
The quality of the product	4	3.8	3.92	4.22
The manufacturing lead time (i.e. time required to manufacture the product)	2.75	3.1	3.08	3.5
The delivery lead time (i.e. time required to ship the product)	2	2.6	2.58	3.06

- A-One component of a product to a single manufacturer
- B-Multiple components of a product to a single manufacturer
- C-Multiple components of a product to different manufacturers
- D-Entire product to a single manufacture

** A statistically significant difference exists between the large and medium sized American companies

4.14 Unanticipated Benefits Encountered in Outsourcing

Companies develop an idea of the anticipated benefits from the research and analysis done prior to deciding to outsource to China. Previously respondents rated a predetermined list of benefits normally anticipated by U.S. companies according multiple source of literature. Question 16 was included to find out if the benefits received were generally those previously anticipated.

Table 4-22. Average responses to China Survey Question 17

	China Company Size		
	Large	Medium	Small
The overall cost (i.e. raw materials, overhead, labor, shipping, inventory costs, etc...)	3.8*	4.1	4.5*
The quality of the products that you manufacture	4.5*	4***	5* ***
The manufacturing lead time (i.e. time required to manufacture the product)	4*	3.8***	4.75* ***
The delivery lead time (i.e. time required to ship the product to the U.S. company)	3.4*	4.1	4.75*

	China Company Founded		
	-1989	1990-1999	2000-
The overall cost (i.e. raw materials, overhead, labor, shipping, inventory costs, etc...)	3.83	4	4.17
The quality of the products that you manufacture	4.67	3.83	4.5
The manufacturing lead time (i.e. time required to manufacture the product)	4.33	3.67	4.08
The delivery lead time (i.e. time required to ship the product to the U.S. company)	3.167*	3.83	4.33*

* A statistically significant difference exists between the large and small sized American companies.

*** A statistically significant difference exists between the medium and small sized American companies

* A statistically significant difference exists between companies founded before 1989 and from 1990-1999.

4.14.1 U.S. Survey Question 16

16. Were there **unanticipated benefits** that you received from outsourcing to China?

Much Less Than Expected					Much Greater Than Expected
1	2	3	4	5	

4.14.2 Analysis

The results shown in Table 4-23 indicate that benefits received from outsourcing were the benefits originally expected prior to the transfer of production overseas to China. The results shown are extremely similar for all of the different description groups.

The research done to generate an expected outcome of outsourcing accounted for the benefits received from outsourcing.

Table 4-23. Average results to U.S. Survey Question 16

	U.S. Company Size		
	Large	Medium	Small
Were there unanticipated benefits that you received from outsourcing to China?	3.20	3.17	3.29

	Goods Outsourced			
	A	B	C	D
Were there unanticipated benefits that you received from outsourcing to China?	3.25	3.2	3.08	3.22

- A-One component of a product to a single manufacturer
- B-Multiple components of a product to a single manufacturer
- C-Multiple components of a product to different manufacturers
- D-Entire product to a single manufacture

4.15 Unanticipated Costs & Difficulties Faced in Outsourcing

The previous question dealt with the unanticipated benefits faced in the executing offshore outsourcing; however, companies may face unanticipated costs and difficulties. Questions 17 and 18 were asked to American firms to determine if they encountered hardships in outsourcing that were not expected or anticipated in deciding to switch to outsourcing in China

4.15.1 U.S. Survey Question 17

17. Were there **unanticipated costs** that you encountered in outsourcing to China?

Much Greater Than Expected				Much Less Than Expected
1	2	3	4	5

4.15.2 U.S. Survey Question 18

18. Were there difficulties that you faced in outsourcing to China?

Much Greater Than Expected					Much Less Than Expected
1	2	3	4	5	

4.15.3 Analysis

The average results shown in Table 4-24 and Table 4-25 do not indicate surprising hardships in outsourcing to the American respondents. The medium firms in Table 4-24 indicated a slightly more unanticipated cost than the large and small companies, but difference is not statistically significant. In general, the U.S. companies surveyed did not encounter unanticipated factors, according to questions 16, 17 and 18 on the survey for American firms. The companies must have performed enough research to generate an expected outcome of outsourcing and they understand the costs and benefits of outsourcing to their specific third party manufacturer.

Table 4-24. Average results to U.S. Survey Question 17

	U.S. Company Size		
	Large	Medium	Small
Were there unanticipated costs that you encountered in outsourcing to China?	2.80	3.17	2.86

	Goods Outsourced			
	A	B	C	D
Were there unanticipated costs that you encountered in outsourcing to China?	3.00	3.2	3.08	2.89

- A-One component of a product to a single manufacturer
- B-Multiple components of a product to a single manufacturer
- C-Multiple components of a product to different manufacturers
- D-Entire product to a single manufacture

Table 4-25. Average results to U.S. Survey Question 18

	U.S. Company Size		
	Large	Medium	Small
Were there difficulties that you faced in outsourcing to China?	3.10	3.50	3.57

	Goods Outsourced			
	A	B	C	D
Were there difficulties that you faced in outsourcing to China?	3.50	3.60	3.25	3.33

- A-One component of a product to a single manufacturer
- B-Multiple components of a product to a single manufacturer
- C-Multiple components of a product to different manufacturers
- D-Entire product to a single manufacture

4.16 Would You Outsource to China in the Future?

Questions number 19 and 20 need little introduction and explanation; China is only one of many countries American companies outsource to, to lower costs. Some American companies outsourcing to multiple countries to mitigate political risk. All the companies included in the study have experience outsourcing to China, and many have experience outsourcing to other countries. Based on their experience, these questions were included to find out if these American companies would choose China again and if not, what country they would choose for third party manufacturing.

4.16.1 U.S. Survey Question 19

19. Based on your current experience would you outsource to China again?

Definitely Would Not Outsource to China					Definitely Would Outsource to China	
1	2	3	4	5		

4.16.2 U.S. Survey Question 20

20. If you would not outsource to China again, what would you do? (Check one answer)

- Outsource manufacturing to another country
What country?
- Outsource manufacturing to a domestic manufacturer
- Not outsource at all and keep manufacturing in-house

4.16.3 Analysis

Overall, 82.6 percent of the American respondents selected five on the Likert scale, meaning they would definitely outsource to China again. The remaining respondents indicated four on the scale. All the firms would outsource to China again based on their current experience, as shown in Table 4-26. If firms would not outsource to China again, five of the large companies indicated they would outsource to Taiwan, Mexico, and Eastern Europe. Two of large companies indicated they would perform intensive research on Indonesia and Malaysia for outsourcing. Not a single survey respondent indicated that as an alternative they would outsource production to India.

Table 4-26. Average responses to U.S. Survey Question 19

	U.S. Company Size		
	Large	Medium	Small
Based on your current experience would you outsource to China again?	4.90	4.83	4.71

	Goods Outsourced			
	A	B	C	D
Based on your current experience would you outsource to China again?	4.75	4.90	4.83	4.83

- A-One component of a product to a single manufacturer
- B-Multiple components of a product to a single manufacturer
- C-Multiple components of a product to different manufacturers
- D-Entire product to a single manufacture

4.17 Benefits Due to Factors Researched on Outsourcing

The decision to outsource is based upon receiving future benefits. The more benefits or the greater the value of any single benefit in the future, the more likely a company is to choose to transfer production to a Chinese manufacturer. In both the American and Chinese surveys, participants were asked about what anticipated benefits of outsourcing production to China. All survey participants were also asked about what factors are researched and analyzed in making a decision to outsource production to China. This section analyzes the relationship between the factors researched and the anticipated benefits of companies.

4.17.1 The Abundant Supply of Production Workers

China has the world's largest manufacturing workforce, at more than 100 million (Banister, 2005). China has an abundant supply of production workers to service or produce production. Other governments do not have enough laborers. The Indian government itself is predicting a shortfall in labor by 2009 (Coxon, 2005). Price is used to balance the supply and demand for a particular resource. In general, companies will outsource less as the cost gets more expensive. The price of production at which the quantity demanded equals the quantity supplied is the market price for production workers. The more production workers are available to manufacture goods, the lower the cost required to compensate workers for their contribution.

The abundant supply of production is a benefit to large and medium sized American firms, according to Table 4-8. The regression indicated the more researched performed on the productivity of production workers in China, the more a company will

anticipate a benefit from the abundant supply of production workers in China. In general, the Chinese people have an excellent work ethic. A survey participant said, “The Chinese are excellent manufacturers because they are well trained and have a fantastic work ethic.” Although not indicated by the American companies studied in this projection, many U.S. manufacturers have found their hourly wages are reduced by producing in a third-world country, only to realize that it takes five times the number of hours to produce the same good domestically (Forrest, 2005). The literature differs concerning the productivity of production workers. The data collected through surveys shows the productivity of Chinese production workers to be strong and the worker productivity creates an anticipated benefit of worker supply and supply of products able to produce. The results from the Chinese companies also indicate a similar association.

The benefit of production worker supply is also associated with the Chinese government. In Figure 4-4, U.S. companies indicated the assistance of the Chinese government in outsourcing was the least likely anticipated benefit. It seems reasonable to conclude that independent of whether or not the Chinese government does help companies to outsource production, those companies that do engage in researching the assistance in the government would learn about the benefit of choosing China. Chinese government officials would boast the resources and benefits it has to offer foreign companies, which includes an abundant supply of production workers to create products at a low cost.

Companies that spend time researching the hourly cost of production workers will realize less of a benefit in the supply of production workers. Although the country has the largest supply of production workers of any country in the world, the majority of Chinese

workers do not live where the factories are located. The majority of the manufacturing companies are located near the coastal regions of the vast country for ease of shipping. The cost of workers along the coast of China is rising, according to personal interviews with Chinese manufacturers. Members of management teams also indicated during visits that fewer production workers are leaving interior homes to travel and work in production factories located along the coast.

4.17.2 The Low Hourly Cost for Production Workers

“Previous studies show that outsourcing can result in cost savings of a least 50 percent over a domestically housed operation” (Mobley, 2004). The primary cost saver is the hourly cost of production workers. In Table 4-35, no strong relationship emerges from factors researched for the benefit of low hourly costs. The low hourly cost of production workers is the primary driver for outsourcing to China. Popular business press and media constantly reiterate the benefit of the hourly wages in Asian countries. The Chinese believe that more research into production, such as, worker supply, productivity, cost, etc... will lead to a lower benefit in terms of hourly worker costs.

The American firms’ experience is different from that of the Chinese manufacturers. The U.S. companies believe more research into the nature of the product manufacturing will lead to increased benefit in the hourly cost for production workers in China. From experience, American firms claim the benefit of low wages is a result of researching and analyzing the nature of the manufacturing for the product to be outsourced. The more a company looks at the nature of the product manufacturing, the more a company will benefit from the low hourly cost of workers to produce the product. China boasts a low worker wage. The more labor intensive a product is, the more value

that can be appropriated by choosing to outsource to China. The more automated a production process for a product is, the less value is created from low workers' wages.

4.17.3 The Change in Focus on Company's Core Business Functions

Outsourcing products to a third-party, which were previously produced in-house, releases resources to add value to core competencies. The change in focus creates opportunities to use company knowledge and technology of existing capabilities. One opportunity is to expand into new product markets. Gateway has established leadership in the plasma television market because it outsourced other products and could focus on expanding to other product areas (Hagel, 2004). Another opportunity is to expand into new markets with existing products. Table 4-27 indicates the more research done on the change in focus associated with outsourcing; the more a U.S. company claims to benefit from the improvement in focus.

4.17.4 The Closer Proximity of Manufacturing to Foreign Markets

The term globalization describes the changes in societies and the world economy that are the result of dramatically increased trade and cultural exchange. In Table 4-2 a significant difference exists between the large American firms and the medium and small companies. The large American firms view the proximity of manufacturing to foreign markets as significantly more beneficial. In a saturated U.S. market, companies are globalizing to new markets for growth.

Regression analysis with survey data from U.S. and Chinese companies indicates a strong relationship with research of inventory costs. Outsourcing to China requires an additional investment in inventory. Most of this inventory is due to the time spent in

transit. Ocean shipping typically takes three to four weeks just in transit, and even more is spent in docks, loading, inspections, unloading, storage, customs, reloading for overland transportation, etc... Finished goods are the most expensive form of inventory, because they have the most investment tied up in materials, parts, labor, machine time, etc... (Forrest, 2005). High volume of finished goods that are expensive means carrying a constantly high inventory cost.

In Table 4-35 both U.S. and Chinese firms believe the more research performed the cost of inventory, the greater the benefit of the proximity of manufacturing facilities to foreign markets for product sales. The cost of inventory, especially finished goods, is high. The less time products are in transit, the less time cash is tied up in inventory. In, Table 4-27 and Table 4-31, the U.S. and Chinese companies respectively claim the same relationship as indicated when the analysis was performed for the data of U.S. and Chinese companies together. The Chinese believe that more research in increased inventory costs will lead to a greater benefit in terms of proximity to foreign markets for product distribution.

The American companies indicate a significant relationship in researching inventory costs and the benefit of a location close to foreign markets. In Table 4-30, the research of the cost of shipping products from China to the U.S. is associated with the benefit of proximity to foreign markets with a coefficient 0.42 and a t-statistic of 2.25. The U.S. firms believe that more research done on inventory and shipping costs will lead to greater benefit in foreign markets sales.

The regression analysis summarized in Table 4-30 also indicates a strong relationship with the research of intellectual property protection. If a company researches

intellectual property, the link with a benefit of close markets is that their IP will help them take advantage of the market proximity, more than non-patented products would. This is because it is so easy to copy in Asia, by having IP you gain some advantage over all of the little firms that can see those same close markets and who could copy more easily and compete with you if you didn't have IP.

4.17.5 An Increase of Market Presence in China

The benefit of market presence in China as a result of outsourcing manufacturing to China is similar to the previous section on the benefit of proximity to other foreign markets. New growth requires expanding to new markets for some American companies. China is a country of 1.3 billion people and foreign firms salivated for years at the thought of selling a toothbrush to every Chinese [citizen] (Shenkar, 2005). In Table 4-2 a significant difference exists between the large American firms and the medium and small companies on the benefit of market presence in China. The large American firms view the market presence in China as significantly more beneficial than the other groups.

In Table 4-2, as previously mentioned, a significant difference exists between the large American firms and the medium on marketing products in China and other countries with a close proximity to manufacturing in China. Small and medium American companies are solely focused on manufacturing goods in China and transporting those goods back to the U.S. for sale. The resource base for the small and medium companies may be too small to tackle the market located near outsourced manufacturing facilities. The large American firms view the proximity as an advantage of outsourcing, but are not capitalizing on the opportunity to the fullest extent possible. The reason may include that the nature of the products are not suited for markets outside the United States.

The decision-making process to outsource manufacturing to a third-party in China requires extensive research and analysis. Some of the relationships of research done prior to deciding to outsource to China have been explained. Other relationships exist, the decision making process should be extensive for transferring production to China. The summarized regression analyses that follow show additional relationships between research factors and benefits realized by American companies.

Table 4-27. Benefits due to factors research by U.S. companies

Research Factors	Anticipated Benefits								
	The abundant supply of production workers in China	The low hourly cost for production workers in China	The low cost of raw materials for production	The elimination of manufacturing overhead costs	An increase in the overall revenue of the product	An improvement in focus on your company's core functions	The closer proximity of mfg. facilities to markets	An increase of market presence in China	The assistance of the Chinese govt. to help you outsource
The supply of production workers in China	-0.115 (-0.545)	-0.104 (-0.633)			-0.441 (-1.684)		-0.246 (-1.771)	-0.33 (-1.115)	-0.129 (-0.776)
The productivity of the production workers in China	0.699 (2.238)	-0.137 (-0.714)			-0.165 (-0.555)				
The overall production cost of manufacturing in China	-0.385 (-1.2370)	-0.197 (-0.768)	0.054 (0.106)	-0.715 (-1.557)		-0.111 (-0.207)	-0.201 (-0.843)		
The time required to manufacture products in China	-0.622 (-2.514)	-0.479 (-1.792)	0.24 (0.678)						
The nature of the manufacturing of your product	0.300 (1.088)	0.626 (3.444)	-0.312 (-1.041)						
The hourly cost for production workers in China	-0.424 (-1.683)	0.222 (1.134)	0.226 (0.484)	-0.393 (-1.486)	0.365 (1.368)	0.261 (0.771)			
The cost of raw materials for production		0.192 (1.268)	-0.143 (-0.321)	-0.28 (-0.946)	0.161 (0.484)	0.337 (0.706)			-0.479 (-2.42)
The ability to control manufacturing operations in China				0.208 (0.598)		-0.304 (-0.708)			
The achievability of the quality required from subcontractors in China	0.385 (1.281)		1.172 (1.942)	0.453 (1.065)	-0.044 (-0.106)	-0.14 (-0.253)			
The cost of selecting a subcontractor in China		0.377 (1.341)		0.42 (1.535)					
The cost of inventory for production in China		-0.295 (-1.598)	0.213 (0.7)			-0.595 (-2.177)	0.367 (2.663)	0.789 (2.384)	0.239 (1.274)
The cost of shipping products from China		-0.131 (-0.553)	-0.104 (-0.204)		-0.259 (-0.796)	0.336 (0.842)	0.42 (2.25)	0.089 (0.231)	-0.094 (-0.414)
The time required to ship products from China		0.257 (1.291)	-0.314 (-0.733)				-0.351 (-1.964)	-0.217 (-0.577)	-0.171 (-0.736)
The overall revenue of the outsourced product	0.059 (0.252)	0.097 (0.566)			0.399 (1.505)		-0.091 (-0.54)	0.247 (0.656)	
The change of market presence in China	-0.243 (-1.081)			-0.26 (-0.92)	0.083 (0.287)	0 (-0.002)	-0.028 (-0.229)	-0.028 (-0.106)	
The change in focus on your company's core business functions				0.438 (1.819)		0.7 (2.262)		-0.526 (-1.592)	
The manufacturing overhead costs				0.192 (0.933)	0.101 (0.452)	0.223 (0.746)			
The protection of intellectual property							0.286 (2.098)	0.38 (1.355)	0.052 (0.249)
The stability of the subcontractor's management in China			-0.263 (-0.714)						
The cultural difference between China and the U.S.			0.301 (1.093)				0.148 (1.227)	0.382 (1.489)	0.093 (0.558)
The stability of the Chinese government			0.345 (1.037)			-0.258 (-0.775)			0.134 (0.718)
The assistance of the Chinese govt. to help you outsource	0.437 (2.155)	-0.208 (-0.973)							0.26 (1.319)

Table 4-28. Detailed benefits due to factors researched by U.S. companies

Research Factors	Anticipated Benefits				
	The abundant supply of production workers in China		The low hourly cost for production workers in China		The low cost of raw materials for production
The supply of production workers in China	-0.115 (-0.545)	0.034 (0.162)	-0.104 (-0.633)		
The productivity of the production workers in China	0.699 (2.238)	-0.015 (-0.065)	-0.137 (-0.714)		
The overall production cost of manufacturing in China	-0.385 (-1.2370)		-0.197 (-0.768)	0.054 (0.106)	
The time required to manufacture products in China	-0.622 (-2.514)		-0.479 (-1.792)	-0.097 (-0.747)	0.24 (0.678)
The nature of the manufacturing of your product	0.300 (1.088)	0.417 (1.545)	0.626 (3.444)	0.325 (2.364)	-0.312 (-1.041)
The hourly cost for production workers in China	-0.424 (-1.683)		0.222 (1.134)	0.128 (0.885)	0.226 (0.484)
The cost of raw materials for production			0.192 (1.268)		-0.143 (-0.321)
The ability to control manufacturing operations in China					0.463 (1.901)
The achievability of the quality required from subcontractors in China	0.385 (1.281)				1.172 (1.942)
The cost of selecting a subcontractor in China			0.377 (1.341)		0.661 (1.817)
The cost of inventory for production in China			-0.295 (-1.598)		0.213 (0.7)
The cost of shipping products from China			-0.131 (-0.553)		-0.104 (-0.204)
The time required to ship products from China			0.257 (1.291)		-0.314 (-0.733)
The overall revenue of the outsourced product	0.059 (0.252)		0.097 (0.566)		
The change of market presence in China	-0.243 (-1.081)				
The change in focus on your company's core business functions					
The manufacturing overhead costs					
The protection of intellectual property					
The stability of the subcontractor's management in China					-0.263 (-0.714)
The cultural difference between China and the U.S.					0.301 (1.093)
The stability of the Chinese government					0.345 (1.037)
The assistance of the Chinese govt. to help you outsource	0.437 (2.155)	0.096 (0.633)	-0.208 (-0.973)		

Table 4-29. Detailed benefits due to factors researched by U.S. companies (Continued)

Research Factors	Anticipated Benefits				
	The elimination of manufacturing overhead costs		An increase in the overall revenue of the product		An improvement in focus on your company's core functions
The supply of production workers in China			-0.441		
			(-1.684)		
The productivity of the production workers in China			-0.165		
			(-0.555)		
The overall production cost of manufacturing in China	-0.715				-0.111
	(-1.557)				(-0.207)
					-0.188
					(-0.395)
The time required to manufacture products in China					
The nature of the manufacturing of your product					
The hourly cost for production workers in China	-0.393	-0.218	0.365	0.116	0.261
	(-1.486)	(-0.924)	(1.368)	(0.509)	(0.771)
The cost of raw materials for production	-0.28	0.017	0.161		0.337
	(-0.946)	(0.083)	(0.484)		(0.706)
The ability to control manufacturing operations in China	0.208				-0.304
	(0.598)				(-0.708)
The achievability of the quality required from subcontractors in China	0.453		-0.044	0.026	-0.14
	(1.065)		(-0.106)	(0.079)	(-0.253)
					0.239
					(0.613)
The cost of selecting a subcontractor in China	0.42				
	(1.535)				
The cost of inventory for production in China					-0.595
					(-2.177)
The cost of shipping products from China			-0.259		0.336
			(-0.796)		(0.842)
The time required to ship products from China					
The overall revenue of the outsourced product			0.399	0.695	
			(1.505)	(3.293)	
The change of market presence in China	-0.26		0.083	-0.11	0
	(-0.92)		(0.287)	(-0.62)	(-0.002)
The change in focus on your company's core business functions	0.438				0.7
	(1.819)				(2.262)
					0.382
					(1.542)
The manufacturing overhead costs	0.192	0.275	0.101		0.223
	(0.933)	(1.681)	(0.452)		(0.746)
					0.029
					(0.151)
The protection of intellectual property					
The stability of the subcontractor's management in China					
The cultural difference between China and the U.S.					
The stability of the Chinese government					-0.258
					(-0.775)
The assistance of the Chinese govt. to help you outsource					

Table 4-30. Detailed benefits due to factors researched by U.S. companies (Continued)

Research Factors	Anticipated Benefits				
	The closer proximity of mfg. facilities to markets		An increase of market presence in China		The assistance of the Chinese govt. to help you outsource
The supply of production workers in China	-0.246 (-1.771)		-0.33 (-1.115)		-0.129 (-0.776)
The productivity of the production workers in China					
The overall production cost of manufacturing in China	-0.201 (-0.843)				
The time required to manufacture products in China					
The nature of the manufacturing of your product					
The hourly cost for production workers in China					
The cost of raw materials for production					-0.479 (-2.42)
The ability to control manufacturing operations in China					
The achievability of the quality required from subcontractors in China					
The cost of selecting a subcontractor in China					
The cost of inventory for production in China	0.367 (2.663)	0.336 (2.689)	0.789 (2.384)	0.506 (1.81)	0.239 (1.274)
The cost of shipping products from China	0.42 (2.25)	0.395 (2.246)	0.089 (0.231)	0.224 (0.571)	-0.094 (-0.414)
The time required to ship products from China	-0.351 (-1.964)	-0.361 (-2.03)	-0.217 (-0.577)	-0.277 (-0.696)	-0.171 (-0.736)
The overall revenue of the outsourced product	-0.091 (-0.54)		0.247 (0.656)		
The change of market presence in China	-0.028 (-0.229)	-0.055 (-0.456)	-0.028 (-0.106)	-0.034 (-0.126)	
The change in focus on your company's core business functions			-0.526 (-1.592)		
The manufacturing overhead costs					
The protection of intellectual property	0.286 (2.098)	0.27 (2.544)	0.38 (1.355)	0.454 (1.912)	0.052 (0.249)
The stability of the subcontractor's management in China					
The cultural difference between China and the U.S.	0.148 (1.227)		0.382 (1.489)		0.093 (0.558)
The stability of the Chinese government					0.134 (0.718)
The assistance of the Chinese govt. to help you outsource					0.002 (0.018)
					0.26 (1.319)
					0.219 (1.63)

Table 4-31. Benefits due to factors researched from China perspective

Research Factors	Anticipated Benefits									
	The abundant supply of production workers in China	A high level of technical skill of your production workers	The low hourly cost for production workers in China	The low cost of raw materials for production	The elimination of manufacturing overhead costs	An increase in the overall revenue of the product	An improvement in focus on your company's core functions	The closer proximity of mfg. facilities to markets	An increase of market presence in China	The assistance of the Chinese govt. to help you outsource
The supply of production workers in China	0.169 (0.917)	0.426 (2.351)	-0.109 (-0.394)			0.262 (0.983)		0.211 (0.867)	-0.229 (-0.945)	0.415 (2.049)
The productivity of the production workers in China	0.055 (0.228)	0.1 (0.414)	-0.074 (-0.195)			0.188 (0.505)				
The overall production cost of manufacturing in China	0.6 (2.43)		-0.103 (-0.255)	-0.212 (-0.357)	-0.003 (-0.012)	-0.504 (-1.376)	-0.283 (-1.348)	-0.089 (-0.229)		
The time required to manufacture products in China	-0.09 (-0.541)	0.311 (1.819)	-0.543 (-1.647)	-0.174 (-0.408)		0.326 (1.008)				
The hourly cost for production workers in China	0.313 (1.355)	-0.183 (-0.766)	0.297 (0.892)	0.217 (0.511)	-0.055 (-0.253)	-0.208 (-0.645)	-0.313 (-1.725)			
The cost of raw materials for production			-0.483 (-1.21)	0.741 (1.272)	0.061 (0.227)	0.313 (0.805)	0.098 (0.482)			0.15 (0.386)
The ability to control manufacturing operations in China					0.512 (2.096)		0.151 (0.753)			
The achievability of the quality required from subcontractors in China	-0.333 (-1.23)	-0.334 (-1.237)		-0.494 (-0.856)	0.573 (1.686)	0.569 (1.468)	0.156 (0.545)			
The cost of inventory for production in China			0.352 (0.827)	0.08 (0.143)		1.114 (2.497)	0.371 (1.472)	0.623 (1.822)	0.53 (1.554)	0.994 (3.581)
The cost of shipping products from China			0.537 (1.029)	0.045 (0.073)		-0.89 (-1.887)	0.271 (0.948)	0.011 (0.034)	-0.02 (-0.061)	-0.412 (-1.245)
The time required to ship products from China			0.304 (0.766)	-0.071 (-0.092)		-0.3 (-0.766)		-0.078 (-0.238)	0.28 (0.875)	0.114 (0.358)
The protection of intellectual property								0.067 (0.219)	-0.264 (-0.858)	-0.136 (-0.58)
The stability of the subcontractor's management in China		0.299 (1.063)		0.927 (1.553)						
The cultural difference between China and the U.S.		-0.498 (-2.104)		0.001 (0.002)				0.416 (1.268)	0.065 (0.239)	-0.462 (-1.296)
The stability of the Chinese government				0.076 (0.159)			-0.099 (-0.524)			-0.058 (-0.261)
The assistance of the Chinese govt. to help you outsource	0.007 (0.046)	0.301 (1.709)	-0.747 (-2.629)							0.359 (1.204)

Table 4-32. Detailed benefits due to factors researched from China perspective

Research Factors	Anticipated Benefits									
	The abundant supply of production workers in China			A high level of technical skill of your production workers		The low hourly cost for production workers in China			The low cost of raw materials for production	
The supply of production workers in China	0.169 (0.917)	0.11 (0.62)	0.127 (0.623)	0.426 (2.351)	0.483 (2.698)	-0.109 (-0.39)				
The productivity of the production workers in China	0.055 (0.228)	0.284 (1.458)	0.371 (1.692)	0.1 (0.414)	-0.039 (-0.2)	-0.074 (-0.19)				
The overall production cost of manufacturing in China	0.6 (2.43)	0.576 (2.45)				-0.103 (-0.26)			-0.212 (-0.36)	
The time required to manufacture products in China	-0.09 (-0.541)			0.311 (1.819)	0.289 (1.907)	-0.543 (-1.65)	-0.055 (-0.29)	-0.267 (-1.22)	-0.174 (-0.408)	
The hourly cost for production workers in China	0.313 (1.355)			-0.183 (-0.77)		0.297 (0.892)	0.212 (0.974)	-0.113 (-0.48)	0.217 (0.511)	0.389 (1.636)
The cost of raw materials for production						-0.483 (-1.21)			0.741 (1.272)	0.697 (2.766)
The ability to control manufacturing operations in China										
The achievability of the quality required from subcontractors in China	-0.333 (-1.23)			-0.334 (-1.24)					-0.494 (-0.86)	-0.287 (-0.76)
The cost of inventory for production in China						0.352 (0.827)			0.08 (0.143)	
The cost of shipping products from China						0.537 (1.029)			0.045 (0.073)	
The time required to ship products from China						0.304 (0.766)			-0.071 (-0.09)	
The protection of intellectual property										
The stability of the subcontractor's management in China				0.299 (1.063)					0.927 (1.553)	
The cultural difference between China and the U.S.				-0.498 (-2.1)					0.001 (0.002)	
The stability of the Chinese government									0.076 (0.159)	
The assistance of the Chinese govt. to help you outsource	0.007 (0.046)	0.065 (0.467)	-0.047 (-0.31)	0.301 (1.709)		-0.747 (-2.63)	-0.56 (-3.09)			

Table 4-33. Detailed benefits due to factors researched from China perspective (Continued)

Research Factors	Anticipated Benefits								
	The elimination of manufacturing overhead costs			An increase in the overall revenue of the product			An improvement in focus on your company's core functions		
The supply of production workers in China				0.262					
				(0.983)					
The productivity of the production workers in China				0.188					
				(0.505)					
The overall production cost of manufacturing in China	-0.003			-0.504			-0.283	-0.186	-0.113
	(-0.01)			(-1.38)			(-1.35)	(-0.76)	(-0.44)
The time required to manufacture products in China				0.326					
				(1.008)					
The hourly cost for production workers in China	-0.055	-0.017	-0.053	-0.208	-0.07	-0.046	-0.313	-0.318	
	(-0.25)	(-0.08)	(-0.23)	(-0.65)	(-0.34)	(-0.17)	(-1.73)	(-1.76)	
The cost of raw materials for production	0.061	0.186	-0.077	0.313			0.098		
	(0.23)	(0.742)	(-0.33)	(0.805)			(0.482)		
The ability to control manufacturing operations in China	0.512	0.515					0.151		
	(2.096)	(2.048)					(0.753)		
The achievability of the quality required from subcontractors in China	0.573			0.569	0.514	-0.088	0.156	0.09	-0.008
	(1.686)			(1.468)	(1.377)	(-0.21)	(0.545)	(0.321)	(-0.03)
The cost of inventory for production in China				1.114	1.184		0.371		
				(2.497)	(3.582)		(1.472)		
The cost of shipping products from China				-0.89	-0.637		0.271		
				(-1.89)	(-1.97)		(0.948)		
The time required to ship products from China				-0.3					
				(-0.77)					
The protection of intellectual property									
The stability of the subcontractor's management in China									
The cultural difference between China and the U.S.									
The stability of the Chinese government							-0.099		
							(-0.52)		
The assistance of the Chinese govt. to help you outsource									

Table 4-34. Detailed benefits due to factors researched from China perspective (Continued)

Research Factors	Anticipated Benefits					
	The closer proximity of mfg. facilities to markets		An increase of market presence in China			The assistance of the Chinese govt. to help you outsource
The supply of production workers in China	0.211 (0.867)		-0.229 (-0.95)			0.415 (2.049)
The productivity of the production workers in China						
The overall production cost of manufacturing in China	-0.089 (-0.23)					
The time required to manufacture products in China						
The hourly cost for production workers in China						
The cost of raw materials for production						0.15 (0.386)
The ability to control manufacturing operations in China						
The achievability of the quality required from subcontractors in China						
The cost of inventory for production in China	0.623 (1.822)	0.745 (2.201)	0.53 (1.554)	0.475 (1.486)	0.456 (1.951)	0.994 (3.581)
The cost of shipping products from China	0.011 (0.034)	0.038 (0.113)	-0.02 (-0.06)	-0.029 (-0.09)		-0.412 (-1.25)
The time required to ship products from China	-0.078 (-0.24)	-0.202 (-0.63)	0.28 (0.875)	0.327 (1.085)	0.327 (1.12)	0.114 (0.358)
The protection of intellectual property	0.067 (0.219)	0.111 (0.363)	-0.264 (-0.86)	-0.218 (-0.75)	-0.213 (-0.77)	-0.136 (-0.58)
The stability of the subcontractor's management in China						
The cultural difference between China and the U.S.	0.416 (1.268)		0.065 (0.239)			-0.462 (-1.29) -0.567 (-1.67)
The stability of the Chinese government						-0.058 (-0.26) 0.09 (0.274)
The assistance of the Chinese govt. to help you outsource						0.359 (1.204) 0.517 (1.777)

Table 4-35. Benefits due to factors researched from both U.S. & China perspectives

Factors Researched	Anticipated Benefits																	
	The abundant supply of production workers in China		The low hourly cost for production workers in China		The low cost of raw materials for production		The elimination of manufacturing overhead costs		An increase in the overall revenue of the product		An improvement in focus on your company's core functions		The closer proximity of mfg. facilities to markets		An increase of market presence in China		The assistance of the Chinese govt. to help you outsource	
The supply of production workers in China	0.034 (0.238)	0.087 (0.676)	0.058 (0.333)	0.109 (0.646)	-0.227 (-1.09)		0.222 (1.129)		-0.312 (-1.4)	-0.304 (-1.42)	-0.046 (-0.22)	-0.247 (-1.55)	-0.005 (-0.03)	-0.277 (-1.22)	-0.236 (-1.25)	-0.014 (-0.07)	0.191 (1.048)	
The productivity of the production workers in China	0.505 (3.095)	0.435 (3.125)	0.166 (0.851)	-0.008 (-0.05)	-0.241 (-1.04)		-0.023 (-0.1)		0.086 (0.349)	0.012 (0.054)	0.348 (1.492)	0.25 (1.4)		0.144 (0.566)		0.516 (2.317)		
The overall production cost of manufacturing in China	-0.052 (-0.25)	0.174 (1.01)	0.082 (0.335)	0.287 (1.228)	0.259 (0.889)	0.179 (0.682)	-0.108 (-0.39)	-0.081 (-0.38)	-0.091 (-0.29)	-0.039 (-0.14)	-0.26 (-0.88)	-0.168 (-0.62)	-0.171 (-0.76)	-0.379 (-1.64)	0.241 (0.752)		-0.276 (-0.98)	
The time required to produce products in China	-0.374 (-2.87)	-0.346 (-2.98)	-0.161 (-1.04)	-0.052 (-0.38)	0.08 (0.434)	0.091 (0.551)	0.124 (0.703)		0.273 (1.375)		-0.064 (-0.34)	-0.173 (-1.22)		-0.136 (-0.67)		-0.072 (-0.41)		
The hourly cost for production workers in China	-0.14 (-1.11)	-0.224 (-2.07)	0.206 (1.367)	0.205 (1.462)	0.424 (2.368)	0.309 (1.912)	-0.14 (-0.82)	-0.14 (-1.09)	0.274 (1.426)	0.262 (1.436)	-0.354 (-1.96)	-0.347 (-2.17)	-0.203 (-1.47)		-0.123 (-0.63)		-0.349 (-2.03)	
The cost of raw materials for production	0.006 (0.042)		0.185 (0.943)	-0.007 (-0.05)	0.424 (1.821)	0.576 (2.892)	-0.025 (-0.12)	0 (-0.01)	0.009 (0.037)	-0.114 (-0.49)	-0.059 (-0.25)	-0.203 (-0.93)	-0.379 (-2.11)		-0.014 (-0.06)		-0.088 (-0.39)	-0.247 (-1.29)
The ability to control mfg. operations in China	0.178 (0.969)		0.373 (1.69)		-0.13 (-0.49)		0.378 (1.516)	0.445 (2.898)	0.321 (1.141)		-0.053 (-0.2)	-0.017 (-0.08)	-0.217 (-1.08)		-0.427 (-1.49)		-0.108 (-0.43)	
The achievability of the quality required from subcontractors in China	-0.141 (-0.65)	-0.116 (-0.65)	0.048 (0.187)		0.161 (0.524)	0.101 (0.332)	0.274 (0.936)	0.331 (1.478)	0.304 (0.92)	0.309 (0.995)	0.276 (0.891)	0.552 (1.996)	-0.323 (-1.36)		0.011 (0.033)		-0.333 (-1.13)	
The cost of inventory for production in China	0.278 (1.893)		-0.059 (-0.34)		0.117 (0.564)	-0.037 (-0.19)	-0.065 (-0.33)		0.317 (1.415)	0.381 (1.715)	0.115 (0.55)	0.108 (0.578)	0.426 (2.654)	0.514 (2.97)	0.541 (2.363)	0.533 (2.524)	0.422 (2.106)	0.567 (2.79)
The cost of shipping products from China	0.15 (0.832)		0.121 (0.56)		-0.096 (-0.38)	-0.129 (-0.56)	0.214 (0.877)		-0.088 (-0.32)	-0.083 (-0.33)	0.506 (1.956)	0.189 (0.871)	0.224 (1.134)	0.061 (0.308)	-0.21 (-0.75)	-0.12 (-0.5)	0.076 (0.309)	-0.269 (-1.11)
The time required to ship products from China	-0.047 (-0.27)		-0.157 (-0.75)	-0.098 (-0.5)	-0.098 (-0.39)	-0.008 (-0.04)	-0.073 (-0.31)		-0.441 (-1.65)	-0.421 (-1.65)	-0.355 (-1.42)		-0.26 (-1.36)	-0.254 (-1.24)	-0.126 (-0.46)	-0.043 (-0.18)	-0.111 (-0.47)	-0.031 (-0.13)
The protection of intellectual property	0.212 (1.45)		0.314 (1.794)		0.074 (0.358)		0.055 (0.28)		0.324 (1.453)		0.376 (1.797)		0.19 (1.187)	0.326 (2.404)	0.29 (1.272)	0.348 (2.098)	0.199 (1.001)	0.232 (1.325)
The stability of the subcontractor's mgmt. in China	-0.032 (-0.18)		-0.263 (-1.19)		0.253 (0.973)	0.186 (0.832)	0.074 (0.298)		-0.326 (-1.16)		0.165 (0.627)		0.329 (1.638)		0.065 (0.229)		0.393 (1.57)	
The cultural difference between China and the U.S.	-0.38 (-2.88)		-0.087 (-0.55)		0.086 (0.464)	0.002 (0.012)	-0.239 (-1.34)		-0.037 (-0.19)		-0.133 (-0.71)		0.125 (0.867)	0.071 (0.45)	0.389 (1.892)	0.218 (1.146)	-0.391 (-2.18)	-0.336 (-1.86)
The stability of the Chinese government	-0.151 (-0.96)		-0.204 (-1.08)		0.179 (0.802)	0.122 (0.655)	0.018 (0.087)		-0.14 (-0.58)		-0.123 (-0.55)	0.009 (0.049)	0.04 (0.236)		-0.083 (-0.34)		-0.184 (-0.86)	-0.32 (-1.69)
The assistance of the Chinese govt. to help you outsource	0.141 (0.902)	0.173 (1.7)	-0.267 (-1.42)		-0.089 (-0.4)		0.053 (0.253)		0.017 (0.071)		-0.004 (-0.02)		0.348 (2.027)		0.367 (1.499)		0.418 (1.954)	0.486 (2.53)

5 Conclusions and Recommendations

5.1 Conclusions

American companies are outsourcing the production of goods to Chinese manufacturers at a growing rate. One of the 22 American companies included in the study has stopped outsourcing to China, but did outsource production to China in the recent past. All the companies researched have benefited from outsourcing production overseas to China. The single company studied that pulled their manufacturing out of China did so because of benefits that exist for manufacturing within the United States, namely manufacturing response time. The data collected through surveys indicates that American firms performed an adequate amount of research to generate an accurate expected outcome and make a decision about outsourcing to a third-party located in China. The American firms encountered what they expected. The companies did not come across any unexpected difficulties or costs in outsourcing, indicating that a sufficient amount of research was performed to develop an accurate expected outcome. The American firms also did not experience any unanticipated benefits in outsourcing to China. Each company's expected outcome of outsourcing was the same as their actual perceived outcome.

Each outsourcing arrangement is unique and each requires individual consideration. In order to make an educated decision whether or not to outsource, companies must formulate an expected outcome of a specific outsourcing arrangement by researching a set of factors. Each factor researched by a company results in an anticipated benefit or an understanding of a potential pitfall. Figure 2-2, at the end of the review of literature, graphically summarizes research factors found in the literature and denotes their potential negative or positive affect on the outsourcing arrangement. Findings from this study confirmed and questioned some of the material found in the review of literature. Figure 5-1 and the regression analyses highlight the significant findings of this thesis. The findings of this study are depicted in Figure5-1 in red typeface.

The research performed to develop an expected outcome is affected by three factors: company size, outsourcing experience, and stage of product in the production life cycle, as shown in Figure 5-1. The literature indicates that high-volume, labor-intensive, stable products are the most suitable for manufacturing in China (Dastmalchi, 2004). Forty-three percent of the American companies surveyed have products in the first stage of the product life cycle, as shown in Figure 4-11. Seventy-one percent of small American companies reported having outsourced products in the introduction stage of the product life cycle. The affect of the stage of the product life cycle on the expected outcome of outsourcing is different than shown in the literature. The American companies have successfully outsourced new products that are less stable and they assume less risk while benefiting from outsourcing.

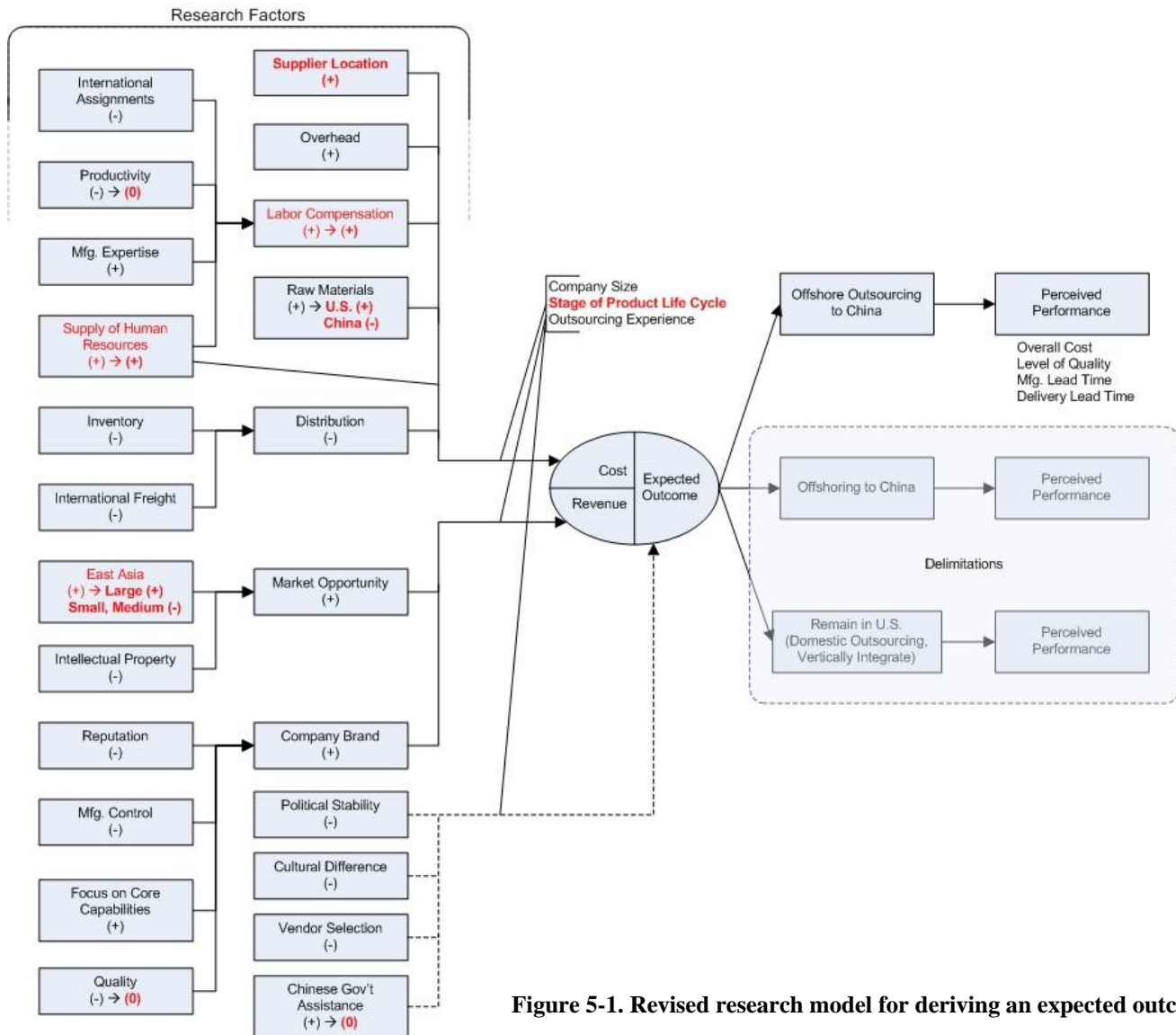


Figure 5-1. Revised research model for deriving an expected outcome for outsourcing

Abraham and Taylor identified the top reason to outsource was to save on wage and benefit payments (McCarthy, 2004). The literature constantly identified labor compensation savings a primary driver of cost savings. A significant number of American companies studied confirmed the literature and the importance of the cost of labor in outsourcing. In the box identified as “Labor Compensation” in Figure 5-1, the notation, “(+) → (+),” indicates that the study findings confirm the findings noted in the literature. The American companies believe more research into the nature of the product manufacturing will lead to increased benefit in the hourly cost for production workers in China, as shown Table 4-27. The more labor intensive production of a product is, the more value that can be appropriated by choosing to outsource to China. The more automated a production process for a product is, the less value is created from low workers’ wages.

The results of the study also confirmed the benefit of an abundant supply of production workers on low labor wages. Additionally, large American companies indicated a benefit of a strong supply of highly educated Chinese on an outsourcing arrangement. The number of Chinese attending institutions of higher education is growing.

The productivity of production workers is also connected to the labor compensation savings. The longer it takes laborers to perform an activity, the less savings are realized in the area of labor compensation. The literature reports that many American companies have found their hourly wages are reduced by producing in a third-world country, but find that it takes five times the number of hours to produce the same activity (Forrest, 2005). The regression analysis shown in Table 4-27 indicates that researching

the productivity of production workers does not significantly change the anticipated benefit of labor savings. The American companies praised the work ethic of the Chinese people in several survey questions and they perceived the manufacturing lead time to be better than average, as seen in Figure 4-12. The productivity of Chinese workers is not a benefit to American companies, but the study questions the idea of productivity as a pitfall in outsourcing.

Regression analysis indicates the more research performed on the productivity of production workers in China, the more a company might benefit from the abundant supply of production workers in China. China has the world's largest manufacturing workforce at more than 100 million and also has millions of university-educated young adults who are hard working and motivated, and work for a fraction of the salaries received by equally capable young adults in developed countries (Banister, 2005). The abundant supply of production workers is a benefit to large and medium sized American firms, according to Table 4-8.

Another factor commonly researched by companies seeking to understand an arrangement of outsourcing is the cost of raw materials. The findings of the study were mixed. The majority of American companies agreed with the literature and anticipated a benefit from the cost of raw materials used in the production process. The Chinese manufactures, however, felt differently. The Chinese firms rated the possibility of a cost benefit on raw material as the least likely benefit of outsourcing in Figure 4-4. The large Chinese manufactures viewed the benefit of material costs significantly different than the small and medium sized firms. The supply of numerous materials appears to be

decreasing with the increase in production operations and the price is rising for numerous materials, according to Chinese manufacturers visited.

On the revenue side of developing an expected outcome in Figure 5-1, the achievability of quality was seen as less of a potential pitfall than the literature depicted. The literature indicated the decision to outsource requires the ability to maintain high quality. The Chinese firms agreed and indicated that quality is a requirement in gaining U.S. business. They noted that quality is more important to U.S. companies than the lowest price or even a competitive price. The Chinese manufacturers also believe that the ability to produce quality products is the most researched factor by American companies in deciding to outsource. The International Journal of Quality & Reliability Management wrote that although quality has gained a foothold in China, the implementation is very uneven (Li, 2002). An overwhelming majority of American firms perceived quality performance of Chinese firms to be better than satisfactory, as shown in Figure 4-12. It is vital to understand the ability of the offshore manufacturer to maintain quality when making a decision to outsource. The attainability of quality by Chinese manufacturers is not an expected benefit of outsourcing; however, it does not appear to be a significant liability.

The American firms believe that more research done concerning the achievability of quality will lead to a higher benefit in terms of cost of raw materials. Table 4-27 presents an extremely high coefficient and t-statistic for the relationship of researching quality and claiming a benefit in material costs. The research of quality is not connected significantly to any other additional benefits from the regression analyses, but it prevents encountering a potential pitfall. The quality of the product is vital to the success of

outsourcing. If quality is not achieved, a cost savings benefit will be virtually impossible to recognize from outsourcing.

“Aside from taking advantage of China’s low-cost labor, materials, and overhead, producing goods overseas establishes a presence from which American companies can market their products throughout East Asia” (Dastmalchi, 2004). The literature identifies an opportunity in outsourcing to market and sell products abroad. The large American firms studied agreed. They viewed the proximity of manufacturing to foreign markets and a market presence in China as significantly more beneficial than medium and small American firms, as shown in Table 4-2. U.S. companies are expanding to new markets for growth because of domestic market saturation. Regression analysis in Table 4-30 shows a strong relationship with research of inventory costs and global distribution. Outsourcing requires an additional investment in inventory. Due to the time spent in transit, inventory increases with outsourcing. Ocean shipping typically takes three to four weeks just in transit, and even more is spent in docks, loading, inspections, unloading, storage, customs, reloading for overland transportation, etc... Finished goods are the most expensive form of inventory because they have the most investment tied up in materials, parts, labor, machine time, etc... (Forrest, 2005). The less time products are in transit, the less time cash is tied up in inventory. Both Chinese and American companies respectively claim that more research in increased inventory costs will lead to a greater benefit in terms of product distribution in China and other countries in close proximity.

The regression in Table 4-30 also shows a significant negative relationship between researching the time required to ship products and the proximity of manufacturing to potential markets. The regression indicates that the more time required

to ship is studied the less benefit is expected in selling in foreign markets. In the previous paragraph it was indicated that the inventory costs pushed for selling in China and surrounding areas. The result is the anticipated time is the realized shipping time and that time can be planned for in an outsourcing arrangement. American companies however, are unwilling or unable to manage the increased cost involved in inventory.

Performing research and developing an expected outcome required locating potential Chinese manufacturers. The Chinese companies included in the study were approached through several different methods. It is apparent that few companies receive referrals from the Chinese government of potential U.S. customers. Seventy-nine percent of the Chinese companies surveyed indicated that the Chinese government had never referred an American company to them. The method most used to locate and contact Chinese companies was through the internet and direct contact. The American company would find the Chinese company information on the World Wide Web and then contact the company to find out more information. A large amount of Chinese companies were referred U.S. business from other Chinese companies who knew of their capabilities. Some research should be completed prior to contacting manufactures in China and some issues should be handled by the potential subcontractors themselves. It is important to learn as much as possible about an outsourcing partner and build a relationship of trust (Biederman, 2005; Cravotta, 2004).

5.2 Research Recommendations

The following points are possible ideas for future research:

- Follow-up research on the relationship of factors researched and the avoidance of potential pitfalls. This research analyzed the relationship of factors researched and the benefits. What potential pitfalls, as described in the literature, are avoided by researching the decision to outsource?
- Study the cost benefit of labor in China. How does the cost of labor change from region to region, industry to industry, etc...? At what rate is the cost of labor changing in China? What factors affect the increase in labor costs?
- Perform an evaluation of shipping products from China to the United States. Develop guidelines for shipping products back to the United States.
- Follow-up research on the outsourcing of products in the introductory stage of the produce life cycle.
- Follow-up research on how company size, product life cycle, and company outsourcing experience determines the outcome(s) of an outsourcing arrangement.
- Study the reasons American companies decide to pull production from China. If a company pulls production from China, where is the production moved? Is the production done in-house? Another country? Outsourced to a domestic company?

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APPENDICES

Appendix A. Survey Cover Letter

(Originally printed on official letterhead of Brigham Young University for distribution to foreign and domestic companies.)

Michael Miles	Michael Favreau
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Friday, August 25, 2005

Survey Participant,

Brigham Young University is conducting a survey of companies that have outsourced production to China. The title of the study is: *An Evaluation of American Companies that have Outsourced Manufacturing to China: Decision-Making Processes and Overall Performance*.

We would appreciate it if someone within your company that has been involved in the decision-making process of outsourcing manufacturing to China would take the survey. The survey will take less than 10 minutes to complete.

The purpose of this research is to search for generally applicable information that can be utilized by American companies in deciding whether to outsource their production to China. This study will also investigate how companies should proceed once a careful decision has been reached to outsource production to China. As part of the research, we traveled to China to visit and interview manufacturing firms in and around the cities of Guangzhou and Shenzhen.

Only authorized persons from Brigham Young University involved in this research study will review your responses and will protect the confidentiality of the records. We guarantee that your responses will not be identified with you personally.

If you would like to receive a copy of the results of the research, please indicate so at the end of the survey.

If you have any questions, please contact Michael Favreau by phone or by email.

Sincerely,

Michael Miles

Michael Favreau

Appendix B. Survey for American Companies

Outsourcing Manufacturing to the People's Republic of China

Survey conducted by:

Michael Miles

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Michael Favreau

BYU Graduate Student

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1. What is the name of your company?

2. When was your company founded?
Year:

3. How many employees does your company currently employ?

4. What was your company's total revenue in 2004?

5. When you first considered outsourcing, which of the following were **anticipated benefits** of outsourcing production to China? The higher the number, the greater the benefit.

Definitely Not An Anticipated Benefit						Definitely An Anticipated Benefit
1	2	3	4	5		
The abundant supply of production workers in China	1	2	3	4	5	
The low hourly cost for production workers in China	1	2	3	4	5	
An increase in the overall revenue of the outsourced product	1	2	3	4	5	
The closer proximity of manufacturing facilities to markets	1	2	3	4	5	
The low cost of raw materials for production	1	2	3	4	5	
The elimination of manufacturing overhead costs	1	2	3	4	5	
An increase of market presence in China	1	2	3	4	5	
An improvement in focus on your company's core business functions	1	2	3	4	5	
The assistance of the Chinese govt. to help you outsource	1	2	3	4	5	
Other:	1	2	3	4	5	

6. In addition to the anticipated benefits of outsourcing to China, what were your **reasons for outsourcing** to a foreign country, in general?

7. What were your reasons for outsourcing to China, as opposed to other countries? (Check all that apply)

- | | |
|--|--|
| <input type="checkbox"/> Chinese Americans available to mediate relations with Chinese | <input type="checkbox"/> Negative experience in working with another country |
| <input type="checkbox"/> Good work ethic of the Chinese | <input type="checkbox"/> Relationship already established with Chinese company |
| <input type="checkbox"/> High education of the Chinese | <input type="checkbox"/> Recommendation of others |
| <input type="checkbox"/> Chinese government bends over backwards to help more than other countries | <input type="checkbox"/> Availability and options for product shipping |
| <input type="checkbox"/> Cost of labor compared to other countries | <input type="checkbox"/> Other: |
| <input type="checkbox"/> Positive experience in working with Chinese in the past | <input type="checkbox"/> Other: |
| | <input type="checkbox"/> Unknown |

Comment(s):

8. Which of the following factors were **researched and analyzed** in making your decision to outsource production to China? The higher the number, the more the factor was explored and evaluated in your decision to send production to China.

Did Not Research or Analyze						Extensive Research and Analysis Performed
1	2	3	4			5
The nature of the manufacturing of your product (i.e. automated, semi-automated, labor-intensive, etc...)	1	2	3	4	5	
The supply of production workers in China	1	2	3	4	5	
The productivity of the production workers in China	1	2	3	4	5	
The achievability of the quality required from subcontractors in China	1	2	3	4	5	
The hourly cost for production workers in China	1	2	3	4	5	

The stability of the subcontractor's management in China	1	2	3	4	5
The ability to control manufacturing operations in China	1	2	3	4	5
The overall revenue of the outsourced product	1	2	3	4	5
The time required to manufacture products in China	1	2	3	4	5
The overall production costs of manufacturing in China	1	2	3	4	5
The time required to ship products from China	1	2	3	4	5
The stability of the Chinese government	1	2	3	4	5
The manufacturing overhead costs	1	2	3	4	5
The cultural difference between China and the United States	1	2	3	4	5
The change of market presence in China	1	2	3	4	5
The protection of intellectual property	1	2	3	4	5
The cost of raw materials for production	1	2	3	4	5
The cost of shipping products from China	1	2	3	4	5
The change in focus on your company's core business functions	1	2	3	4	5
The cost of inventory for production in China	1	2	3	4	5
The assistance of the Chinese govt. to help you outsource	1	2	3	4	5
The cost of selecting a subcontractor in China	1	2	3	4	5
Other:	1	2	3	4	5

Comment(s):

9. When did your company begin outsourcing to China?

Month:

Year:

10. To how many different Chinese companies does your company outsource production?

1

2

3

4

5

6

7

8

Other:

11. Optional: What are the names of the companies that your company outsources to in China? Please respond if the names of the companies are not proprietary.

12. What does your company outsource to China? (Check all that apply)

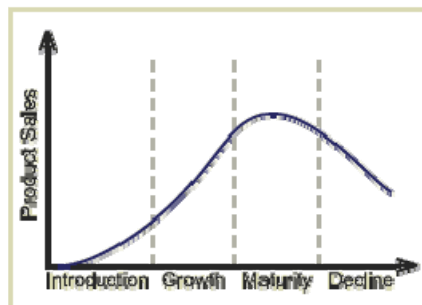
- One component of a product to a single manufacturer
- Multiple components of a product to a single manufacturer
- Multiple components of a product to different manufacturers
- Entire product to a single manufacturer
- Other:

13. How would you rate the amount of automation involved in the production of the component(s) or product(s) that you outsource to China? The higher the number, the more automation used in production.

No Automation Involved, Labor-Intensive Production					Highly Automated Production
1	2	3	4	5	

14. In what stage of the product life cycle is the product that you outsource to China?

Introduction	Growth	Maturity	Decline
--------------	--------	----------	---------



15. How would you rate your **actual performance** in the following areas after outsourcing production to China? The higher the number, the better the performance.

Very Poor		The Same		Excellent
1	2	3	4	5

The overall cost (i.e. raw materials, overhead, labor, shipping, inventory costs, etc...)	1	2	3	4	5
---	---	---	---	---	---

The quality of the product	1	2	3	4	5
The manufacturing lead time (i.e. time required to manufacture the product)	1	2	3	4	5
The delivery lead time (i.e. time required to ship the product)	1	2	3	4	5

16. Were there **unanticipated benefits** that you received from outsourcing to China?

Much Less Than Expected					Much Greater Than Expected
1	2	3	4	5	

17. Were there **unanticipated costs** that you encountered in outsourcing to China?

Much Greater Than Expected					Much Less Than Expected
1	2	3	4	5	

18. Were there difficulties that you faced in outsourcing to China?

Much Greater Than Expected					Much Less Than Expected
1	2	3	4	5	

19. Based on your current experience would you outsource to China again?

Definitely Would Not Outsource to China					Definitely Would Outsource to China
1	2	3	4	5	

20. If you would not outsource to China again, what would you do? (Check one answer)

- Outsource manufacturing to another country
What country?
- Outsource manufacturing to a domestic manufacturer
- Not outsource at all and keep manufacturing in-house

21. Is there anything that you would like to add to the survey? If so, please add your comments here.

Would you like to receive a copy of the results of the study? Yes No

Thank you for taking the time to participate in this survey.

Appendix C. Survey for Chinese Companies (Chinese)

来自美国的生产加工业务

问卷起草人:

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你的公司的名称是什么?

1. 你的公司是什么时候创立的?

年:

2. 你的公司大约有多少员工?

3. 你的公司在2004的营业额是多少?

4. 在美国公司外包生产加工业务给你们公司时, 你认为他们可以得到下列哪些益处?
数字越大, 代表好处越多。

	美国公司得到很少 或没有益处					美国公司受益极大				
	1	2	3	4	5	1	2	3	4	5
充足的劳动力资源				1	2	3	4	5		
低廉的工人工资				1	2	3	4	5		
不断增长的来自美国公司产品的营业额				1	2	3	4	5		
市场上更多的生产设备				1	2	3	4	5		
廉价的生产原材料				1	2	3	4	5		
消除美国公司的生产固定成本				1	2	3	4	5		
增加美国公司在中国市场上的知名度				1	2	3	4	5		
增强美国公司的核心竞争力				1	2	3	4	5		
中国政府对美国公司外包业务的帮助和支持				1	2	3	4	5		
一线工人的技术水平				1	2	3	4	5		
其他:				1	2	3	4	5		

5. 什么是美国公司把生产外包到中国，而不是其他的国家，的最重要的原因？
(选择一个)

- | | |
|--|-----------------------------------|
| <input type="checkbox"/> 美籍华人在美国推进中美关系 | <input type="checkbox"/> 其他国家推荐中国 |
| <input type="checkbox"/> 中国的工作精神 | <input type="checkbox"/> 便捷的船务运输 |
| <input type="checkbox"/> 中国的高教育水平 | <input type="checkbox"/> 中国人的技能 |
| <input type="checkbox"/> 中国政府愿意帮助其他国家 | <input type="checkbox"/> 其他： |
| <input type="checkbox"/> 跟其他国家相比的劳动力成本 | <input type="checkbox"/> 未知 |

6. 美国公司用下列哪些**方法找到并联系你们公司**来得到生产加工的报价？数字越大，表示方法的使用频率越高。

从来没用过	用得最多				
1	2	3	4		
1	2	3	4	5	
美国公司通过广告找到你们公司并直接向你们询价	1	2	3	4	5
美国公司通过互联网找到你们公司并直接向你们询价	1	2	3	4	5
美国公司通过一家中国公司介绍找到你们公司并直接向你们询价	1	2	3	4	5
美国公司通过另一家美国公司介绍找到你们公司并直接向你们询价	1	2	3	4	5
美国公司通过一家美国专门从事外包业务的中介找到你们公司并向你们询价	1	2	3	4	5
美国公司通过一家中国专门从事外包业务的中介找到你们公司并向你们询价	1	2	3	4	5
美国公司通过中国政府找到你们公司并直接向你们询价	1	2	3	4	5

7. 你们公司需要客户提供哪些资料来对某一个产品加工进行报价？
(选择所有合适的选项)

- 完成产品的工程图，包括耐用性和原材料
- 提供样品
- 描述生产工序
- 加工的产品数量和要求的时间
什么时间段？
- 其他：
- 其他：

8. 除了有竞争力的报价外, 你们公司提供其他什么样的条件来让美国公司选择你们公司来加工他们的产品? (选择所有合适的选项)

- 描述你们的生产设备和产能 (例如, 录像, 宣传单, 宣传册)
- 邀请美国公司参观厂房设施
- 介绍你们公司的质量, 性能, 创新的历史
- 展示你们公司曾为别的公司生产的产品
- 礼物
- 其他:

9. 美国公司**调查和分析**哪些因素以决定外包加工业务给你们公司? 数字越大, 因素在美国公司评估和做决定时起的作用越大。

	没有调查和分析					大量的调查和分析				
	1	2	3	4	5	1	2	3	4	5
你的工人的供应				1	2	3	4	5		
你的工人的生产效率				1	2	3	4	5		
你们公司达到美国公司质量要求的能力				1	2	3	4	5		
你们公司的工人每小时工资				1	2	3	4	5		
你们公司的管理能力				1	2	3	4	5		
美国公司控制你们公司生产运作的的能力				1	2	3	4	5		
你们公司生产所需的时间				1	2	3	4	5		
你们公司的生产成本				1	2	3	4	5		
你们公司发货到美国公司所需的时间				1	2	3	4	5		
中国政府的稳定性				1	2	3	4	5		
中美之间的文化差异				1	2	3	4	5		
你们公司对美国公司的知识产权的保护				1	2	3	4	5		
生产原材料的成本				1	2	3	4	5		
运输成本				1	2	3	4	5		
由于运输时间而产生的仓储成本				1	2	3	4	5		

中国政府对加工业务的支持	1	2	3	4	5
--------------	---	---	---	---	---

你们公司总的加工的成本	1	2	3	4	5
-------------	---	---	---	---	---

其他:	1	2	3	4	5
-----	---	---	---	---	---

其他:	1	2	3	4	5
-----	---	---	---	---	---

评论:

10. 美国公司对你们公司接受业务有什么要求？（把你的回答按从1到6 排序，1 为对你们公司要求最多，6为对你们公司要求最少）

什么样的公司对你们公司要求最少					什么样的公司对你们公司要求最多
1	2	3	4	5	6

- 比其他任何公司的报价都低
- 有竞争力的报价，但并不一定是最低的
- 一致的生产时间
- 稳定质量的能力
- 保障知识产权的保护
- 在其他美国公司之间好的口碑

评论:

11. 为了得到美国公司的业务，你们公司会让步到什么限度？

12. 你们公司为多少不同的美国公司生产产品？

1 2 3 4 5 6 7 8 其他：

13. 可选择的：你们代加工的美国公司的名称？如果这些名称不涉及商业秘密。

14. 为了接到美国公司的业务，你们公司做了哪些具体调整？

（例如：工序，质量，培训，客户沟通，客户关系，技术能力）

15. 你怎样评价你们公司在生产美国公司产品时的自动化程度？数字越大，代表自动化程度越高。

没有创新，劳动力密集型					高度自动化生产	
1	2	3	4	5		

16. 你怎样评价你门公司的实际表现？数字越大，表现越好。

很差					极好	
1	2	3	4	5		

总的成本 （例如：原材料，固定成本，人工，船运，仓储，等）	1	2	3	4	5
生产的产品质量	1	2	3	4	5
生产所需时间（例如：生产所花的时间）	1	2	3	4	5
发货时间（例如：从完工到美国收货的时间）	1	2	3	4	5

17. 你还有其他的可以加在这张问卷中？如果有，请加在这儿。

你愿意收到这个研究的结果吗？

是

否

谢谢你参与这张问卷。

Appendix D. Survey for Chinese Companies (English)

Outsourced Manufacturing from the United States of America

Survey conducted by:

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1. What is the name of your company?

2. When was your company founded?
Year:

3. Approximately how many employees does your company currently employ?

4. What was your company's total revenue in 2004?

5. Which of the following are **benefits that you think U.S. companies receive** when outsourcing their manufacturing to your company? The higher the number, the greater the benefit.

	Little or No Benefit to U.S. Companies				Extremely Beneficial to U.S. Companies			
	1	2	3	4	5			
The abundant supply of production workers				1	2	3	4	5
The low hourly cost for your production workers				1	2	3	4	5
An increase in the overall revenue of the U.S. company's product				1	2	3	4	5
The closer proximity of manufacturing facilities to markets				1	2	3	4	5
The low cost of raw materials for production				1	2	3	4	5
The elimination of manufacturing overhead costs for the U.S. company				1	2	3	4	5
An increase of market presence for the U.S. company in China				1	2	3	4	5
An improvement in focus on the U.S. company's core business functions				1	2	3	4	5
The assistance of the Chinese govt. to help the U.S. company outsource				1	2	3	4	5
A high level of technical skill of your production workers				1	2	3	4	5
Other:				1	2	3	4	5

6. What is the top reason why U.S. companies should outsource to China, as opposed to other countries? (Select one)

- Chinese Americans available in U.S. to mediate relations with Chinese
- Good work ethic of the Chinese
- High education of the Chinese
- Chinese government willing to help more than other countries
- Cost of labor compared to other countries
- China recommended by other companies
- Availability and options for product shipping
- Technical skill of the Chinese
- Other:
- Unknown

7. Which of the following are **methods that U.S. companies use to locate and contact your company** for a quote on manufacturing their product? The higher the number, the more often that method is used to request a quote.

Never Used	Extensively Used				
1	2	3	4	5	
U.S. company finds your company through some form of advertisement and contacts you directly for a quote	1	2	3	4	5
U.S. company finds your company on the internet and contacts you directly for a quote	1	2	3	4	5
U.S. company is referred to your company by a Chinese company and contacts you directly for a quote	1	2	3	4	5
U.S. company is referred to your company by a U.S. company and contacts you directly for a quote	1	2	3	4	5
U.S. company works through a U.S. company that specializes in outsourcing and contacts your company for a quote	1	2	3	4	5
U.S. company works through a Chinese company that specializes in outsourcing and contacts your company for a quote	1	2	3	4	5
U.S. company works through the Chinese government and contacts your company directly for a quote	1	2	3	4	5
Other:	1	2	3	4	5

8. What information does your company require from a company in order to make a quote on the manufacturing of a product? (Check all that apply)

- Complete engineering drawings of the product, including tolerances and materials
- Prototype or sample of the product
- Description of the processes to manufacture the product

- Quantity of the product to be manufactured over some specified period of time
What period of time?
- Other:
- Other:

9. Besides a competitive quote, what does your company provide a U.S. company to help them decide to outsource their manufacturing to your company? (Check all that apply)

- Description of your manufacturing facilities and its capabilities (i.e. video, pamphlet, brochure)
- Invitation to U.S. company to visit your manufacturing facilities
- Description of your company's history in quality, reliability, ingenuity, etc...
- References from other companies that your company has manufactured products for in the past
- A gift
- Other:
- Other:

10. Which of the following factors do U.S. companies **research and analyze** in making the decision to outsource production to your company? The higher the number, the more the factor is explored and evaluated by U.S. companies in making their decision to send their production to your company.

Did Not Research or Analyze	Extensive Research and Analysis Performed				
	1	2	3	4	5
Your supply of production workers	1	2	3	4	5
The productivity of your production workers	1	2	3	4	5
The ability of your company to achieve the quality required by the U.S. company	1	2	3	4	5
The hourly cost for your production workers	1	2	3	4	5
The ability of your company's management	1	2	3	4	5
The ability of the U.S. company to control manufacturing operations with your company	1	2	3	4	5
The lead time required for your company to manufacture products	1	2	3	4	5
The overall production costs of manufacturing with your company	1	2	3	4	5
The time required to ship products from your facilities to the U.S. company	1	2	3	4	5

The stability of the Chinese government	1	2	3	4	5
The cultural difference between China and the United States	1	2	3	4	5
The protection of the U.S. company's intellectual property with your company	1	2	3	4	5
The cost of raw materials for production	1	2	3	4	5
The cost of shipping products from your facilities	1	2	3	4	5
The cost of additional inventory for production due to the time required to ship products to the U.S. company	1	2	3	4	5
The assistance of the Chinese govt. to help them outsource	1	2	3	4	5
The total cost of outsourcing production to your company	1	2	3	4	5
Other:	1	2	3	4	5

Comment(s):

11. What do U.S. companies demand from your company for you to receive their business?
(Rank the responses below from 1 to 6. 1 being what companies demand the most from your company and 6 being what companies demand the least of from your company.

What companies demand the least of from your company					What companies demand the most from your company
1	2	3	4	5	6

- Lower quote than all other companies
- Competitive quote, but not necessarily the lowest price of all other companies
- Consistent manufacturing lead times
- Ability to maintain high quality

- A surety that your company can protect intellectual property
- Good references in manufacturing from other U.S. companies

Comment(s):

12. What limit would your company go to in order to secure the business of a U.S. company?

13. How many different U.S. companies does your company manufacture products for?

1 2 3 4 5 6 7 8 Other:

14. Optional: What are the names of the U.S. companies that your company manufactures products for? Please respond if the names of the companies are not proprietary.

15. What specific adjustments did your company make as a result of U.S. companies outsourcing production to your company? (i.e. processes, quality, training, customer communication, customer relationship, technical skill)

16. How would you rate the amount of automation your company uses in manufacturing products for U.S. companies? The higher the number, the more automation that is used in your manufacturing processes.

No Automation Involved, Labor- Intensive Production					Highly Automated Production
1	2	3	4	5	

17. How would you rate your **actual performance** in the following? The higher the number, the better the performance.

Very Poor				Excellent
-----------	--	--	--	-----------

	1	2	3	4	5
The overall cost (i.e. raw materials, overhead, labor, shipping, inventory costs, etc...)	1	2	3	4	5
The quality of the products that you manufacture	1	2	3	4	5
The manufacturing lead time (i.e. time required to manufacture the product)	1	2	3	4	5
The delivery lead time (i.e. time required to ship the product to the U.S. company)	1	2	3	4	5

18. Is there anything that you would like to add to the survey? If so, please add your comments here.

Would you like to receive a copy of the results of the study? Yes No

Thank you for taking the time to participate in this survey.

Appendix E. U.S. Survey Results

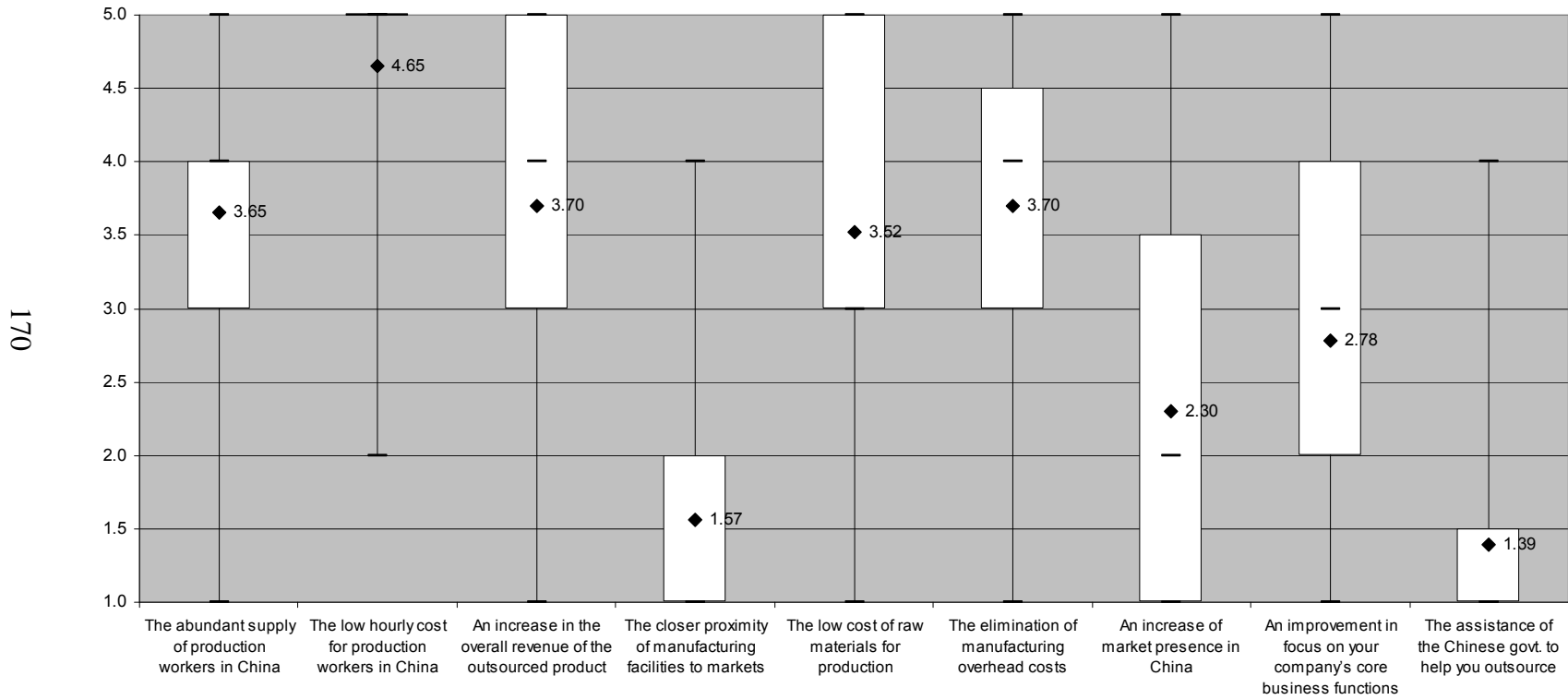


Figure E-1. Results to U.S. Survey Question 5

Table E-1. Written responses to U.S. Survey Question 6

Customers were/are applying price pressure. We need to reduce costs to maintain margins.
It also allowed us to learn and maintain an understanding of what China's capabilities were and how they progressed to be as time went by. Also, since many manufacturers are producing in China, it allows us to see the industry trends first hand before the end products actually hit the retail market in the U.S.
Lower labor, overhead. Increased margins, profitability
Meet product cost reduction needs in order to compete with our major competitors who were also going offshore or to Mexico.
Key suppliers had also moved to Mexico, then on to China. This made retaining production in North America even more costly.
The ability to lower our cost of goods and provide our customers with competitive pricing while maintaining a good profit margin for our company.
Cost! Commodity products. Lower price for finished/packaged goods.
First and foremost lower cost without the sacrifice of quality. Corporate decision to move significant amounts of components to low cost country regions in the world.
Closer alignment of manufacturing with customers. Leverage investments in PPE to secure additional business in the region.
There were three main reasons to outsource: 1. To remain competitive in the face of world competition required cost basis that could not be obtained in the USA for apparel production 2. The ability to use the companies financials to concentrate on design, delivery, and brand development 3. To have the ability to grow rapidly, as apparel production was almost impossible to attract skilled workers in the USA
None really. It needs to be done to be price competitive, because all our competitors do the same thing.
Lower cost of finished goods, China has much faster ramp up time than in other countries, proximity to European, Canadian, and Mexican markets, reduced import tariffs.
1. Improve profit margins by lowering product costs 2. Improve competitiveness with other companies outsourcing to low-cost areas 3. Broaden product line w/o investing in additional domestic manufacturing equipment, capacity, and resources
Cost of product. Quality of product.
The nature of our product and channels we serve dictate a need to have world class cost position. This drove us to look outside the U.S. and western Europe.
Low cost of goods is the primary driver.
In order to be price competitive in our market we were forced to outsource to areas with lower manufacturing costs.
It is not our goal to outsource to a foreign country. Rather, in some cases, it is required, in order to get the most competitive costs for select products.
Low cost labor, low cost materials, low cost overhead support, required by customers who had already located to China, local China market opportunity.

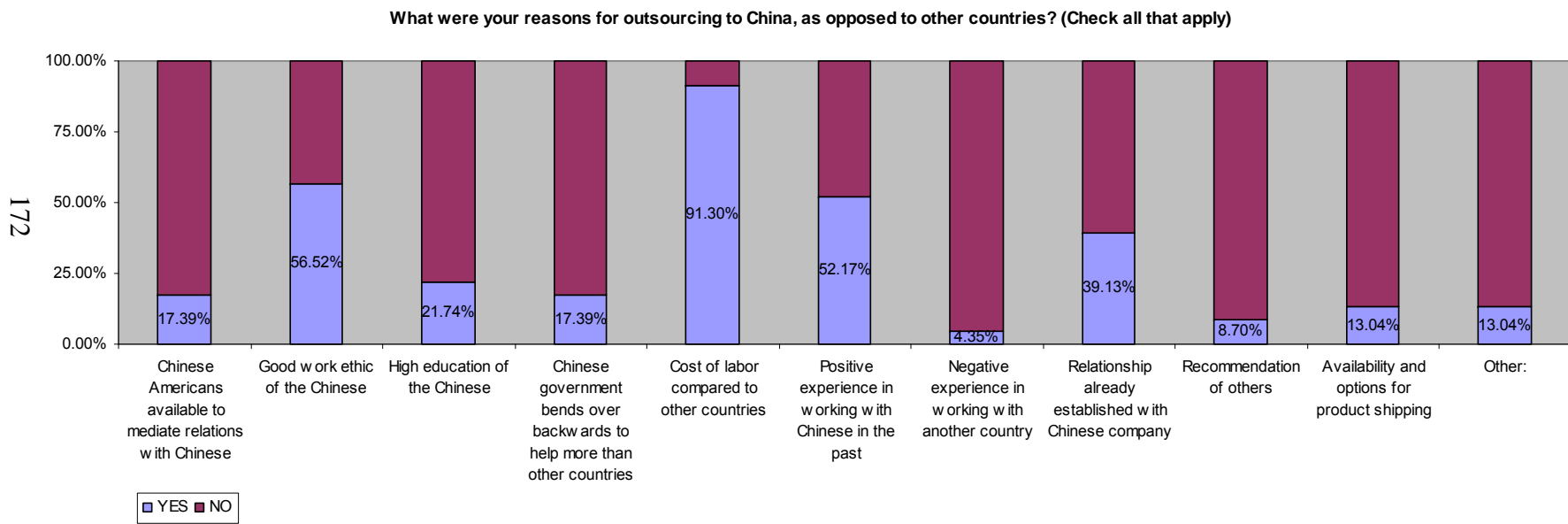


Figure E-2. Results to U.S. Survey Question 7

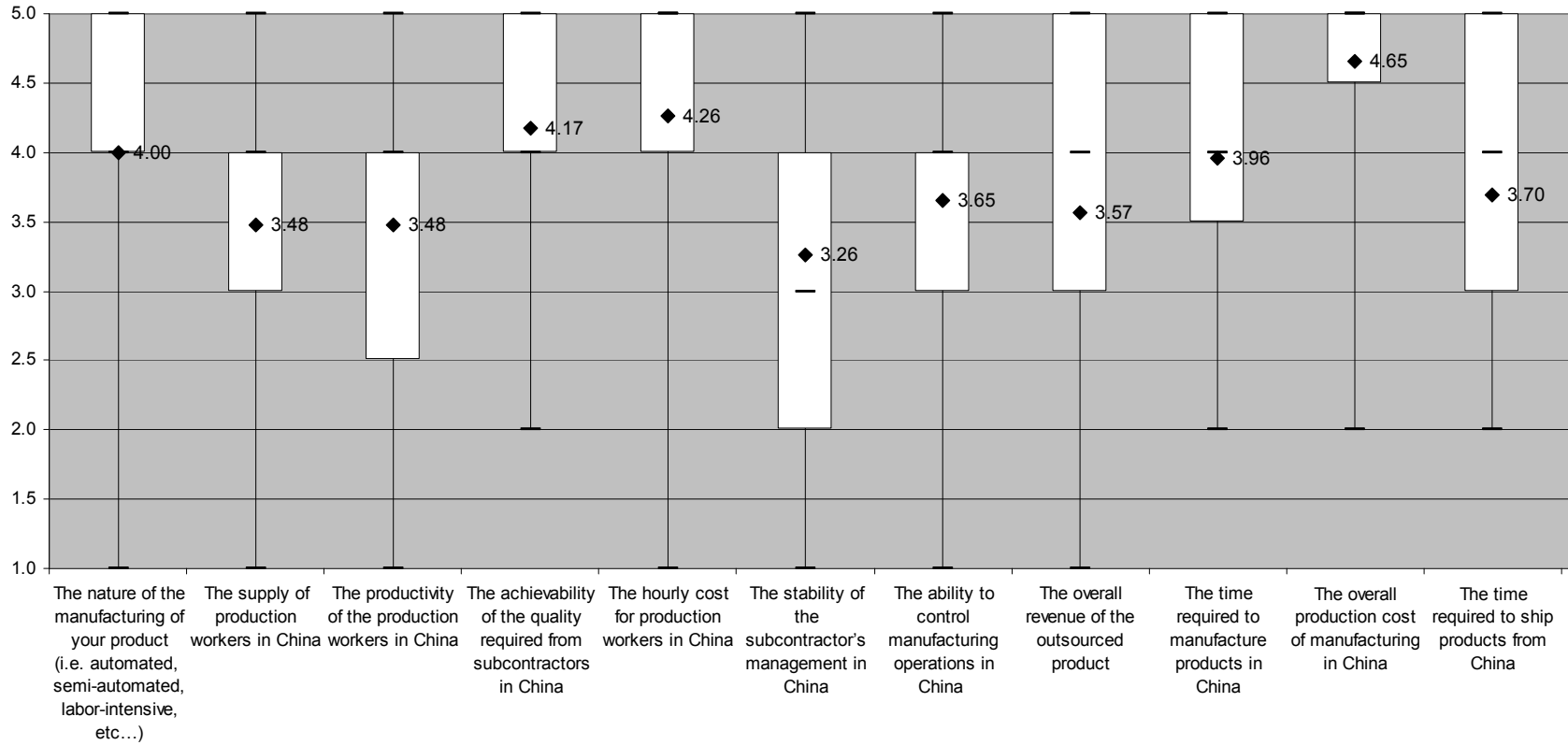


Figure E-3. Results to U.S. Survey Question 8

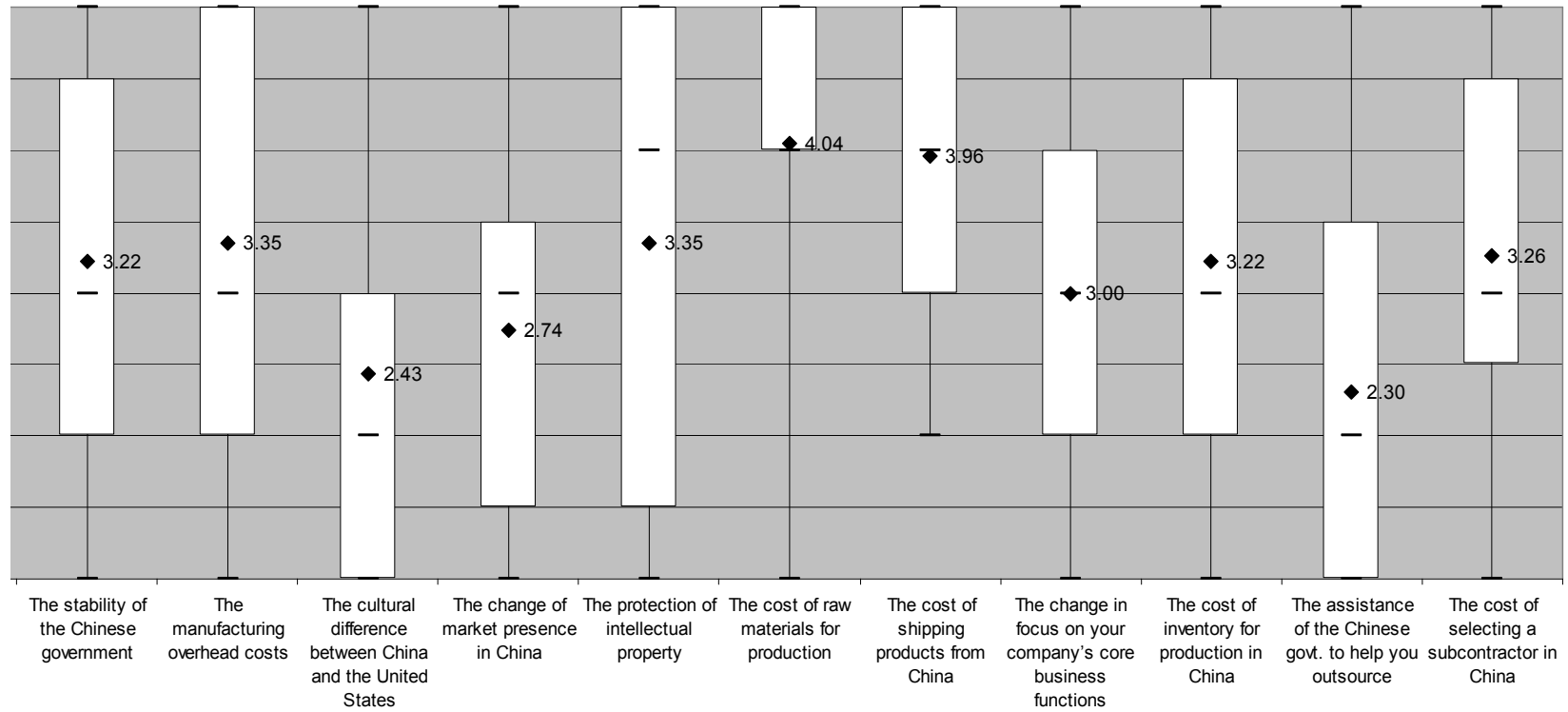


Figure E-4. Results to U.S. Survey Question 8 (Continued)

When did your company begin outsourcing to China?

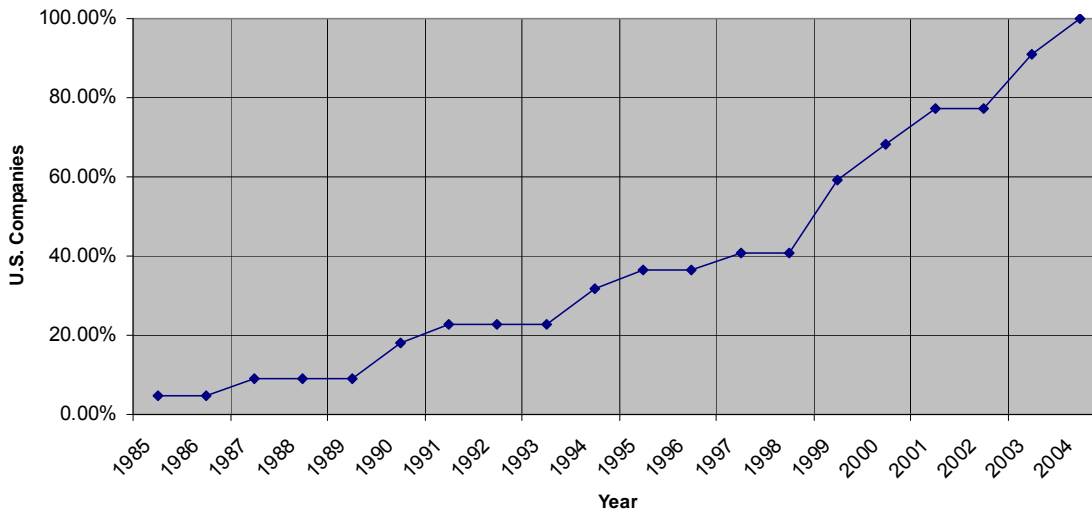


Figure E-5. Results to U.S. Survey Question 9

What does your company outsource to China? (Check all that apply)

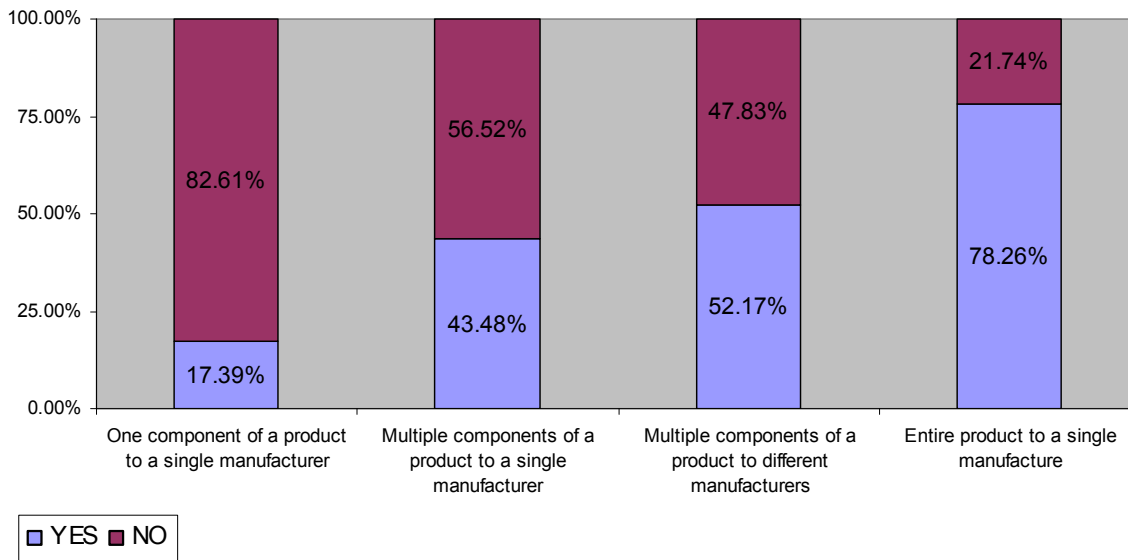


Figure E-6. Results to U.S. Survey Question 12

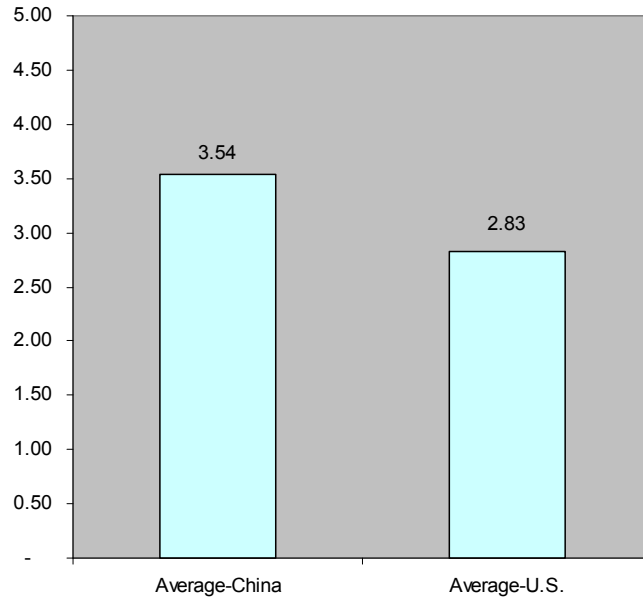


Figure E-7. Average results to U.S. Survey Question 13 & China Survey Question 16

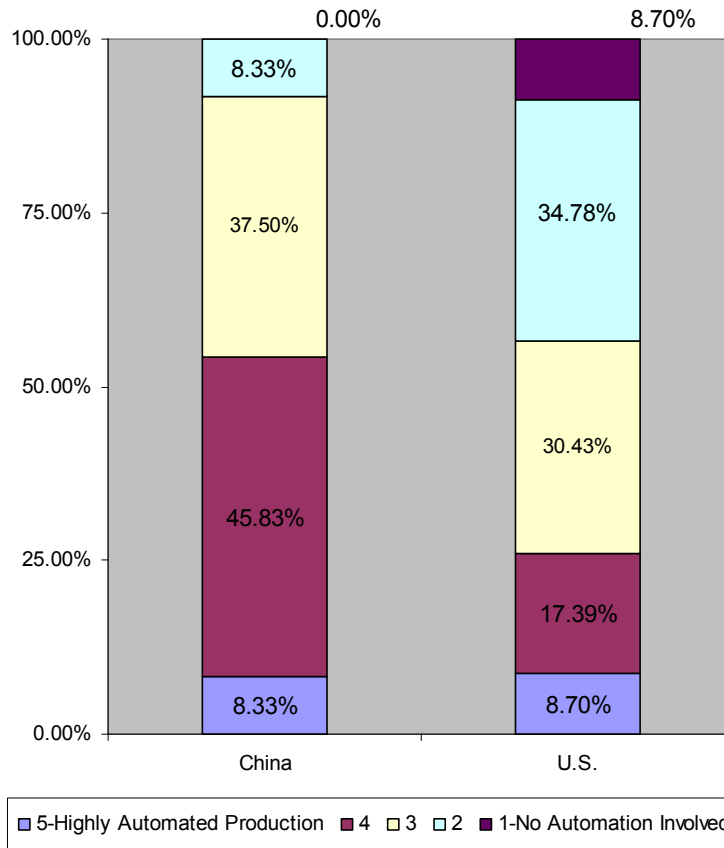


Figure E-8. Results to U.S. Survey Question 13 & China Survey Question 16

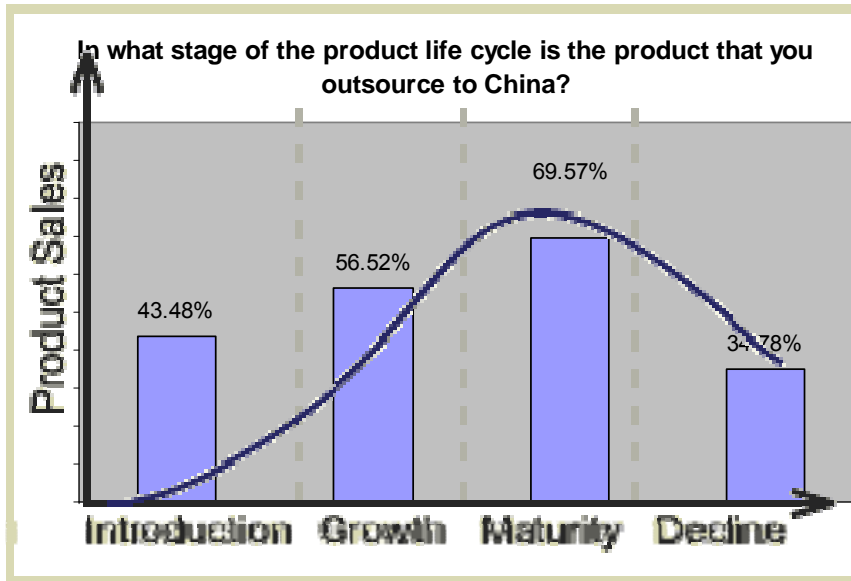


Figure E-9. Results to U.S. Survey Question 14

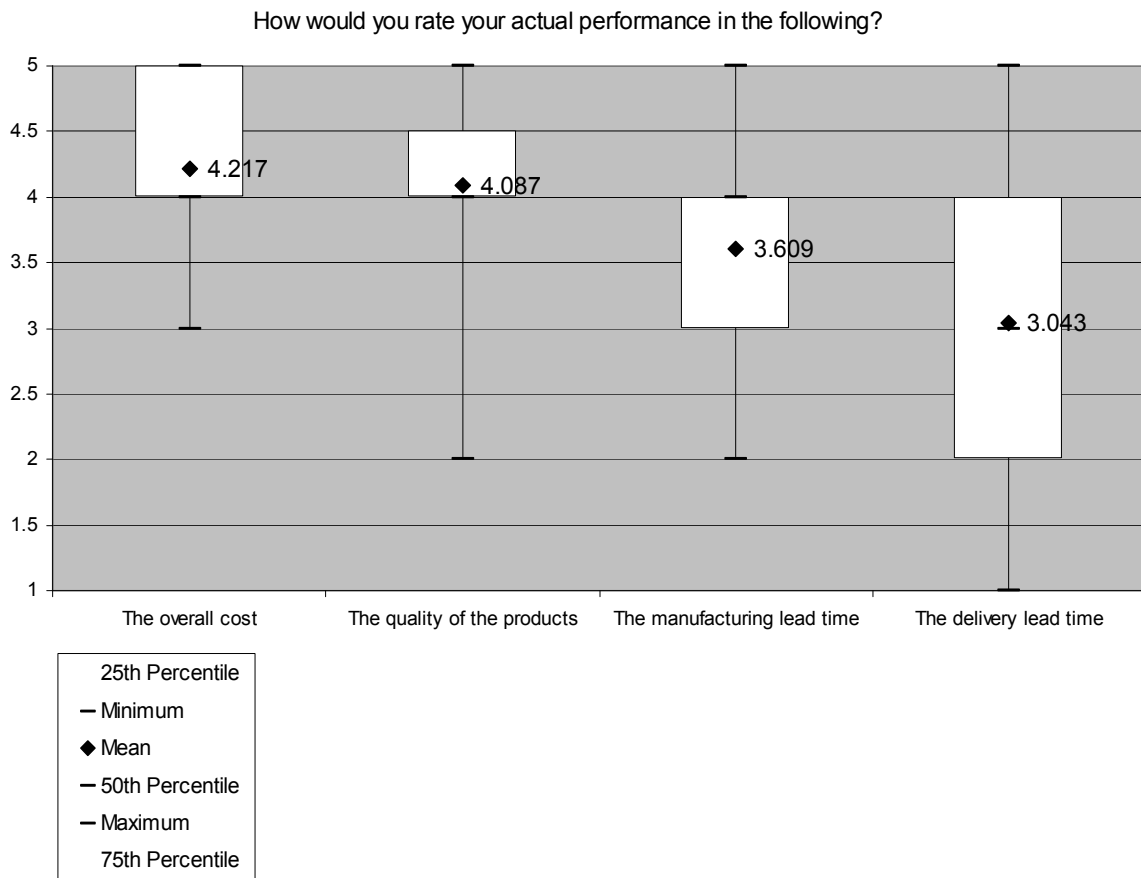


Figure E-10. Results to U.S. Survey Question 15

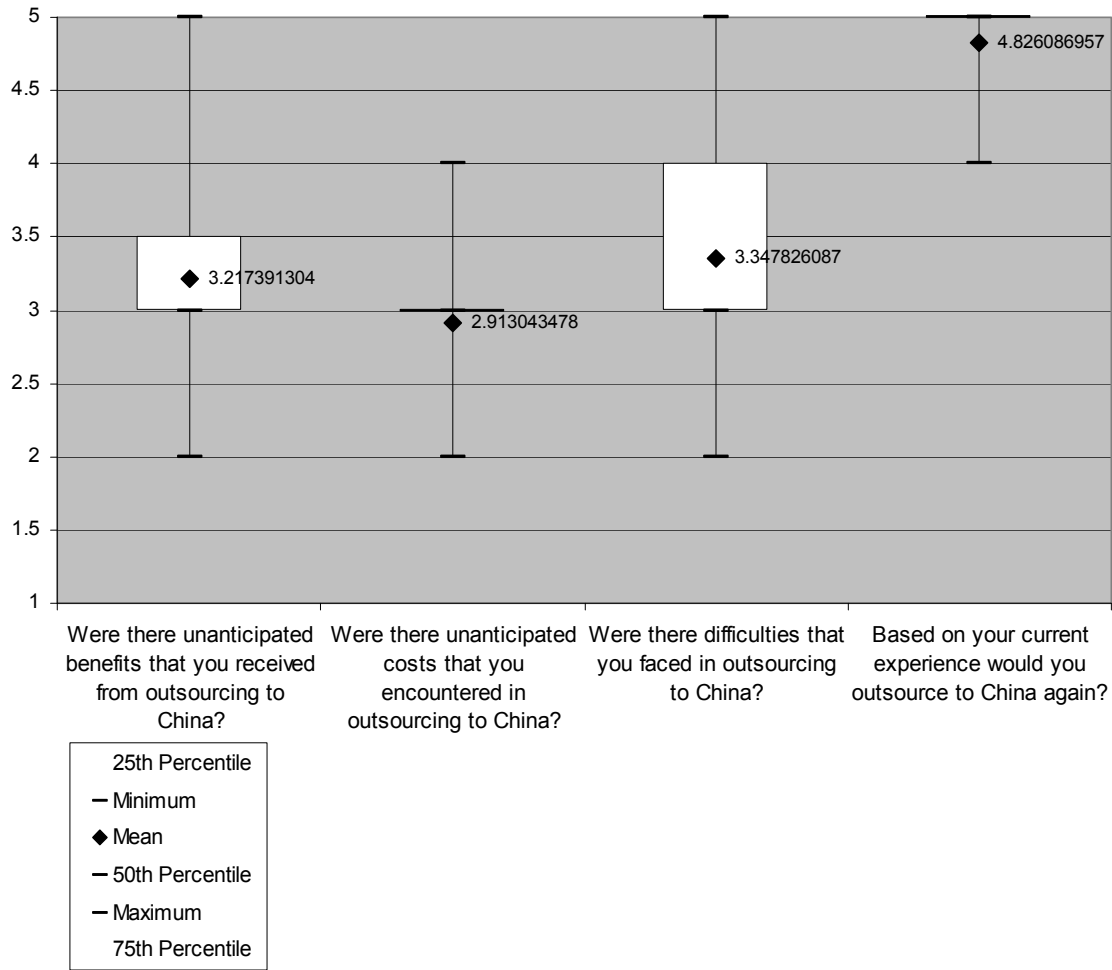


Figure E-11. Results to U.S. Survey Questions 16, 17, 18, & 19

Appendix F. China Survey Results

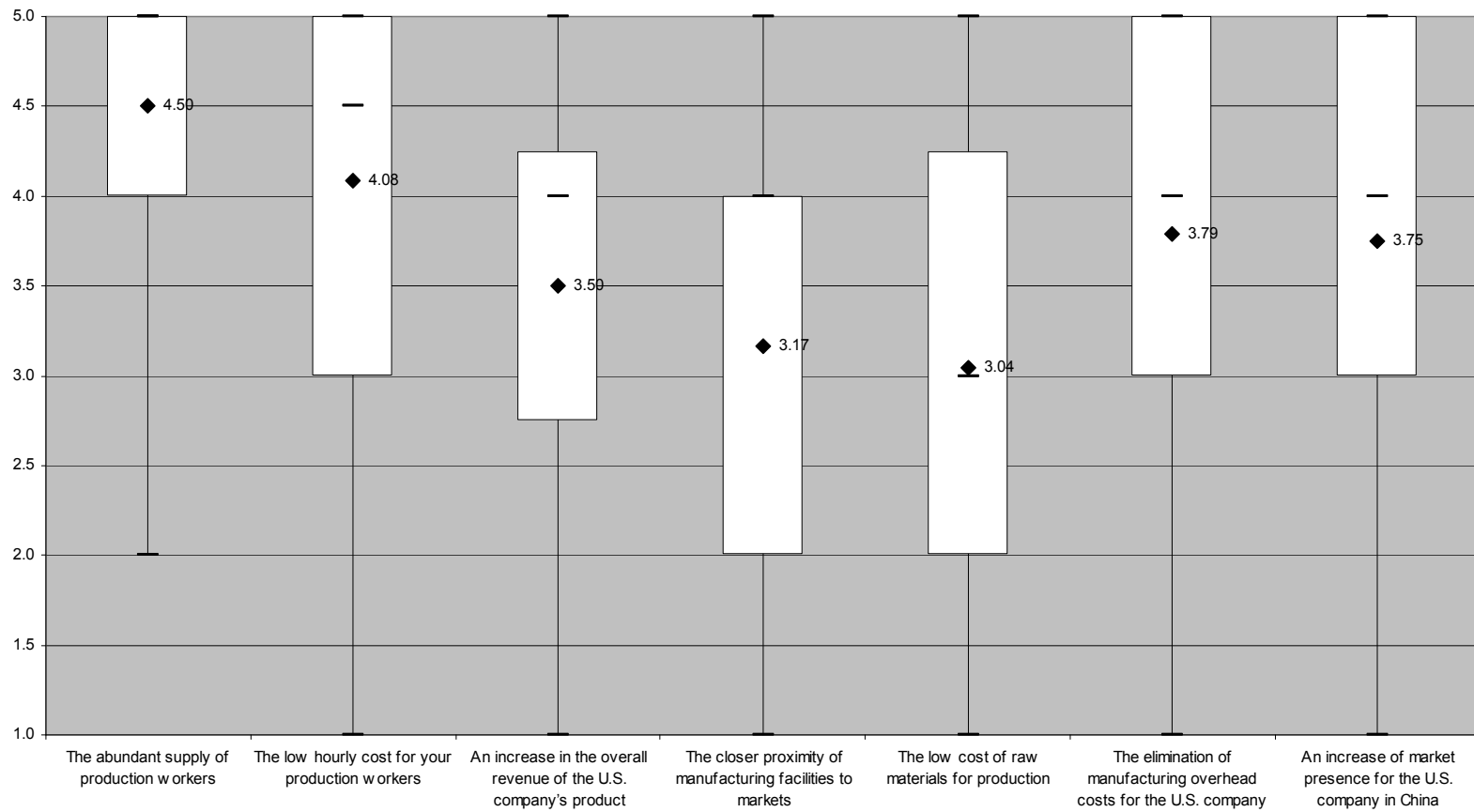


Figure F-1. Results to China Survey Question 5

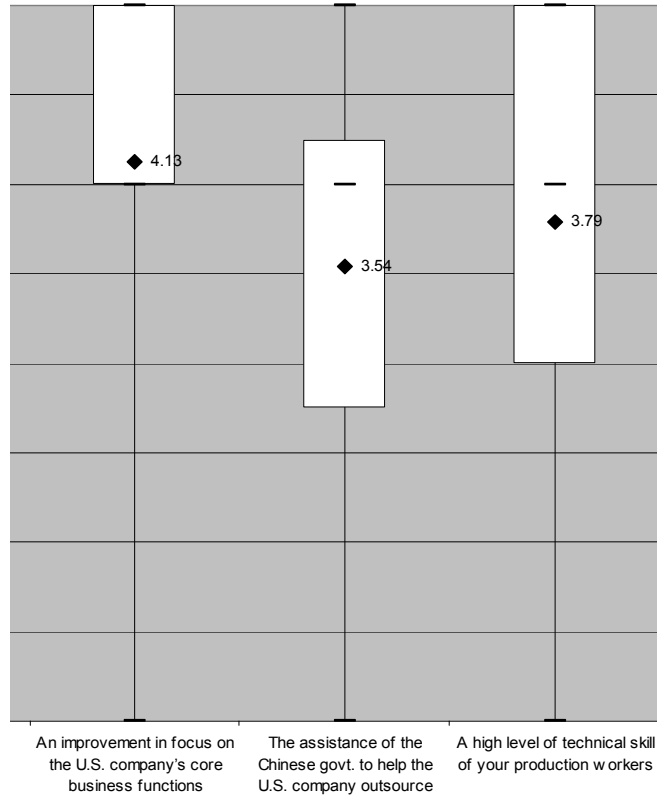


Figure F-2. Results to China Survey Question 5 (Continued)

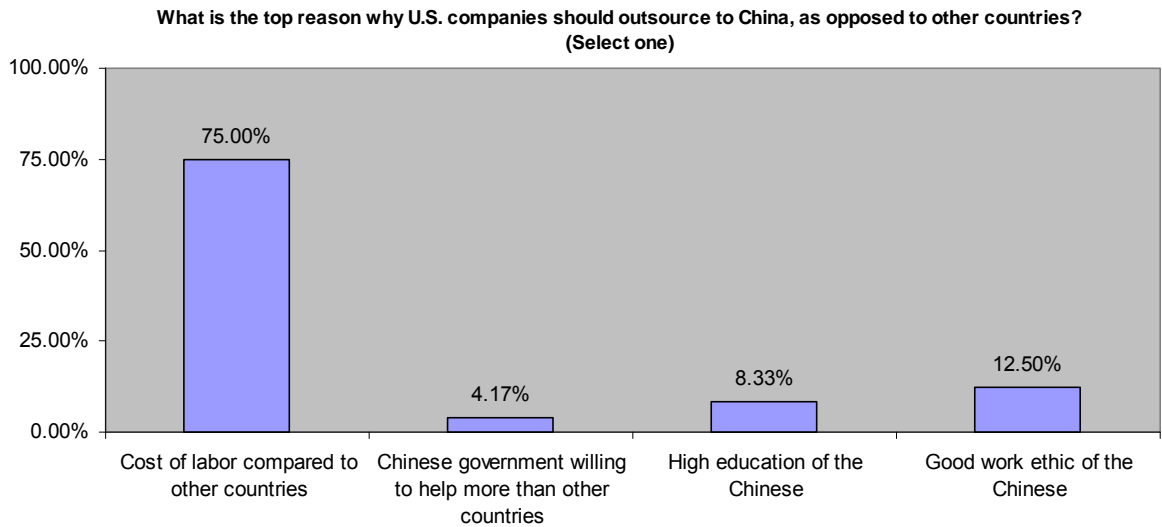


Figure F-3. Results to China Survey Question 6

Which of the following are methods that U.S. companies use to locate and contact your company for a quote on manufacturing their product? The higher the number, the more often that method is used to request a quote.

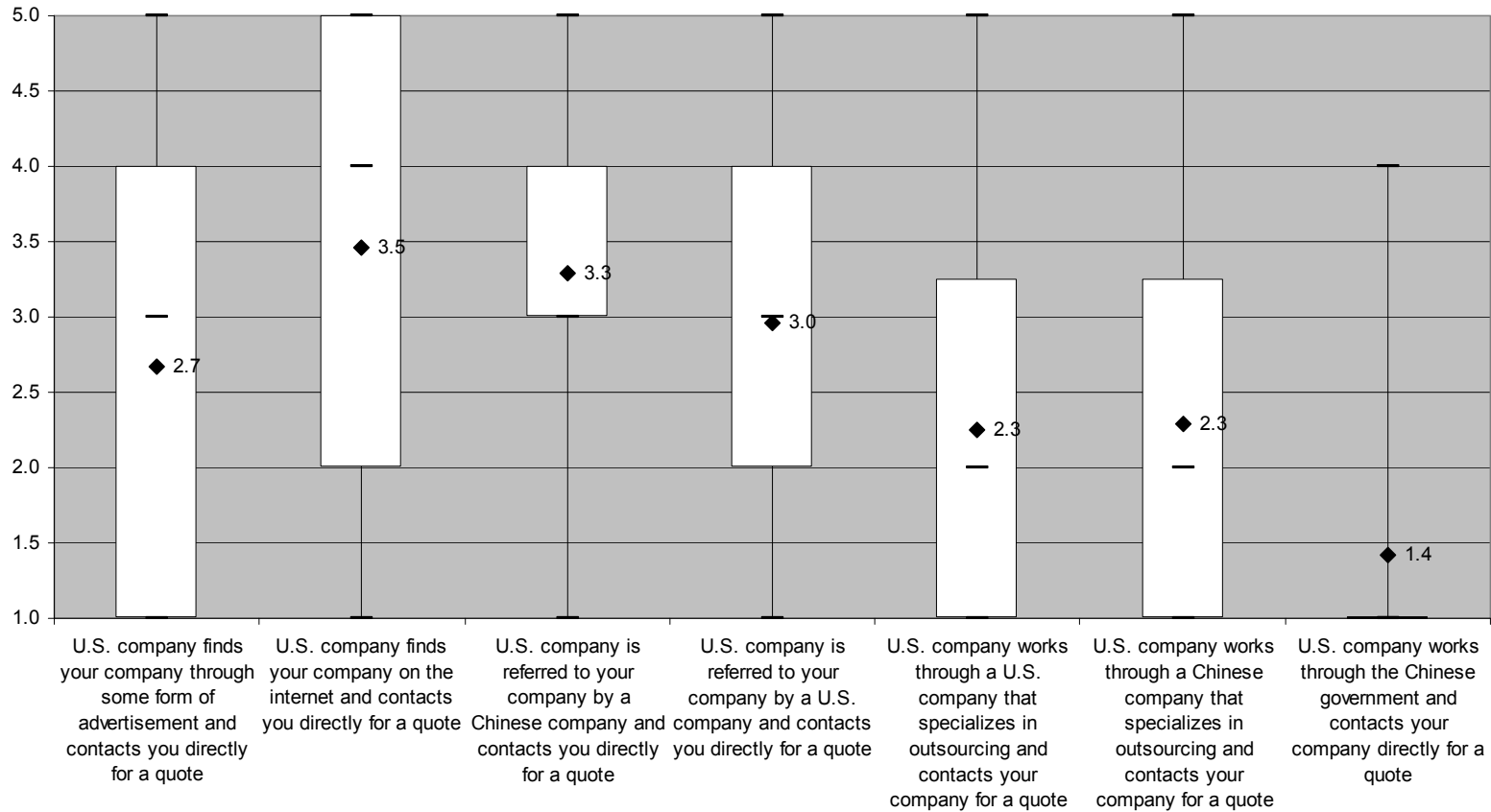


Figure F-4. Results to China Survey Question 7

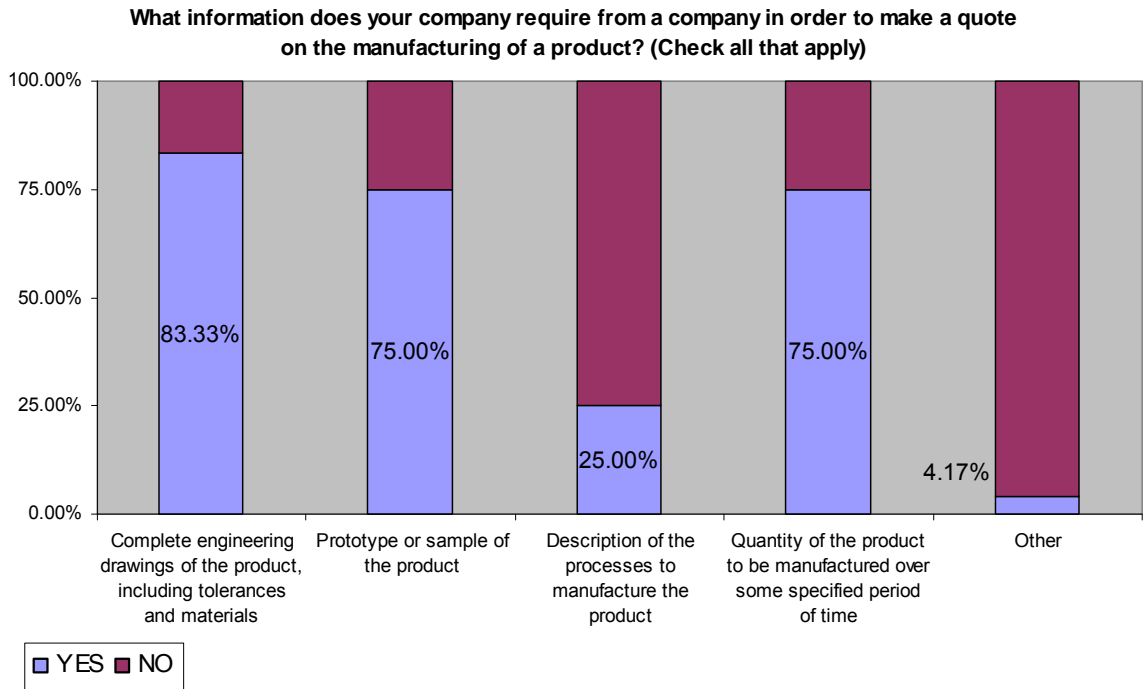


Figure F-5. Results to China Survey Question 8

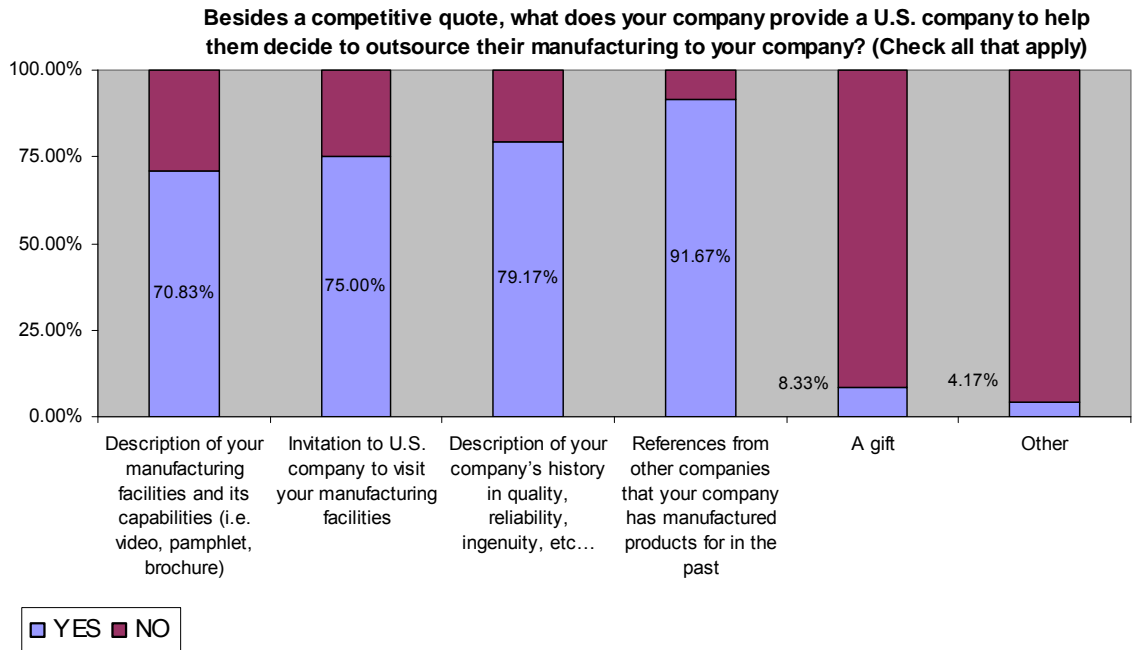


Figure F-6. Results to China Survey Question 9

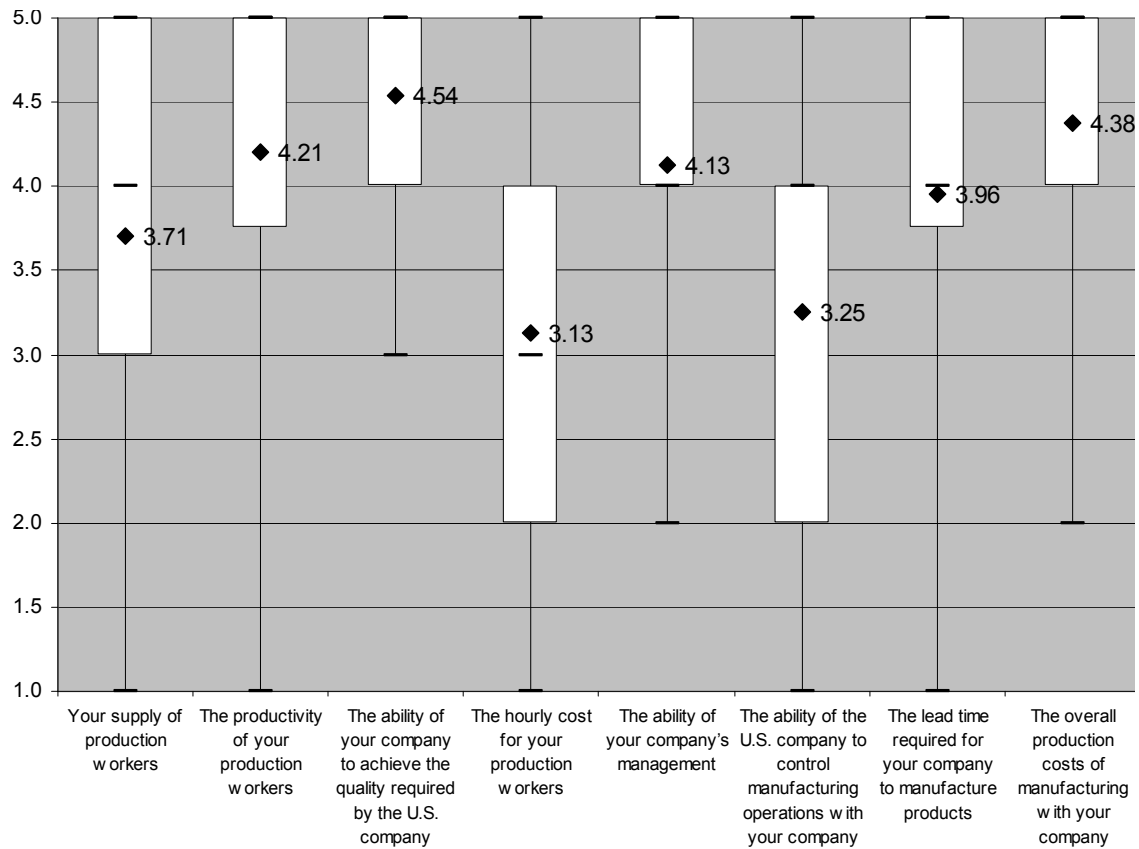


Figure F-7. Results to China Survey Question 10

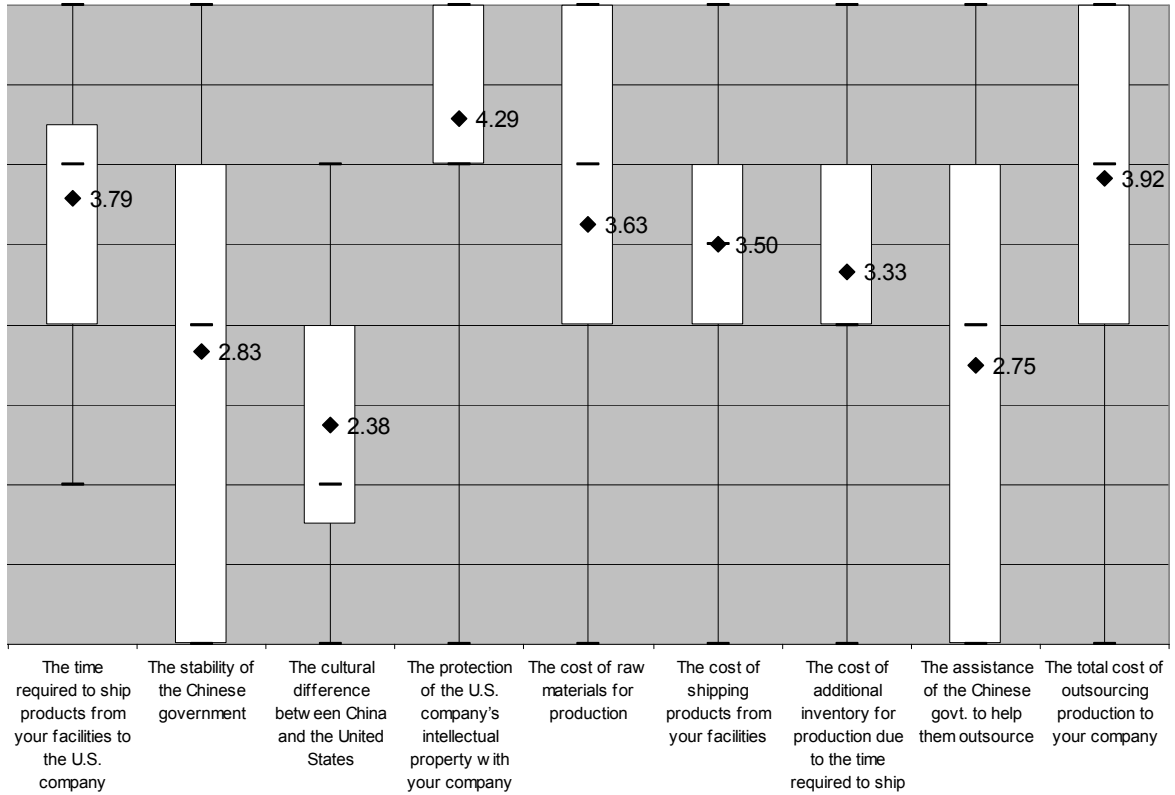


Figure F-8. Results to China Survey Question 10 (Continued)

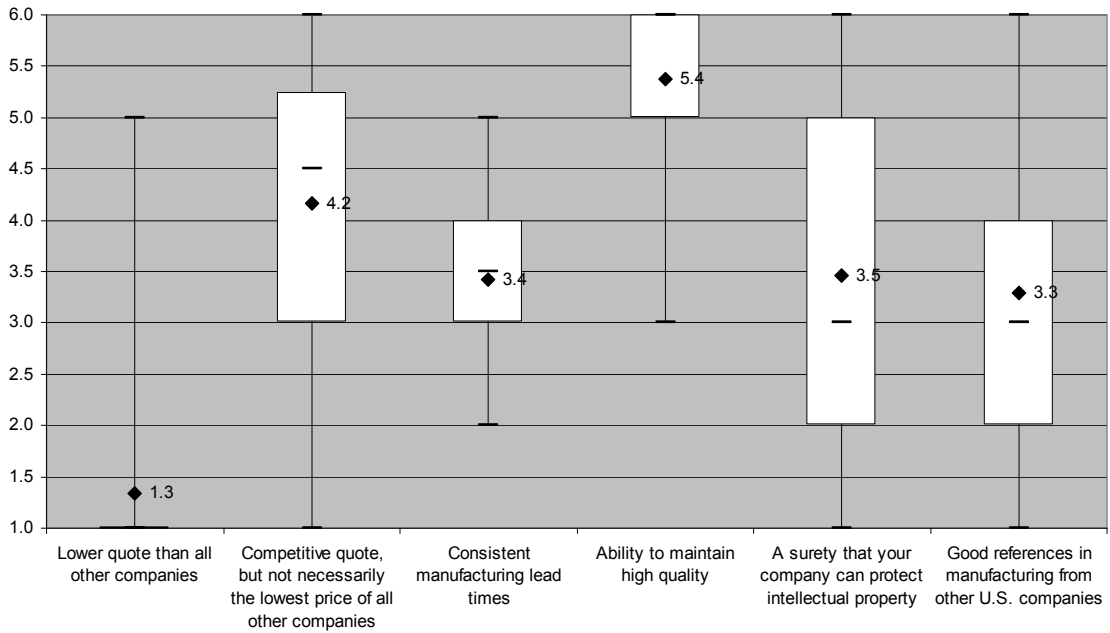


Figure F-9. Results to China Survey Question 11

Table F-1. Written responses to China Survey Question 12

Our company will not give up generally on the price and payments. We satisfy our customers with after-sale service.
They would give up anything until the sale price is less than the cost.
Our company will try to achieve double-win with our customers and satisfy their requirements under the law.
Reasonable profit.
The limit of some profit for the company.
Give favorable price and we are willing to store some finished goods so that we can make sure of prompt delivery.
It depends what the company asks us to change in order to secure their business. So far nobody has asked us to change anything in our operations.
Within the limit that the company costs can accept.
Reasonable price and date of delivery.
It is difficult to say at the moment.
Low profit.
Based on cooperation, our company will try to satisfy all the reasonable requirements with a rigorous attitude.
We promise a good price, but we will not give up anything without promised orders.
It all depends on the potential for our company to make profits.
We can accept everything on condition that our company will not get a loss. For example, we can guarantee the quality of product with the lowest price.
Achieve the lowest profit rate of 5 percent.
Profit margin about 15 percent
Profit must be over 20 percent
We make sure that we get about 30 percent profit.
Minimum order about 10,000 items.

Table F-2. Written responses to China Survey Question 15

Keep improving quality, training employees to have the sense of serving and strengthening the customer communication.
Increase closer communication with the customer. Be aware of the customer requirements and fulfill all requirements. Stricter quality control. Human first strategy, continuous improvement by scientific measurement.
In order to do business with American company, our company takes some measures as: communicating with clients, adjusting processes, etc. Doing these things to meet different product techniques and requirements.
Build quality system, hold training for all staff, continue improvement of production processes, strengthen communication with customers to make sure of changes in information.
We train employees to be aware of quality. We emphasize the critical dimension, make specific float for production technology and quality control procedure.
Customer relationship and customer communication. Improved the internal management process, delivery time, and keeping promises that are made in contracts with customers. "The U.S. companies have higher requirements than other companies, so other companies are impressed if you do business with them." Better reputation.
Increase capacity. In the process of becoming ISO9001 certified, expecting approval in August 2005.
Strict control on quality. Strengthen communication.
Quality, technical abilities, training, and customer communication.
Quality, training, customer communication, customer relationship, skill/ability.
Quality, customer communication, and skill/ability.
We make adjustments to satisfy our customers' in every aspect.
We made specific adjustments on quality, training, skill, and customer communication, etc.
On the perfection of quality system and the improvement of skill and ability.
To meet the needs of our customers and the changing market, our company holds different kinds of training every year. Such as, we have training on production quality, management, customer communication, and relationship maintenance, etc. Besides, we produce various kinds of products according to different requirements for our customers and we try our hardest to satisfy them with all
Adjust the processing, quality, and redo qualification standards. Train operators again and strengthen on-time communication with customer.
New process lines, ISO9001, ISO14000, service hot line
We can have customers buy products which satisfy them with low price and good quality. Furthermore, the skill and ability of our factory will not make our customers disappointed.
Quality, technical skill, customer communication, training
Additional processes, technical skill
Quality certification and TS16949 certification
Quality certification, TS16949 certification
Quality certification and TS12946 certification
Quality certification, QS9000/ISO 14000

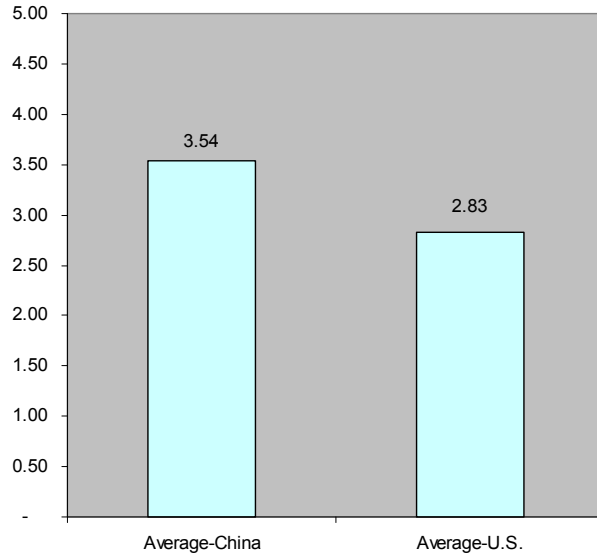


Figure F-10. Average results to U.S. Survey Question 13 & China Survey Question 16

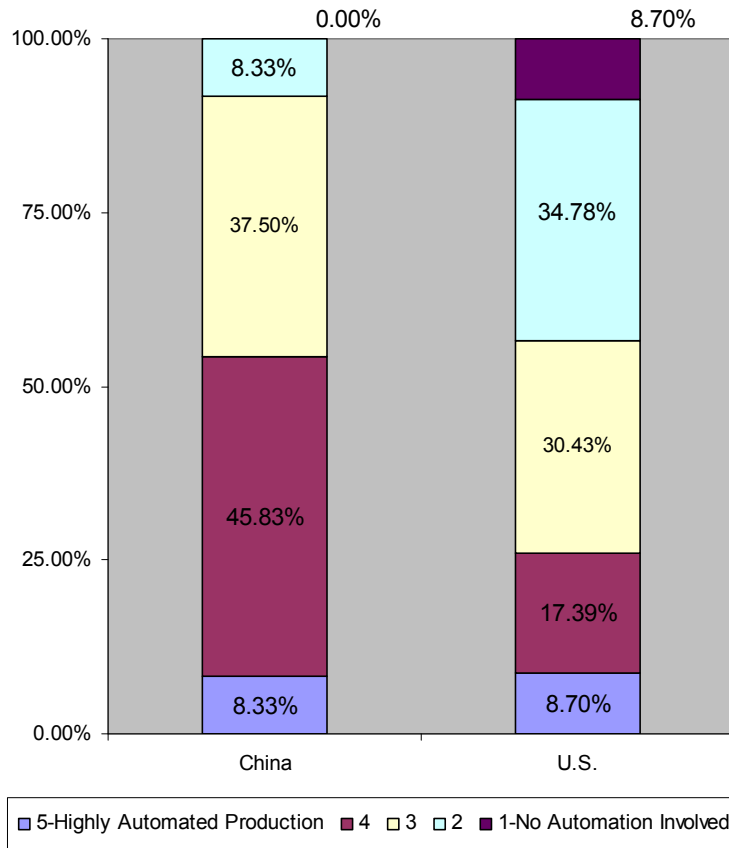


Figure F-11. Results to U.S. Survey Question 13 & China Survey Question 16

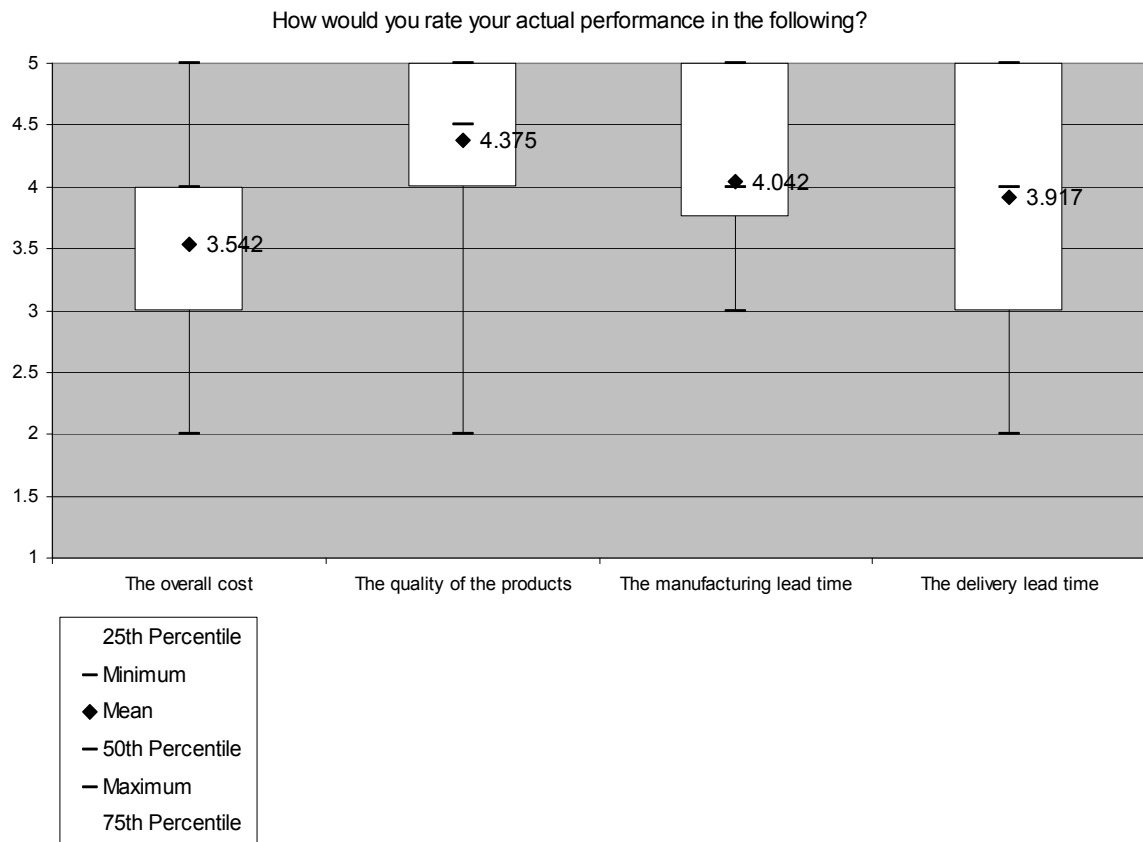


Figure F-12. Results to China Survey Question 17

Appendix G. U.S. Survey Regression Analysis Results

The abundant supply of production workers in China						
SUMMARY OUTPUT						
<i>Regression Statistics</i>						
Multiple R	0.7980					
R Square	0.6368					
Adjusted R Square	0.3341					
Standard Error	0.8383					
Observations	23.0000					
ANOVA						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	10.0000	14.7843	1.4784	2.1038	0.1114	
Residual	12.0000	8.4331	0.7028			
Total	22.0000	23.2174				
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	4.3171	1.6077	2.6853	0.0198	0.8142	7.8199
The nature of the manufacturing of your product	0.2998	0.2756	1.0877	0.2981	-0.3007	0.9004
The supply of production workers in China	-0.1145	0.2103	-0.5446	0.5960	-0.5728	0.3438
The productivity of the production workers in China	0.6992	0.3124	2.2383	0.0449	0.0186	1.3798
The hourly cost for production workers in China	-0.4237	0.2518	-1.6826	0.1183	-0.9724	0.1250
The overall revenue of the outsourced product	0.0588	0.2335	0.2519	0.8054	-0.4500	0.5676
The time required to manufacture products in China	-0.6219	0.2473	-2.5145	0.0272	-1.1608	-0.0830
The overall production cost of manufacturing in China	-0.3849	0.3113	-1.2366	0.2399	-1.0631	0.2933
The change of market presence in China	-0.2431	0.2249	-1.0809	0.3010	-0.7331	0.2469
The assistance of the Chinese govt. to help you outsource	0.4372	0.2029	2.1549	0.0522	-0.0049	0.8793
The achievability of the quality required from subcontractors in China	0.3851	0.3007	1.2810	0.2244	-0.2700	1.0403

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.5288
R Square	0.2796
Adjusted R Square	0.1196
Standard Error	0.9639
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4.0000	6.4926	1.6232	1.7469	0.1837
Residual	18.0000	16.7248	0.9292		
Total	22.0000	23.2174			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.6939	0.8050	2.1042	0.0497	0.0026	3.3851
The supply of production workers in China	0.0347	0.2133	0.1629	0.8724	-0.4134	0.4829
The nature of the manufacturing of your product	0.4170	0.2697	1.5460	0.1395	-0.1497	0.9837
The assistance of the Chinese govt. to help you outsource	0.0967	0.1526	0.6334	0.5344	-0.2239	0.4172
The productivity of the production workers in China	-0.0153	0.2354	-0.0652	0.9487	-0.5098	0.4791

The low hourly cost for production workers in China

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.8975
R Square	0.8055
Adjusted R Square	0.5246
Standard Error	0.5344
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	13.0000	10.6469	0.8190	2.8675	0.0595
Residual	9.0000	2.5705	0.2856		
Total	22.0000	13.2174			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	3.4994	1.4340	2.4403	0.0373	0.2554	6.7433
The nature of the manufacturing of your product	0.6260	0.1817	3.4440	0.0073	0.2147	1.0370
The supply of production workers in China	-0.1040	0.1644	-0.6330	0.5429	-0.4759	0.2680
The productivity of the production workers in China	-0.1370	0.1916	-0.7140	0.4932	-0.5702	0.2966
The hourly cost for production workers in China	0.2220	0.1956	1.1340	0.2860	-0.2206	0.6642
The overall revenue of the outsourced product	0.0970	0.1715	0.5660	0.5850	-0.2909	0.4851
The time required to manufacture products in China	-0.4790	0.2674	-1.7920	0.1068	-1.0841	0.1258
The overall production cost of manufacturing in China	-0.1970	0.2564	-0.7680	0.4623	-0.7770	0.3832
The time required to ship products from China	0.2570	0.1988	1.2910	0.2289	-0.1931	0.7063
The cost of raw materials for production	0.1920	0.1516	1.2680	0.2365	-0.1506	0.5351
The cost of shipping products from China	-0.1310	0.2363	-0.5530	0.5936	-0.6652	0.4038
The cost of inventory for production in China	-0.2950	0.1847	-1.5980	0.1444	-0.7130	0.1226
The assistance of the Chinese govt. to help you outsource	-0.2080	0.2142	-0.9730	0.3562	-0.6930	0.2763
The cost of selecting a subcontractor in China	0.3770	0.2810	1.3410	0.2128	-0.2588	1.0124

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.5205
R Square	0.2709
Adjusted R Square	0.1558
Standard Error	0.7122
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3.0000	3.5808	1.1936	2.3533	0.1044
Residual	19.0000	9.6366	0.5072		
Total	22.0000	13.2174			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	3.1893	0.8961	3.5592	0.0021	1.3138	5.0648
The nature of the manufacturing of your product	0.3250	0.1375	2.3641	0.0289	0.0373	0.6128
The hourly cost for production workers in China	0.1284	0.1450	0.8852	0.3871	-0.1752	0.4320
The time required to manufacture products in China	-0.0971	0.1299	-0.7477	0.4638	-0.3690	0.1748

The low cost of raw materials for production

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.8110
R Square	0.6577
Adjusted R Square	0.2470
Standard Error	1.2512
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	12.0000	30.0849	2.5071	1.6015	0.2318
Residual	10.0000	15.6543	1.5654		
Total	22.0000	45.7391			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-1.8066	3.0747	-0.5876	0.5698	-8.6574	5.0441
The nature of the manufacturing of your product	-0.3124	0.2999	-1.0418	0.3220	-0.9806	0.3557
The achievability of the quality required from subcontractors in China	1.1725	0.6036	1.9425	0.0807	-0.1724	2.5173
The hourly cost for production workers in China	0.2262	0.4669	0.4843	0.6386	-0.8143	1.2666
The overall production cost of manufacturing in China	0.0549	0.5163	0.1063	0.9174	-1.0956	1.2054
The cost of raw materials for production	-0.1435	0.4457	-0.3219	0.7541	-1.1365	0.8495
The cost of inventory for production in China	0.2136	0.3049	0.7005	0.4996	-0.4657	0.8928
The stability of the subcontractor's management in China	-0.2639	0.3695	-0.7142	0.4915	-1.0872	0.5594
The stability of the Chinese government	0.3457	0.3331	1.0378	0.3238	-0.3965	1.0878
The time required to ship products from China	-0.3148	0.4290	-0.7338	0.4799	-1.2705	0.6410
The time required to manufacture products in China	0.2402	0.3538	0.6788	0.5126	-0.5482	1.0285
The cost of shipping products from China	-0.1048	0.5120	-0.2047	0.8419	-1.2455	1.0359
The cultural difference between China and the United States	0.3016	0.2758	1.0934	0.2999	-0.3130	0.9161

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.7148
R Square	0.5110
Adjusted R Square	0.4338
Standard Error	1.0850
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3.0000	23.3727	7.7909	6.6183	0.0030
Residual	19.0000	22.3664	1.1772		
Total	22.0000	45.7391			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-2.6888	1.4848	-1.8109	0.0860	-5.7964	0.4189
The achievability of the quality required from subcontractors in China	0.6620	0.3642	1.8176	0.0849	-0.1003	1.4242
The cost of raw materials for production	0.4630	0.2435	1.9013	0.0725	-0.0467	0.9728
The hourly cost for production workers in China	0.3697	0.2242	1.6491	0.1156	-0.0995	0.8389

The elimination of manufacturing overhead costs

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.6882
R Square	0.4736
Adjusted R Square	0.1092
Standard Error	1.0812
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9.0000	13.6739	1.5193	1.2998	0.3234
Residual	13.0000	15.1956	1.1689		
Total	22.0000	28.8696			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	4.5645	2.0137	2.2667	0.0411	0.2142	8.9148
The achievability of the quality required from subcontractors in China	0.4534	0.4256	1.0655	0.3060	-0.4659	1.3728
The hourly cost for production workers in China	-0.3939	0.2651	-1.4860	0.1611	-0.9665	0.1787
The overall production cost of manufacturing in China	-0.7153	0.4592	-1.5578	0.1433	-1.7072	0.2767
The manufacturing overhead costs	0.1926	0.2063	0.9339	0.3674	-0.2530	0.6383
The change in focus on your company's core business functions	0.4386	0.2410	1.8196	0.0919	-0.0821	0.9593
The cost of raw materials for production	-0.2806	0.2966	-0.9462	0.3613	-0.9213	0.3601
The change of market presence in China	-0.2605	0.2829	-0.9208	0.3739	-0.8717	0.3507
The cost of selecting a subcontractor in China	0.4205	0.2738	1.5356	0.1486	-0.1711	1.0120
The ability to control manufacturing operations in China	0.2084	0.3484	0.5982	0.5600	-0.5442	0.9610

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.3790
R Square	0.1436
Adjusted R Square	0.0084
Standard Error	1.1407
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3.0000	4.1465	1.3822	1.0622	0.3884
Residual	19.0000	24.7231	1.3012		
Total	22.0000	28.8696			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	3.6337	1.3572	2.6773	0.0149	0.7930	6.4744
The hourly cost for production workers in China	-0.2190	0.2368	-0.9246	0.3668	-0.7147	0.2767
The manufacturing overhead costs	0.2757	0.1640	1.6814	0.1091	-0.0675	0.6189
The cost of raw materials for production	0.0178	0.2126	0.0838	0.9341	-0.4271	0.4627

An increase in the overall revenue of the outsourced product

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.7919
R Square	0.6271
Adjusted R Square	0.3689
Standard Error	1.0560
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9.0000	24.3739	2.7082	2.4288	0.0712
Residual	13.0000	14.4957	1.1151		
Total	22.0000	38.8696			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	2.8175	1.9521	1.4433	0.1726	-1.3998	7.0349
The supply of production workers in China	-0.4417	0.2623	-1.6843	0.1160	-1.0083	0.1248
The productivity of the production workers in China	-0.1654	0.2980	-0.5551	0.5883	-0.8092	0.4784
The change of market presence in China	0.0837	0.2907	0.2879	0.7779	-0.5443	0.7117
The overall revenue of the outsourced product	0.3991	0.2651	1.5058	0.1560	-0.1735	0.9718
The manufacturing overhead costs	0.1019	0.2254	0.4521	0.6587	-0.3850	0.5888
The cost of raw materials for production	0.1614	0.3331	0.4845	0.6361	-0.5582	0.8810
The cost of shipping products from China	-0.2598	0.3262	-0.7964	0.4401	-0.9646	0.4450
The achievability of the quality required from subcontractors in China	-0.0449	0.4196	-0.1069	0.9165	-0.9513	0.8616
The hourly cost for production workers in China	0.3659	0.2675	1.3682	0.1944	-0.2119	0.9437

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.6576
R Square	0.4325
Adjusted R Square	0.3064
Standard Error	1.1070
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4.0000	16.8108	4.2027	3.4294	0.0299
Residual	18.0000	22.0587	1.2255		
Total	22.0000	38.8696			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.9113	1.4996	0.6077	0.5510	-2.2392	4.0617
The change of market presence in China	-0.1107	0.1784	-0.6206	0.5427	-0.4856	0.2641
The overall revenue of the outsourced product	0.6952	0.2111	3.2935	0.0040	0.2517	1.1386
The hourly cost for production workers in China	0.1168	0.2293	0.5094	0.6166	-0.3650	0.5987
The achievability of the quality required from subcontractors in China	0.0267	0.3348	0.0798	0.9373	-0.6767	0.7301

An improvement in focus on your company's core business functions

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.7219
R Square	0.5212
Adjusted R Square	0.0424
Standard Error	1.2150
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	11.0000	17.6747	1.6068	1.0885	0.4454
Residual	11.0000	16.2384	1.4762		
Total	22.0000	33.9130			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.0884	2.5209	0.4318	0.6743	-4.4601	6.6369
The achievability of the quality required from subcontractors in China	-0.1405	0.5548	-0.2533	0.8047	-1.3617	1.0806
The hourly cost for production workers in China	0.2616	0.3392	0.7713	0.4568	-0.4849	1.0081
The ability to control manufacturing operations in China	-0.3048	0.4302	-0.7085	0.4933	-1.2516	0.6420
The overall production cost of manufacturing in China	-0.1111	0.5364	-0.2071	0.8397	-1.2917	1.0695
The stability of the Chinese government	-0.2585	0.3333	-0.7755	0.4544	-0.9921	0.4751
The manufacturing overhead costs	0.2236	0.2995	0.7466	0.4710	-0.4356	0.8829
The cost of raw materials for production	0.3373	0.4774	0.7066	0.4945	-0.7134	1.3881
The cost of shipping products from China	0.3369	0.4000	0.8421	0.4177	-0.5436	1.2173
The change in focus on your company's core business functions	0.7000	0.3095	2.2621	0.0449	0.0189	1.3812
The cost of inventory for production in China	-0.5956	0.2735	-2.1776	0.0521	-1.1975	0.0064
The change of market presence in China	-0.0006	0.2625	-0.0025	0.9981	-0.5784	0.5771

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.4233
R Square	0.1791
Adjusted R Square	-0.0033
Standard Error	1.2436
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4.0000	6.0753	1.5188	0.9821	0.4420
Residual	18.0000	27.8377	1.5465		
Total	22.0000	33.9130			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.4126	1.9383	0.7288	0.4755	-2.6597	5.4848
The achievability of the quality required from subcontractors in China	0.2399	0.3909	0.6138	0.5470	-0.5813	1.0612
The manufacturing overhead costs	0.0296	0.1948	0.1519	0.8810	-0.3796	0.4387
The change in focus on your company's core business functions	0.3823	0.2478	1.5427	0.1403	-0.1383	0.9029
The overall production cost of manufacturing in China	-0.1886	0.4763	-0.3960	0.6968	-1.1892	0.8120

The closer proximity of manufacturing facilities to markets

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.8244
R Square	0.6796
Adjusted R Square	0.4578
Standard Error	0.6211
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9.0000	10.6372	1.1819	3.0638	0.0331
Residual	13.0000	5.0150	0.3858		
Total	22.0000	15.6522			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.8915	1.0365	0.8601	0.4053	-1.3477	3.1308
The overall revenue of the outsourced product	-0.0912	0.1687	-0.5403	0.5981	-0.4556	0.2733
The time required to ship products from China	-0.3516	0.1790	-1.9642	0.0713	-0.7384	0.0351
The change of market presence in China	-0.0288	0.1251	-0.2299	0.8217	-0.2991	0.2416
The cost of shipping products from China	0.4210	0.1870	2.2506	0.0424	0.0169	0.8251
The cultural difference between China and the United States	0.1483	0.1208	1.2271	0.2416	-0.1128	0.4094
The cost of inventory for production in China	0.3679	0.1381	2.6634	0.0195	0.0695	0.6663
The protection of intellectual property	0.2866	0.1366	2.0982	0.0560	-0.0085	0.5818
The supply of production workers in China	-0.2464	0.1391	-1.7718	0.0999	-0.5470	0.0541
The overall production cost of manufacturing in China	-0.2011	0.2385	-0.8434	0.4143	-0.7163	0.3140

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.7544
R Square	0.5691
Adjusted R Square	0.4423
Standard Error	0.6299
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5.0000	8.9070	1.7814	4.4898	0.0086
Residual	17.0000	6.7451	0.3968		
Total	22.0000	15.6522			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-0.4971	0.6195	-0.8024	0.4334	-1.8042	0.8100
The time required to ship products from China	-0.3619	0.1783	-2.0301	0.0583	-0.7380	0.0142
The change of market presence in China	-0.0555	0.1216	-0.4567	0.6537	-0.3120	0.2009
The cost of shipping products from China	0.3953	0.1759	2.2470	0.0382	0.0241	0.7664
The cost of inventory for production in China	0.3362	0.1250	2.6893	0.0155	0.0725	0.6000
The protection of intellectual property	0.2706	0.1064	2.5446	0.0209	0.0462	0.4951

An increase of market presence in China

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.7694
R Square	0.5919
Adjusted R Square	0.3094
Standard Error	1.3124
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9.0000	32.4783	3.6087	2.0951	0.1094
Residual	13.0000	22.3913	1.7224		
Total	22.0000	54.8696			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-0.0687	1.8364	-0.0374	0.9707	-4.0361	3.8987
The change in focus on your company's core business functions	-0.5263	0.3304	-1.5928	0.1352	-1.2401	0.1875
The supply of production workers in China	-0.3303	0.2961	-1.1157	0.2848	-0.9699	0.3093
The overall revenue of the outsourced product	0.2474	0.3766	0.6569	0.5227	-0.5662	1.0611
The time required to ship products from China	-0.2176	0.3765	-0.5779	0.5732	-1.0309	0.5958
The cultural difference between China and the United States	0.3829	0.2570	1.4899	0.1601	-0.1723	0.9381
The change of market presence in China	-0.0281	0.2642	-0.1062	0.9170	-0.5989	0.5428
The cost of shipping products from China	0.0891	0.3842	0.2319	0.8202	-0.7409	0.9190
The cost of inventory for production in China	0.7899	0.3312	2.3850	0.0330	0.0744	1.5055
The protection of intellectual property	0.3804	0.2805	1.3558	0.1982	-0.2257	0.9864

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.6208
R Square	0.3854
Adjusted R Square	0.2047
Standard Error	1.4084
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5.0000	21.1478	4.2296	2.1322	0.1109
Residual	17.0000	33.7217	1.9836		
Total	22.0000	54.8696			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-0.6153	1.3852	-0.4442	0.6625	-3.5379	2.3073
The time required to ship products from China	-0.2776	0.3986	-0.6964	0.4956	-1.1185	0.5634
The change of market presence in China	-0.0345	0.2718	-0.1269	0.9005	-0.6079	0.5389
The cost of shipping products from China	0.2246	0.3933	0.5711	0.5754	-0.6052	1.0545
The cost of inventory for production in China	0.5062	0.2795	1.8108	0.0879	-0.0836	1.0960
The protection of intellectual property	0.4548	0.2378	1.9124	0.0728	-0.0470	0.9566

The assistance of the Chinese govt. to help you outsource

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.7001
R Square	0.4901
Adjusted R Square	0.1371
Standard Error	0.7271
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9.0000	6.6062	0.7340	1.3885	0.2861
Residual	13.0000	6.8721	0.5286		
Total	22.0000	13.4783			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	2.5827	0.9930	2.6010	0.0220	0.4375	4.7279
The supply of production workers in China	-0.1298	0.1672	-0.7762	0.4515	-0.4910	0.2315
The stability of the Chinese government	0.1345	0.1872	0.7184	0.4852	-0.2699	0.5388
The cultural difference between China and the United States	0.0934	0.1670	0.5589	0.5857	-0.2675	0.4543
The protection of intellectual property	0.0522	0.2090	0.2499	0.8066	-0.3993	0.5038
The cost of raw materials for production	-0.4797	0.1982	-2.4203	0.0309	-0.9079	-0.0515
The cost of shipping products from China	-0.0943	0.2276	-0.4143	0.6854	-0.5861	0.3975
The cost of inventory for production in China	0.2398	0.1882	1.2741	0.2249	-0.1668	0.6464
The assistance of the Chinese govt. to help you outsource	0.2603	0.1973	1.3193	0.2098	-0.1659	0.6864
The time required to ship products from China	-0.1713	0.2326	-0.7366	0.4745	-0.6739	0.3312

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.4220
R Square	0.1781
Adjusted R Square	0.0483
Standard Error	0.7636
Observations	23.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3.0000	2.3999	0.8000	1.3720	0.2816
Residual	19.0000	11.0783	0.5831		
Total	22.0000	13.4783			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.7975	0.4246	1.8780	0.0758	-0.0913	1.6863
The assistance of the Chinese govt. to help you outsource	0.2192	0.1345	1.6301	0.1195	-0.0623	0.5007
The stability of the Chinese government	0.0025	0.1349	0.0186	0.9853	-0.2798	0.2848
The cultural difference between China and the United States	0.0331	0.1157	0.2860	0.7780	-0.2090	0.2752

Appendix H. China Survey Regression Analysis Results

The abundant supply of production workers						
SUMMARY OUTPUT						
<i>Regression Statistics</i>						
Multiple R	0.7527					
R Square	0.5665					
Adjusted R Square	0.3137					
Standard Error	0.8241					
Observations	20.0000					
ANOVA						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	7.0000	10.6511	1.5216	2.2407	0.1050	
Residual	12.0000	8.1489	0.6791			
Total	19.0000	18.8000				
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.9335	2.1441	0.9018	0.3849	-2.7380	6.6051
Your supply of production workers	0.1694	0.1846	0.9177	0.3768	-0.2327	0.5715
The productivity of your production workers	0.0559	0.2441	0.2289	0.8228	-0.4760	0.5877
The hourly cost for your production workers	0.3137	0.2315	1.3554	0.2003	-0.1906	0.8181
The overall production costs of manufacturing with your company	0.6000	0.2469	2.4302	0.0317	0.0621	1.1379
The assistance of the Chinese govt. to help them outsource	0.0073	0.1573	0.0463	0.9638	-0.3354	0.3500
The lead time required for your company to manufacture products	-0.0908	0.1677	0.5413	0.5982	-0.4561	0.2746
The ability of your company to achieve the quality required by the U.S. company	-0.3336	0.2711	1.2305	0.2421	-0.9242	0.2571

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.4842
R Square	0.2345
Adjusted R Square	0.0909
Standard Error	0.9484
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3.0000	4.4082	1.4694	1.6336	0.2212
Residual	16.0000	14.3918	0.8995		
Total	19.0000	18.8000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	2.5688	0.9116	2.8179	0.0124	0.6363	4.5013
Your supply of production workers	0.1270	0.2036	0.6237	0.5416	-0.3047	0.5587
The productivity of your production workers	0.3715	0.2195	1.6924	0.1099	-0.0938	0.8368
The assistance of the Chinese govt. to help them outsource	-0.0471	0.1523	0.3094	0.7610	-0.3700	0.2757

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.6733
R Square	0.4533
Adjusted R Square	0.3076
Standard Error	0.8277
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4.0000	8.5227	2.1307	3.1098	0.0475
Residual	15.0000	10.2773	0.6852		
Total	19.0000	18.8000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.2202	1.2456	0.1768	0.8620	-2.4347	2.8751
Your supply of production workers	0.1103	0.1779	0.6202	0.5445	-0.2688	0.4894
The productivity of your production workers	0.2843	0.1948	1.4589	0.1652	-0.1310	0.6996
The assistance of the Chinese govt. to help them outsource	0.0658	0.1407	0.4678	0.6467	-0.2341	0.3657
The overall production costs of manufacturing with your company	0.5763	0.2352	2.4506	0.0270	0.0750	1.0775

A high level of technical skill of your production workers

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.8122
R Square	0.6596
Adjusted R Square	0.4121
Standard Error	0.7974
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	8.0000	13.5551	1.6944	2.6646	0.0673
Residual	11.0000	6.9949	0.6359		
Total	19.0000	20.5500			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.7238	1.9834	0.8691	0.4033	-2.6416	6.0892
Your supply of production workers	0.4268	0.1815	2.3511	0.0384	0.0272	0.8263
The productivity of your production workers	0.1003	0.2419	0.4146	0.6864	-0.4322	0.6328
The ability of your company to achieve the quality required by the U.S. company	-0.3345	0.2703	1.2374	0.2417	-0.9295	0.2605
The hourly cost for your production workers	-0.1835	0.2392	0.7670	0.4592	-0.7100	0.3431
The ability of your company's management	0.2991	0.2813	1.0634	0.3104	-0.3200	0.9183
The lead time required for your company to manufacture products	0.3116	0.1713	1.8191	0.0962	-0.0654	0.6886
The cultural difference between China and the United States	-0.4983	0.2368	2.1044	0.0592	-1.0195	0.0229
The assistance of the Chinese govt. to help them outsource	0.3016	0.1764	1.7096	0.1154	-0.0867	0.6900

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.6786
R Square	0.4604
Adjusted R Square	0.3593
Standard Error	0.8325
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3.0000	9.4619	3.1540	4.5511	0.0173
Residual	16.0000	11.0881	0.6930		
Total	19.0000	20.5500			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.0188	0.9897	1.0294	0.3186	-1.0793	3.1169
Your supply of production workers	0.4833	0.1791	2.6983	0.0158	0.1036	0.8630
The productivity of your production workers	-0.0398	0.1943	0.2048	0.8403	-0.4517	0.3721
The lead time required for your company to manufacture products	0.2897	0.1519	1.9071	0.0746	-0.0323	0.6117

The low hourly cost for your production workers

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.7881
R Square	0.6211
Adjusted R Square	0.2001
Standard Error	1.0652
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	10.0000	16.7382	1.6738	1.4752	0.2852
Residual	9.0000	10.2118	1.1346		
Total	19.0000	26.9500			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	5.9101	2.1846	2.7053	0.0242	0.9682	10.8520
Your supply of production workers	-0.1092	0.2766	0.3947	0.7023	-0.7350	0.5166
The productivity of your production workers	-0.0746	0.3820	0.1952	0.8496	-0.9386	0.7895
The hourly cost for your production workers	0.2973	0.3332	0.8922	0.3955	-0.4565	1.0511
The lead time required for your company to manufacture products	-0.5430	0.3297	1.6473	0.1339	-1.2888	0.2027
The overall production costs of manufacturing with your company	-0.1033	0.4045	0.2554	0.8041	-1.0184	0.8118
The time required to ship products from your facilities to the U.S. company	0.3044	0.3971	0.7665	0.4630	-0.5939	1.2027
The cost of raw materials for production	-0.4833	0.3993	1.2105	0.2569	-1.3866	0.4199
The cost of shipping products from your facilities	0.5371	0.5218	1.0294	0.3302	-0.6433	1.7176
The cost of additional inventory for production due to the time required to ship products to the U.S. company	0.3526	0.4260	0.8278	0.4292	-0.6110	1.3163
The assistance of the Chinese govt. to help them outsource	-0.7477	0.2843	2.6299	0.0274	-1.3909	-0.1045

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.2915
R Square	0.0850
Adjusted R Square	-0.0227
Standard Error	1.2044
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2.0000	2.2901	1.1451	0.7894	0.4701
Residual	17.0000	24.6599	1.4506		
Total	19.0000	26.9500			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	5.3837	1.1713	4.5965	0.0003	2.9126	7.8549
The hourly cost for your production workers	-0.1134	0.2341	0.4842	0.6344	-0.6074	0.3806
The lead time required for your company to manufacture products	-0.2674	0.2186	1.2234	0.2379	-0.7287	0.1938

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.6543
R Square	0.4281
Adjusted R Square	0.3209
Standard Error	0.9814
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3.0000	11.5382	3.8461	3.9928	0.0267
Residual	16.0000	15.4118	0.9632		
Total	19.0000	26.9500			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	5.0677	0.9599	5.2796	0.0001	3.0329	7.1026
The hourly cost for your production workers	0.2124	0.2178	0.9749	0.3441	-0.2494	0.6742
The lead time required for your company to manufacture products	-0.0557	0.1908	0.2919	0.7741	-0.4602	0.3488
The assistance of the Chinese govt. to help them outsource	-0.5603	0.1808	3.0986	0.0069	-0.9436	-0.1770

The low cost of raw materials for production

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.8009
R Square	0.6414
Adjusted R Square	0.1484
Standard Error	1.3589
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	11.0000	26.4269	2.4024	1.3010	0.3625
Residual	8.0000	14.7731	1.8466		
Total	19.0000	41.2000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-0.6662	5.2177	0.1277	0.9016	-12.6982	11.3658
The ability of your company to achieve the quality required by the U.S. company	-0.4946	0.5777	0.8561	0.4169	-1.8268	0.8377
The hourly cost for your production workers	0.2173	0.4247	0.5115	0.6228	-0.7621	1.1966
The ability of your company's management	0.9277	0.5973	1.5531	0.1590	-0.4497	2.3050
The lead time required for your company to manufacture products	-0.1741	0.4263	0.4084	0.6937	-1.1571	0.8089
The overall production costs of manufacturing with your company	-0.2126	0.5939	0.3580	0.7296	-1.5820	1.1568
The time required to ship products from your facilities to the U.S. company	-0.0720	0.7779	0.0925	0.9286	-1.8659	1.7220
The stability of the Chinese government	0.0762	0.4769	0.1597	0.8771	-1.0236	1.1759
The cultural difference between China and the United States	0.0015	0.6638	0.0022	0.9983	-1.5292	1.5321
The cost of raw materials for production	0.7418	0.5829	1.2728	0.2388	-0.6022	2.0859
The cost of shipping products from your facilities	0.0457	0.6191	0.0738	0.9430	-1.3819	1.4733
The cost of additional inventory for production due to the time required to ship products to the U.S. company	0.0806	0.5636	0.1430	0.8898	-1.2190	1.3803

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.6946
R Square	0.4825
Adjusted R Square	0.3855
Standard Error	1.1544
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3.0000	19.8785	6.6262	4.9724	0.0126
Residual	16.0000	21.3215	1.3326		
Total	19.0000	41.2000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.6155	1.6032	0.3839	0.7061	-2.7830	4.0140
The ability of your company to achieve the quality required by the U.S. company	-0.2873	0.3780	0.7599	0.4583	-1.0886	0.5141
The hourly cost for your production workers	0.3895	0.2380	1.6362	0.1213	-0.1151	0.8941
The cost of raw materials for production	0.6978	0.2522	2.7669	0.0137	0.1632	1.2323

The elimination of manufacturing overhead costs for the U.S. company

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.5980
R Square	0.3576
Adjusted R Square	0.1281
Standard Error	1.0093
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5.0000	7.9380	1.5876	1.5584	0.2352
Residual	14.0000	14.2620	1.0187		
Total	19.0000	22.2000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-0.4533	2.3338	0.1942	0.8488	-5.4588	4.5522
The ability of your company to achieve the quality required by the U.S. company	0.5731	0.3397	1.6869	0.1138	-0.1555	1.3017
The hourly cost for your production workers	-0.0552	0.2179	0.2533	0.8037	-0.5226	0.4122
The ability of the U.S. company to control manufacturing operations with your company	0.5126	0.2445	2.0965	0.0547	-0.0118	1.0370
The overall production costs of manufacturing with your company	-0.0038	0.2979	0.0129	0.9899	-0.6428	0.6352
The cost of raw materials for production	0.0620	0.2727	0.2273	0.8235	-0.5229	0.6469

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.1201
R Square	0.0144
Adjusted R Square	-0.1015
Standard Error	1.1345
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2.0000	0.3200	0.1600	0.1243	0.8839
Residual	17.0000	21.8800	1.2871		
Total	19.0000	22.2000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	4.1143	0.8690	4.7347	0.0002	2.2810	5.9477
The hourly cost for your production workers	-0.0534	0.2327	-	0.8213	-0.5444	0.4376
The cost of raw materials for production	-0.0779	0.2345	-	0.7438	-0.5726	0.4168

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.4681
R Square	0.2191
Adjusted R Square	0.0727
Standard Error	1.0409
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3.0000	4.8646	1.6215	1.4966	0.2534
Residual	16.0000	17.3354	1.0835		
Total	19.0000	22.2000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.5438	1.4869	1.0382	0.3146	-1.6084	4.6959
The hourly cost for your production workers	-0.0178	0.2142	-	0.9349	-0.4719	0.4364
The cost of raw materials for production	0.1864	0.2508	0.7429	0.4683	-0.3454	0.7181
The ability of the U.S. company to control manufacturing operations with your company	0.5155	0.2517	2.0481	0.0573	-0.0181	1.0492

An increase in the overall revenue of the U.S. company's product

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.8368
R Square	0.7003
Adjusted R Square	0.3672
Standard Error	1.0412
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	10.0000	22.7931	2.2793	2.1025	0.1393
Residual	9.0000	9.7569	1.0841		
Total	19.0000	32.5500			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.0457	2.8253	0.0162	0.9875	-6.3456	6.4369
Your supply of production workers	0.2630	0.2675	0.9831	0.3512	-0.3422	0.8681
The productivity of your production workers	0.1887	0.3730	0.5059	0.6251	-0.6550	1.0324
The ability of your company to achieve the quality required by the U.S. company	0.5695	0.3878	1.4685	0.1760	-0.3078	1.4469
The hourly cost for your production workers	-0.2086	0.3233	0.6451	0.5349	-0.9398	0.5227
The lead time required for your company to manufacture products	0.3266	0.3238	1.0089	0.3394	-0.4058	1.0591
The overall production costs of manufacturing with your company	-0.5047	0.3666	1.3765	0.2020	-1.3340	0.3247
The time required to ship products from your facilities to the U.S. company	-0.3007	0.3921	0.7669	0.4628	-1.1878	0.5864
The cost of raw materials for production	0.3134	0.3893	0.8051	0.4415	-0.5672	1.1940
The cost of shipping products from your facilities	-0.8901	0.4715	1.8877	0.0917	-1.9567	0.1766
The cost of additional inventory for production due to the time required to ship products to the U.S. company	1.1148	0.4464	2.4973	0.0340	0.1050	2.1246

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.0736
R Square	0.0054
Adjusted R Square	-0.1116
Standard Error	1.3800
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2.0000	0.1765	0.0882	0.0463	0.9548
Residual	17.0000	32.3735	1.9043		
Total	19.0000	32.5500			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	3.8756	1.9118	2.0272	0.0586	-0.1580	7.9092
The ability of your company to achieve the quality required by the U.S. company	-0.0889	0.4275	0.2080	0.8377	-0.9909	0.8131
The hourly cost for your production workers	-0.0464	0.2713	0.1711	0.8662	-0.6187	0.5259

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.6905
R Square	0.4768
Adjusted R Square	0.3372
Standard Error	1.0656
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4.0000	15.5189	3.8797	3.4170	0.0355
Residual	15.0000	17.0311	1.1354		
Total	19.0000	32.5500			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-0.4304	1.9181	0.2244	0.8255	-4.5188	3.6580
The cost of additional inventory for production due to the time required to ship products to the U.S. company	1.1848	0.3308	3.5821	0.0027	0.4798	1.8899
The cost of shipping products from your facilities	-0.6374	0.3238	1.9684	0.0678	-1.3275	0.0528
The ability of your company to achieve the quality required by the U.S. company	0.5145	0.3735	1.3773	0.1886	-0.2817	1.3106
The hourly cost for your production workers	-0.0704	0.2100	0.3353	0.7420	-0.5181	0.3773

An improvement in focus on the U.S. company's core business functions

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.8226
R Square	0.6767
Adjusted R Square	0.4415
Standard Error	0.6815
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	8.0000	10.6916	1.3364	2.8778	0.0537
Residual	11.0000	5.1084	0.4644		
Total	19.0000	15.8000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	2.8882	1.6989	1.7001	0.1172	-0.8510	6.6275
The ability of your company to achieve the quality required by the U.S. company	0.1561	0.2863	0.5452	0.5965	-0.4740	0.7862
The hourly cost for your production workers	-0.3135	0.1817	1.7252	0.1124	-0.7135	0.0865
The ability of the U.S. company to control manufacturing operations with your company	0.1520	0.2017	0.7532	0.4672	-0.2921	0.5960
The overall production costs of manufacturing with your company	-0.2831	0.2100	1.3484	0.2046	-0.7453	0.1790
The stability of the Chinese government	-0.0994	0.1894	0.5249	0.6101	-0.5162	0.3174
The cost of raw materials for production	0.0983	0.2035	0.4829	0.6386	-0.3495	0.5460
The cost of shipping products from your facilities	0.2710	0.2858	0.9485	0.3633	-0.3579	0.9000
The cost of additional inventory for production due to the time required to ship products to the U.S. company	0.3715	0.2524	1.4721	0.1690	-0.1840	0.9271

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.1070
R Square	0.0115
Adjusted R Square	-0.1048
Standard Error	0.9585
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2.0000	0.1811	0.0905	0.0985	0.9067
Residual	17.0000	15.6189	0.9188		
Total	19.0000	15.8000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	4.6268	1.8302	2.5280	0.0217	0.7654	8.4882
The ability of your company to achieve the quality required by the U.S. company	-0.0085	0.2924	-	0.9771	-0.6254	0.6084
The overall production costs of manufacturing with your company	-0.1137	0.2568	-	0.6635	-0.6554	0.4280

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.4154
R Square	0.1726
Adjusted R Square	0.0174
Standard Error	0.9039
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3.0000	2.7264	0.9088	1.1122	0.3733
Residual	16.0000	13.0736	0.8171		
Total	19.0000	15.8000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	5.3921	1.7796	3.0299	0.0080	1.6195	9.1647
The ability of your company to achieve the quality required by the U.S. company	0.0905	0.2814	0.3217	0.7519	-0.5060	0.6871
The overall production costs of manufacturing with your company	-0.1870	0.2457	-	0.4577	-0.7078	0.3338
The hourly cost for your production workers	-0.3182	0.1803	-	0.0966	-0.7003	0.0640

The closer proximity of manufacturing facilities to markets

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.7298
R Square	0.5326
Adjusted R Square	0.2599
Standard Error	1.1668
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	7.0000	18.6128	2.6590	1.9531	0.1472
Residual	12.0000	16.3372	1.3614		
Total	19.0000	34.9500			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-0.3772	2.3695	0.1592	0.8762	-5.5397	4.7854
Your supply of production workers	0.2116	0.2438	0.8679	0.4025	-0.3196	0.7428
The overall production costs of manufacturing with your company	-0.0898	0.3910	0.2297	0.8222	-0.9416	0.7620
The time required to ship products from your facilities to the U.S. company	-0.0781	0.3277	0.2383	0.8156	-0.7922	0.6360
The cultural difference between China and the United States	0.4167	0.3285	1.2684	0.2287	-0.2991	1.1325
The protection of the U.S. company's intellectual property with your company	0.0676	0.3075	0.2197	0.8298	-0.6025	0.7376
The cost of shipping products from your facilities	0.0116	0.3334	0.0349	0.9728	-0.7147	0.7380
The cost of additional inventory for production due to the time required to ship products to the U.S. company	0.6234	0.3420	1.8224	0.0934	-0.1219	1.3686

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.6187
R Square	0.3828
Adjusted R Square	0.2182
Standard Error	1.1992
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4.0000	13.3794	3.3448	2.3260	0.1037
Residual	15.0000	21.5706	1.4380		
Total	19.0000	34.9500			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.7016	1.6576	0.4233	0.6781	-2.8315	4.2348
The time required to ship products from your facilities to the U.S. company	-0.2026	0.3197	0.6339	0.5357	-0.8840	0.4787
The protection of the U.S. company's intellectual property with your company	0.1117	0.3072	0.3635	0.7213	-0.5431	0.7665
The cost of shipping products from your facilities	0.0387	0.3417	0.1134	0.9112	-0.6895	0.7670
The cost of additional inventory for production due to the time required to ship products to the U.S. company	0.7455	0.3386	2.2019	0.0437	0.0238	1.4671

An increase of market presence for the U.S. company in China

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.5738
R Square	0.3293
Adjusted R Square	0.0197
Standard Error	1.1759
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	6.0000	8.8250	1.4708	1.0638	0.4312
Residual	13.0000	17.9750	1.3827		
Total	19.0000	26.8000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	2.7229	1.9059	1.4286	0.1767	-1.3946	6.8405
Your supply of production workers	-0.2292	0.2423	0.9457	0.3615	-0.7527	0.2944
The time required to ship products from your facilities to the U.S. company	0.2804	0.3203	0.8756	0.3971	-0.4115	0.9723
The cultural difference between China and the United States	0.0657	0.2741	0.2398	0.8142	-0.5265	0.6579
The protection of the U.S. company's intellectual property with your company	-0.2641	0.3077	0.8582	0.4063	-0.9289	0.4007
The cost of shipping products from your facilities	-0.0206	0.3353	0.0614	0.9520	-0.7449	0.7037
The cost of additional inventory for production due to the time required to ship products to the U.S. company	0.5307	0.3415	1.5541	0.1442	-0.2070	1.2683

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.5307
R Square	0.2817
Adjusted R Square	0.0901
Standard Error	1.1329
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4.0000	7.5489	1.8872	1.4705	0.2603
Residual	15.0000	19.2511	1.2834		
Total	19.0000	26.8000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.9079	1.5660	1.2184	0.2419	-1.4299	5.2457
The time required to ship products from your facilities to the U.S. company	0.3279	0.3020	1.0858	0.2947	-0.3158	0.9716
The protection of the U.S. company's intellectual property with your company	-0.2186	0.2902	0.7533	0.4629	-0.8372	0.4000
The cost of shipping products from your facilities	-0.0294	0.3228	0.0911	0.9286	-0.7174	0.6586
The cost of additional inventory for production due to the time required to ship products to the U.S. company	0.4754	0.3198	1.4864	0.1579	-0.2063	1.1571

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.5304
R Square	0.2813
Adjusted R Square	0.1465
Standard Error	1.0972
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3.0000	7.5382	2.5127	2.0872	0.1422
Residual	16.0000	19.2618	1.2039		
Total	19.0000	26.8000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.8530	1.3998	1.3238	0.2042	-1.1143	4.8204
The time required to ship products from your facilities to the U.S. company	0.3276	0.2925	1.1202	0.2792	-0.2924	0.9476
The protection of the U.S. company's intellectual property with your company	-0.2139	0.2765	0.7734	0.4505	-0.8001	0.3724
The cost of additional inventory for production due to the time required to ship products to the U.S. company	0.4563	0.2338	1.9514	0.0687	-0.0394	0.9520

The assistance of the Chinese govt. to help the U.S. company outsource

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.9072
R Square	0.8231
Adjusted R Square	0.6638
Standard Error	0.8069
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	9.0000	30.2893	3.3655	5.1691	0.0085
Residual	10.0000	6.5107	0.6511		
Total	19.0000	36.8000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.0772	2.1315	0.0362	0.9718	-4.6720	4.8264
Your supply of production workers	0.4154	0.2027	2.0493	0.0676	-0.0362	0.8670
The time required to ship products from your facilities to the U.S. company	0.1147	0.3197	0.3586	0.7273	-0.5977	0.8270
The stability of the Chinese government	-0.0585	0.2238	-	0.7991	-0.5572	0.4402
The cultural difference between China and the United States	-0.4628	0.3571	1.2961	0.2240	-1.2584	0.3328
The protection of the U.S. company's intellectual property with your company	-0.1367	0.2358	0.5801	0.5747	-0.6620	0.3885
The cost of raw materials for production	0.1506	0.3893	0.3869	0.7069	-0.7168	1.0181
The cost of shipping products from your facilities	-0.4128	0.3315	1.2454	0.2414	-1.1514	0.3258
The cost of additional inventory for production due to the time required to ship products to the U.S. company	0.9942	0.2776	3.5812	0.0050	0.3756	1.6127
The assistance of the Chinese govt. to help them outsource	0.3598	0.2987	1.2048	0.2560	-0.3056	1.0253

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.5426
R Square	0.2944
Adjusted R Square	0.1621
Standard Error	1.2740
Observations	20.0000

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3.0000	10.8327	3.6109	2.2249	0.1248
Residual	16.0000	25.9673	1.6230		
Total	19.0000	36.8000			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	3.1390	0.7658	4.0990	0.0008	1.5156	4.7625
The assistance of the Chinese govt. to help them outsource	0.5177	0.2913	1.7773	0.0945	-0.0998	1.1353
The stability of the Chinese government	0.0901	0.3286	0.2741	0.7875	-0.6065	0.7867
The cultural difference between China and the United States	-0.5674	0.3403	1.6670	0.1150	-1.2889	0.1541

Appendix I. Journal from China

Saturday, June 19, 2005

Today, Tyler, another graduate student from Brigham Young University, and I flew from Salt Lake City to Los Angeles, where we met up with Joseph, an undergraduate student who is going to assist us in our research. Tyler and I waited in Los Angeles for more than two hours for the next leg of travel from Los Angeles. Joseph was close to missing the next leg of our flight on our trip to China. Evidently he had to wait in a long line of passengers to check in his luggage for an international flight. Luckily, Tyler and I took care of the international check-in in Salt Lake where the lines were much shorter.

The majority of the passengers on the flight from Los Angeles to Osaka, Japan were of Asian descent. The airline that we flew on was Japan Airlines, a partner of American Airlines. The flight was long and uncomfortable. We crossed the International Date Line during the flight, so had no clue what day it actually was. That night we stayed in Osaka in a hotel that was attached to the airport. We stumbled around for a bit, but we eventually found our way to the hotel. Tired and exhausted, we attempted to sleep, but our bodies were confused. The next morning we enjoyed a decent breakfast at the hotel and boarded another plane to take us from Osaka, Japan to Guangzhou, China.

Tuesday, June 22, 2005

Clueless as to how we were going to meet up with a driver that was sent from Gatehill International to pick us up, we assumed that he would be holding a sign with our names on it. The process of entering the country was tedious and long, but we eventually got through it. We exited the customs area to find a young man hold a small sign that said Gatehill. He spoke no English. We followed him out to the street curb, he stopped and made some hand gestures and then took off running. We assumed he was going to get the car or van. We were correct and after about eight minutes, he brought a van up to the curb where we were waiting.

We arrived at Gatehill International around 4:00 PM. We met with Cliff, the administrative operations manager, about the purpose of our studies. I was tired and I could barely think straight, so I do not remember what I told him about my project. Later he showed us to our apartment, which was located 20 yards from the back gate of the factory. After we dropped off our luggage Cliff took us to a restaurant, helped us order some food and left. It is still hard to believe that I am in China.

Wednesday, June 23, 2005

This morning we met with Ben, the head of the engineering department at Gatehill International. The meeting was short and sweet. Ben kept mentioning the fact that he was asked by Vern Jenkins not to help us too much. Later in the day he gave us the contact information of EIC, an American owned company that we could visit. He mentioned the fact that the owner was American and lived for a period of time in Utah. He also mentioned that he was not going to point us in the right direction of where to find

the company. We then called the number and arranged with the president of the company to visit the next day.

We spent the day getting ready for the weeks that lay ahead of us. We worked on locating a translator, purchasing a cell phone, getting bottled water for the apartment, determining where to wash laundry, determining how to get around the area, exchanging money, printing out surveys, obtaining a list of Gatehill suppliers, etc...

Thursday, June 24, 2005

EIC (Engenuity International) is located only about 150 yards from the back gate of Gatehill International and was actually started by Gatehill. The president, Scott, started the company with his father, who has been involved in Gatehill International. EIC was once located at Gatehill International. EIC specializes in the manufacturing of the rollers that are used in printer cartridges. EIC was able to enter the market by producing the roller for \$1 instead of the \$3, which Gatehill paid another supplier.

Thursday morning Scott gave us a tour of the factory and the unique machinery that has enabled him to establish his business and make it grow. He showed us the equipment, but he does not allow other visitors to see them. EIC has a big line of rollers for the printer cartridges. The smallest was about the size of a pencil and the largest was more than 10-12 inches in diameter. Some of the aluminum rollers have a silicon cover that is injected onto the roller for different printer cartridges.

This afternoon I came up with the idea of writing a short paragraph, to be translated into Chinese, of who we were, what we were doing in China, and who it is that we would like to talk to within a given company. My hope was to be able to get some information without the use of a translator, since we did not have one yet. With the

translated paragraph we could approach the security guard of any manufacturing facility and find someone to take the survey within the company. We asked a couple of the employees at Gatehill International to translate the paragraphs for us for a small fee. Tyler also had his survey translated into Chinese by one of the employees.

Friday, June 25, 2005

This afternoon we decided to try out the paragraphs that we had written, and then had translated, for approaching companies. I approached the gates of a large manufacturing company called TK. We were eager to get back information from our surveys. As I approached the security guard, I presented the paragraph that had been translated into Chinese. The security guard of course chuckled a bit and then presented it to another guard who seemed to preside over security. He attempted to say something to us in Chinese, but we just responded by saying that we did not speak Chinese. The guard chuckled and entered the security office. We watched him pick up a phone and dial to talk to someone within the company. He read the paragraph to the person on the other end of the line. He returned my paragraph and indicated with his hands that we should wait and someone would be coming out to meet us.

A couple of minutes later a gentleman approached us at the gate. We greeted him and followed him back to a conference room where he presented us with his business card and bottled water. This was our first experience receiving a business card from a Chinese person. He carefully held the top two corners of his card and slowly presented it to each of us. Tyler and Joseph were unaware of the formality of exchanging business cards with the Chinese, so I quietly whispered for them to accept it with two hands and carefully review it.

TK International

“Forty percent of our production is for U.S. customers.”

“I believe that it is important for us to understand each other.”

“I think that we (Chinese) know more about the United States than Americans know about China. When we are in middle school, the teachers start sharing special topics and news about what is going on in the U.S.”

“This is the first time that I have ever filled out a survey.”

Monday, June 27, 2005

Tyler and I walked the entire YuLu Village today trying to get into manufacturing companies, but we were unsuccessful. Security guards turned us away and tried to speak with us in Chinese. In a time of desperation and frustration, we approached Cliff to help us find a translator. Cliff sent out a company-wide email at Gatehill International asking the employees if they had any friends that could serve as our translator for the next couple of weeks. We had tried finding a translator, but nobody could help us. During the past week I have contacted the following friends and former colleagues to try to locate a person to translate for us.

- Michael –Chinese law professor that I have done work with for the TALL Group. Provided me with the contact information for the branch president in Guangzhou.
- Beibei –native of China and former colleague and Chinese translator for the TALL Group, my employer, who is currently living in Guangzhou.
- William –native of China and the current Chinese translator for the TALL Group, who lived in the Shenzhen area less than two years ago. He too,

provided me with the contact information for the branch president in Guangzhou.

- Ting –former BYU student and current LDS branch president in Guangzhou. President Yeoung provided me with the contact information for the branch president in Shenzhen.
- Brian –expatriate and former LDS branch president in Shenzhen. Provided me with the contact information for the current branch presidency in Shenzhen.
- John –expatriate and member of the current LDS branch presidency in Shenzhen. Works for Wal-Mart in China.
- Barry –expatriate and member of the current LDS branch presidency in Shenzhen. Works for Trek Bicycles. Graduated from the manufacturing engineering program at Brigham Young University
- Scot –expatriate and current LDS branch president in Shenzhen.

The day was brutal. The heat and humidity were unbearable. Tyler had to use his umbrella to avoid getting sunburned, after already applying sunscreen. I have never been that wet in such nice clothes. The humidity was painful. We walked the streets of the village hoping to find a company that would let us talk to them, but nothing opened up.

We decided that our approach was not effective, but it had worked so well in approaching TK the week before. Hot and frustrated, we returned to Gatehill International to try to contact companies and request visits with them over the phone and by email. In doing so, I encountered the language barrier and the secretaries did not transfer me to someone within the company that spoke English. Out of ten calls I

managed to set up one appointment with Cathay Tat Ming Metal Mfy, Ltd, company that specializes in OEM products and high-precision metal parts, including various connectors, adapters, electronic components, precision turned parts, automotive parts, medical equipment parts, stamping and plastic parts, etc. That appointment was set for Thursday morning of this week.

Tuesday, June 28, 2005

There has still been no response from the company-wide email for someone that could serve as a translator. The highlight of the day was an introduction to the supply-chain manager at Gatehill International, Tony. He is going to contact and arrange meeting times with the suppliers of Gatehill International. He also said that he would supply an engineer to accompany us until we get a translator.

Wednesday, June 29, 2005

We have received one application of a girl that is interested in serving as a translator for us. We are going to set up an interview with her sometime this week.

We had another meeting with Tony, the supply-chain manager at Gatehill International. He has assigned an engineer, Michael, to contact and schedule appointments with companies. We supplied Michael with our surveys so that he could email the surveys to the companies and then they could review them and fill them out prior to our arrival at their facility.

This morning we met with Ada, the quality manager at Enignuity International, an American owned company that is located in YuLu. EIC specializes in the rollers that are used in the printer cartridges. Gatehill International is one of their customers.

We received completed surveys from Cathay Tat Ming Metal Mfy, Ltd. Michael had emailed our survey to them this morning and they completed them in the afternoon. We are still going to be visiting their facilities in the morning to review their responses with them and tour their facilities.

Thursday, June 30, 2005

Michael had set up another visit with another company in addition to the appointment I scheduled with Cathay Tat Ming Metal Manufacturing. Michael, Tyler, and I left Gatehill International at about 8:15 AM and headed for Cathay Tat Ming Metal Manufacturing which is located approximately forty minutes from Gatehill International.

Cathay Tat Ming Metal Manufacturing

When we arrived at Cathay Tat Ming Metal International, we were welcomed with open arms. They directed us into what appeared to be the executive board room, which included a bronze statue of the owner of the company. They had done some preparation for our visit and gave us a presentation of what their company does. Prior to the presentation, we were introduced to the Vice-Chairman/Managing Director. He was unable to attend the meeting due to a conflict in his schedule, but we were able to meet with the business and quality managers.

I was impressed with the objectives of the company for expansion. The company is trying to become the one-stop shop for metal production work. Cathay Tat Ming currently has over 400 CNC lathes and more than 100 automatic lathes, but has plans to secure more machinery in the future.

- 10% of their production is for U.S. customers
- 60% for China

- 20% for European companies
- 10% for companies in other countries in Southeast Asia

When asked, “How do U.S. companies contact or find out about your company?,” Paul, the business manager, replied with the following comments:

- “Cathay Tat Ming Metal Manufacturing is famous in this area. Companies are referred to us by other companies in the Shenzhen and Guangzhou area.”
- “We also do some internet advertising to attract customers.”
- “We have a sales office in Germany that brings us some foreign orders.”
- “Often we attend trade shows in China and every once in awhile an international trade show.”

When asked about intellectual property, Paul said that their customers do entrust them with a certain amount of intellectual property. He indicated that customers have them sign an agreement to ensure the protection of their property. “They trust our company,” said Paul.

“We can’t deny the fact that in the China market we have a problem with IP, but we are improving.” (Paul)

When asked why U.S. companies come to China, Paul replied, “Chinese are one of the hardest working people in the world.” He also indicated that U.S. companies come to China to take advantage of the wide variety of capabilities that are available and the professionalism.

We toured their facility and I was quite impressed with the sheer size and the number of machines that they had in their factory. In the presentation they mentioned the number of machines that they had, but it did not seem real until I saw the rooms filled with the machinery. I was impressed with how well maintained and clean that factory was, as opposed the company that we would visit later on in the day.

After visiting the factory, I began to understand some of the responses that they made on my survey. They responded with a four out of a scale of five on how much of their work is automated, which is due to the CNC machines that they operate. I also found out why they indicated a two out of a scale of five on the benefit of low costing raw materials in China. Cathay Tat Ming gets most outside of China. One type of bronze actually comes from the U.S. and the other type from China, but the steel comes from Japan. All the metal materials, except for two types, come from foreign countries because of the cost and reliability.

Major customers are: LG, Emerson, Canon, Siemens, Andrew, Champ, Hitachi, Danfoss, Minolta, Nidec, Xerox, Huber+Suhner

I was given a copy of the power point presentation that was given to us during our visit to Cathay Tat Ming Metal Manufacturing. I also received a company brochure.

Chichibun Precession (Shenzhen) Company

After visiting Cathay Tat Ming Metal Manufacturing and having lunch at Kentucky Fried Chicken, we drove to Shekou to visit Chichibun. We met with the sales and quality managers.

Friday, July 1, 2005

(No activities recorded.)

Saturday, July 2, 2005

This morning we interviewed an applicant to be our translator, but the applicant would have to quit another job in order to translate for us and we did not feel comfortable having her quit her job to work for us for two or three weeks.

After the interview, we met Cliff and his two kids at the ice skating arena inside a local mall. Tyler and I skated and provided some companionship to Cliff's daughter on the ice rink. Cliff wanted us to skate with her because she never has anyone to skate with after she is done with her private ice-skating lessons.

We spent the entire day with Cliff and his family; we had lunch with them and swam for most of the afternoon with them. Later in the evening we scoped out some spots to purchase things for our families and practiced our golf game at the local driving range with Cliff. The evening was capped off with Tyler knocking the head off of Cliff's driver and driving it 50 meters down the range. Tyler felt awful.

Sunday, July 3, 2005

Today we attended LDS church services in the home of John, the first counselor in the branch presidency of the English speaking branch in Shenzhen. Last week we were unable to find the meeting location of the branch, but later realized that we were next door to where the meeting was actually taking place. We were so close, yet so far.

Because several of the families had returned to the United States for the summer, the branch only held the sacrament meeting services. The member of the branch presidency that was conducting the meeting mentioned that the visitors outnumbered the regular members of the branch. One family and one couple were visiting China from Hawaii.

Being Fast Sunday, I took the opportunity to share my testimony. As asked by the person conducting the meeting, I gave a brief introduction of myself. I mentioned why I was here in China and that I was from Mesa, Arizona, temporarily living in Springville, Utah. After the meeting, one lady from Hawaii came up to me and mentioned that she was from Thatcher, Arizona. I could not believe it. Here I was so far from home in a foreign country that is not generally the travel destination of many Americans and I meet a lady that knows my mother and her family. Her name was Shauna Thee, formerly, Shauna Peurdy.

Following the sacrament services, everyone was invited to eat dinner. I asked if this was a once a month ordeal that takes place on Fast Sunday and John reassured me that they have food every week after the meetings. We might go back to that ward just for that reason. While eating we had a great opportunity to talk with different members of the branch about what it is that we are doing in China. Some of the members are going to see if they know of any companies that will fit our criteria and allow us to survey/visit them.

The LDS church branch that we attended was only for foreigners. The Chinese government does not allow us to meet with the Chinese members of the LDS church, so they have a Shenzhen church branch for foreigners and a church branch for Chinese citizens. The Chinese branch is made up of roughly 15-20 members. John said that most of them became members while attending schools in the U.S. Preaching is not allowed in China, so these members were introduced to the gospel outside the control of the Chinese government.

Monday, July 4, 2005

Today we have a translator working with us that was recommended by the members visiting from Hawaii. The translator is blind, but he speaks great English. His wife came along to help him get around. He owns a massage parlor, but he jumped at the opportunity to translate for more money than he makes doing massages.

Our translator was able to negotiate with a local driver to take us around for the entire day for a cheap price. We learned however, throughout the day that the car was not comfortable and the air conditioning did not work well. The car was sort of a compact mini-van, so Tyler and I sat in the back, right up against the back door. The sun came through the back window and made us so hot. Unfortunately, the sun was at our back on both legs of the trip, so we were miserable. We spent more than five and a half hours in this awful car. It was hot and very uncomfortable. To make the situation worse, the car had no shocks and the roads were terrible. I cannot describe how miserable our transportation situation was.

Shenzhen Tong Chuangxin Electronics

We visited with the general manager of the manufacturing facility and what seemed to be his assistant. I exchanged business cards with the general manager, but his card was entirely in Chinese, so I was unable to read his name. The company specializes in printer circuit boards (PCB), digital cameras, mp3 players, car alarms, and other electrical devices. The majority of their production is sold to a Taiwan company that adds more value to the product before selling and shipping the product to the U.S. They do sell some printer circuit boards (PCB) directly to the U.S. companies.

We took a quick tour of the facility by walking down a hallway and looking through windows into the production areas on both sides of the hallway. As I mentioned before, the tour was quick and I did not notice anything extraordinary about the company or their processes. The layout could be improved upon. They had too many different rooms where processes took place, so the product traveled in batches.

Silver Age Engineering Plastics, Ltd.

Silver Age is a technology enterprise that is involved in researching, developing, and producing new types of modified polymer materials. Silver Age has passed certificates of ISO9001:2000, GP, American safety standard UL, Japanese Toy safety standard ST mark and European standard EN71, EN1122.

The facility that we visited is mainly engaged in the production of modified plastics (resins) for several different industries, such as, IT, office equipment, mobile phones, communication, machine, toy, cable, etc... At the facility we met with Eric, the sales manager.

The facility that we visited is part of the supply chain for products that are sold to companies in the United States. They make the resins that are used by other companies to produce plastic parts for products that are sent to the U.S. For example, Silver Age sell resins to Harmon, a Chinese owned company that produces parts for Apple. Silver Age is part of the supply chain for products used in the U.S.

It was interesting to see how they produce resins. They had an extruder that had a die with about 8-10 ¼ inch holes in it. The plastic shot through the die to form long strands of plastic that immediately went into a cool water batch. The strands were pulled

through the water bath and through a drier to remove water. The strands of plastic were then cut up to form the resin pellets that are sold to companies.

Tuesday, July 05, 2005

Viasystems

[Confidential information removed]

Shenzhen BIT Industry

General Manager attended to us.

Wednesday, July 06, 2005

This morning we were supposed to travel to Nanhai city to visit Yibang Precision. Michael, an engineer from Gatehill, was unable to negotiate a reasonable price with the local taxi drivers, so we did not make the trek. We returned to Gatehill International to try and find a driver to take us to visit the company, but we were unsuccessful. I used my time communicating with different companies that we would like to visit and summarizing all the visits that we have made this week. In the afternoon we visited Shun Hing Plastic Mould Co., Ltd., located in Shenzhen.

Shun Hing Plastic Mould Co., Ltd.

Shun Hing Plastic Mould Co.,Ltd. is a specialized manufacturer of plastic molds and injection molding. We were greeted at the front gate by Zhang, the director of quality at the manufacturing facility. We also met with the head engineer and the assistant to the marketing manager.

In meeting with employees of the company, I did not have many questions. The general manager had done such a great job filling out my survey that I did not have to clarify or re-ask any questions.

Shun Hing is mainly involved in the production of parts for air-conditioning and office equipment for customers such as Panasonic, Canon, Xerox, Epson, Hitachi, Ricoh, Samsung, etc... The plastic parts include air-conditioning housing, fax machines, copy machines, CD player, mp3 player, television sets, mice (for computers), vacuums, etc... The majority of Shun Hing's products are for Japanese companies. They sell some molds to companies in Korea, India, Malaysia, and America. In addition to molds, they also sell some injection molded parts directly to some U.S. companies. The majority however, are sold to Japanese companies and then sold in the U.S.. Proctor & Gamble (P&G) is one of their biggest U.S. customers. They produce parts for vacuums and towel dispensers for P&G.

Shun Hing produces some huge molds for injection. While touring the facilities I got to take a look at size and the complexity of the molds, and the work required to maintain a mold. Periodically the molds have to be cleaned and polished before production can continue using the mold. On the other side of the facility, the company used their own molds to produce parts. Some of the parts that I saw were parts to telephone receivers, vacuum handles, drink dispensers, seats, container caps, mice (for computers), and other small parts. They had a wide range of injection molding machines. The largest could handle 750 tons and can produce molds four or five feet wide. They also had smaller injection molding machines for smaller parts and some vertical injection molding machines. I am curious to know the advantage of the vertical injection molding machine or what the difference is.

On the way home from Shun Hing, Tyler and I had a discussion on order. I mentioned some of my thoughts about a conversation that I had with a taxi driver the previous day. The taxi driver asked, “How much does a taxi driver make?” Through my translator I responded and the conversation continued to a point where I told him that most people in the U.S. have their own car. I told him that I had my own car and that Tyler had his own car. He then asked, “Are not the streets crowded and the intersections jammed?” I didn’t know how to respond and I do not remember how I responded, but I know what I thought. I thought to myself that the streets are not more crowded, maybe because we have wider roads and they are organized better. I have no doubt that the traffic jams and problems that exist in transportation in China are due to lack of order and that is part of their culture.

There are no traffic laws in China. Chinese drivers pass cars by driving in the shoulder. Drivers do not care about the lines that divide up the lanes on the streets. If you can fit, then go. Drivers drive on the wrong side of the road. Traffic jams are commonplace and often all the cars are in a deadlock, unable to move. They drive with the mentality that if you do not pull forward an inch, then the next guy will and that is being taken advantage of. They stick their car out into traffic and push their way into where they are going. In the picture below (that I took today), not a single car is moving. Everyone is blocking each other from moving. I believe that the order and laws that exist in driving in the U.S. decrease the time that it takes to get from point A to point B.



Figure I-1. Traffic in Guangdong Province, China

Thursday, July 7, 2005

Hai Xing Precision Machinery Co.,Ltd.

(No activities recorded.)

Minglida Precision Machinery Co.,Ltd.

(No activities recorded.)

THERMODISC-EMERSON

Friday, July 08, 2005

This morning at 8 AM, 6 PM MST, I had my friend Ty drop off a bouquet of flowers on the door step of my house in Springville. While talking to my wife, I asked her to check the porch and to her surprise she found the bouquet. She loved the unanticipated gift.

This morning we took a taxi north about 35 minutes to visit a company in the southern part of Dong Guan. We had some difficulty finding the location of the manufacturing facility. The taxi driver had detailed instructions, but could not find the facility. We finally called the company again and they directed the driver where to go.

Ten Tech Composites Technology Corp.

Barry, an employee of Trek Bicycles and a former graduate of the manufacturing program at Brigham Young University, is living in China for ten months to set up the production of a couple different product lines for Trek Bicycles. Barry provided us with the contact information for Ten Tech Composites Technology Corp. and a man named Lewis, a manager and part owner of the Taiwanese company. Ten Tech Composites is specialized in the manufacturing of carbon fiber bicycles frames and forks. Ten Tech Composites major customers are Scott (the biggest bicycle company in Europe), Trek Bicycles (the largest bicycle company in the world), and another Canadian bicycle company. Ten Tech Composites is a Taiwanese company that is owned by four different individuals.

I was much more interested in visiting Ten Tech Composites than any other company that we have visited so far, due to the nature of their manufacturing. I enjoy mountain biking, so I had an increased interest in learning how the carbon fiber frames are produced.

Ten Tech Composites was an excellent host. We were greeted by Lewis, a managing director, upon arrival and were led into a conference room where we were offered bottled water, soda, chocolate, crackers, and pistachios. We were then introduced and greeted by the president and part owner. We first took a tour of the facility, which took nearly two hours due to the numerous questions that Tyler and I had on the production processes of carbon fiber bicycle frames. Two of the frames that we saw in production are currently being ridden in the Tour de France competition by a couple of different athletes.

[Description of manufacturing processes omitted to preserve confidentiality.]

The sheets are made up of thousands of carbon fibers that are mixed with a resin. Lewis said that an inch of those sheets has more than 24,000 carbon fibers.

The bicycles for Scott are mostly shipped to Holland for further processing. Trek Bicycles are taken to Hong Kong and then shipped to the U.S. for distribution.

Lewis also set up a visit with another company that his wife works for, which is called, Taiwan Strong. Taiwan Strong specializes in the manufacturing of tennis racquets and is also working with Trek Bicycles to produce a bicycle trailer.

Oddly enough we returned to Gatehill International for less than one half hour, to be picked up and driven back past Ten Tech Composites (a forty minute travel time from Gatehill International) on the way to ShiLiHe Machinery and Equipment Co. (a ninety minute travel time from Gatehill International). Somewhere, planning failed and valuable time was lost.

ShiLiHe kindly sent a van and driver to pick us up and take us to ShiLiHe Machinery and Equipment Co., located in the northern part of Dong Guan.

ShiLiHe Machinery and Equipment Co.,Ltd.

We were welcomed to the facility and directed into a small conference room at the front of the small building. We sat down on stools and then the people that we would be meeting with entered and introduced themselves to us. We exchanged business cards and I noticed that their card was not in the English, a sign and that they may not do business with U.S. companies.

ShiLeHe Machinery and Equipment Co., a Chinese owned company, specializes in the designing and manufacturing of electrical and machinery integration machines,

equipments for special purpose assembling, clamping, processing, and testing, as well as precise clamping apparatus, nonstandard instruments, and measuring tools. A main selling point that they emphasized to me is that they are able to reach precision of 0.002 millimeters. They also mentioned that they are equipped with high precision testing instruments, but I did not see them in touring the facility. It may be that that equipment is located at their other production facility that is much larger than the one that we visited.

The company seemed to be expecting some great and wise improvement suggestions from our visit. We felt as though we were leaving them with less than they expected, but there was not much that we could do in one visit to build upon what they had.

Saturday, July 9, 2005

Early this morning we traveled to Shekou to take a ferry over to Hong Kong. We had a two-fold purpose for our trip. In order to stay in China for more than thirty days, we got what is called a double entry visa, where each entry into the country is good for thirty days. Going to Hong Kong and returning to China would give us another thirty days to stay in the country for our research. Additionally, we would meet two of our professors from Brigham Young University. The purpose of their visit is to checkup on the progress of our research and to provide us with any direction that might be needed.

We departed YuLu early in the morning in order to get on the 9 o'clock ferry from Shekou to Hong Kong. The ferry was reasonably priced, costing us \$75 RMB each. The trip lasted more than 50 minutes, but included some beautiful scenic views. The boat was fast and had a double hull. The swaying of the ship however, still managed to make

me feel queasy and sick. I laid my head back and quickly breathed in and out to keep relaxed.

My first glances of Hong Kong were ones of amazement. The buildings were enormous and the number of them was astonishing. I saw buildings with familiar names, such as, Phillips, Sharp, Canon, ING Direct, Panasonic, Olympus, and many more. I realized that Hong Kong was not going to be anything like what I had experience so far in China.

I was happy to get off the ship and excited to experience a new culture and atmosphere. We traveled by taxi directly to the LDS temple in Kowloon. The temple is located at 2 Cornwall Street, Kowloon Tong. The temple was not far from the ferry port and we wanted to get into to the 11 o'clock session at the temple. We made the temple session and had a wonderful time participating in the sacredness of the temple in a foreign country. The Hong Kong temple was dedicated on May 26, 1996. It is a unique temple that is built vertically to utilize the real estate. The building houses the temple, the mission office, and a chapel for regular church meetings.

After our visit to the LDS temple, we decided to find our hotel, so we flagged down one of the many taxi cabs and indicated that we wanted to go to The Peninsula Hotel. We were not staying at that particular hotel, but we were told by several sources that The Peninsula Hotel is a very famous and prestigious hotel and we were staying in the hotel next door to it. I was uncertain about the quality of our hotel, due to its name: YMCA Hotel. To my amazement the hotel turned out to be a very high quality hotel.

We dropped off our belongings at the hotel and we headed straight for McDonald's. I cannot remember the last time that I ate at McDonald's in the U.S., but I

was craving it. I never eat there, but that changed after eating Chinese food for 3 weeks straight. We wanted what we referred to as “normal food.”

The area surrounding the hotel was full of different shops and vendors selling all types of items. We spent the rest of the afternoon walking around the streets shopping for different things to take home with us. Each of us purchased imitation purses for someone special back home. I purchased several ties and a shirt. We had hoped to find more things that were cheap, but we found out that things generally cost the same as in the U.S.

We returned to the hotel and waited for a phone call from our two professors. They flew in Saturday evening in a direct flight from the U.S. to Hong Kong. Professor Hawks suggested that we take advantage of the clear evening and travel over to the peak tram to get a good view of Hong Kong. Since we had only two days to experience Hong Kong, we jumped at the suggestion and went. We took the Star Ferry from the peninsula off to the island and found our way over to the peak tram. The line was long, but the wait was worth it. The view was spectacular.

Sunday, July 10, 2005

We took the long walking route to get to the church house this morning. Catherine, a colleague of mine at the TALL Group and a student in Professor Hawks’ institute class attended the same church meeting as our group. Catherine is in Hong Kong training tutors and setting up the TALL system. She mentioned to me the difficulties that she has had in setting up the system and getting support from different entities back in North America. I was saddened by the news and I wish that I could have done something to help the situation.

The branch was small. A member of the branch presidency indicated that they have about eight regular members, so he asked me to give the opening prayer. I was happy to do so.

After the church services we had to go eat. Professor Hawks asked Catherine if she wanted to eat lunch with us. I got worried when I heard the words leave his mouth. Professor Hawks did not know that Catherine is a vegan, a strict vegetarian or someone who eats no animal or dairy products. Having worked with Catherine for many years, I knew about her diet, so I was worried about the options of restaurants. Professor Hawks did not retract his offer for having lunch with Catherine, so we all ate lunch at a Chinese vegetarian restaurant. The food was not bad, but I would not pick to eat there on my own. Catherine has been alone in Hong Kong for a couple of weeks, so she enjoyed the company. I was glad that we had lunch with her, but I did not want news of the experience getting back to the TALL Group, my place of employment.

After lunch I took a long nap. I slept for more than two and a half hours. I was so tired from all the companies that we had been visiting over the course of a couple of weeks.

Monday, July 11, 2005

This morning we returned to China, accompanied by Professors Hawks and Miles. We departed Hong Kong early in the morning to facilitate a visit with a president of a company that had limited time to meet with us. The ferry boat left Hong Kong at 7:45 AM and arrived at the Shekou port approximately fifty minutes later. Our means of transportation was confused about our original plan, so we ended up waiting more than a half an hour for him to arrive.

We went with Tony, the supply chain manager at Gatehill, to meet with the brother of Tony's former colleague with a previous employee. The meeting turned out to be more than just a meeting with a president concerning our areas of research. The discussion expanded into a discussion of China and how it is changing.

Sino Security International (SSI)

This company will not be in the study, but I learned valuable information from the discussions that we had with the president of the company, Ray. Before I begin to summarize what I got from the meeting with Ray, let me give some background on Ray. Ray is an American citizen, but he was originally born in China. He lived most of his growing-up years living in California. He attended college in the U.S., at UCLA. After college, he decided to come back to China to check out what was going on. He stayed and worked for a couple of different companies.

One of the companies dealt with the production of ballasts (lights). I am not sure what capacity he filled in that company, but he would give advice to someone about the direction of the company. The company was targeting the American market, but the competition was going to be too great, so Ray advised against the objective. The company was sold, but he learned some important ideas that were laid out in the company. He learned about manufacturing flow. He learned that there is a process involved and it must be laid out properly for the production to flow. He said, "You cannot just buy a building and set up manufacturing. You build a building according to the manufacturing flow." He also learned that nobody will buy a company that does not have any value, so you have to add value to it.

He has used those strategies in his current endeavors. Sino Security International (SSI) is a company that specializes in security technology. The interesting part is that all the products come from the United States. Ray mentioned the huge trade deficit between China and the United States, so as an American citizen, he decided to do his part to decrease the deficit. He imports security products from the U.S. to be sold in China. The security products that he buys from U.S. companies have an 80% markup by the U.S. companies; however, Chinese companies are only commanding a 15-20% markup for the products that they are selling to U.S. companies.

Another endeavor is a company that produces molds for injection molding, which does sell molds to U.S. companies. One U.S. company he mentioned that purchases molds from this company was Gibson guitar. We asked permission to visit this injection molding company and he consented, so we will visit that company in the near future.

ZTE Corporation

ZTE is a state owned company that does little or no selling of products to the U.S. and therefore it will not be included in the study.

ZTE is either the largest or the second largest company in Shenzhen, and is growing. They are constructing a new tower to house all the Research and Development (R&D) of ZTE, which includes several ZTE R&D groups around China. The current facility in Shenzhen employs approximately eight thousand employees. We met with a single production manager that oversees only 300 of those employees and had no knowledge of products sold to the U.S.

The company did not fit the criteria of the companies to be included in the study and the employee had no idea about the specifics in manufacturing products for U.S. companies, so I did attempt to question him.

Cuo Sheng Precision

Later that afternoon we met with Shu Qin Song, the general manager of a Chinese company called Cuo Sheng Precision. Shu Qin Song's business card indicated that his business was, "A professional manufacturer for precise mechanical parts, mold settings, a variety of testing of assembly tools; competent for both design and fabrication of automatic mechanism; precision up to 0.005mm." His business seemed to be involved in the manufacturing of different fixtures and components for U.S. customers.

When asked how much of his production was sold to U.S. customers, Shu Qin Song indicated that 20% of his production was for U.S. companies and almost 30% for Japanese companies. He would not indicate to us who the U.S. companies were that he manufactured products for in the U.S. He said that that information was confidential; however, he indicated that he had 3 companies in the U.S. that he manufactured parts and components for.

I learned an interesting fact today: Kentucky Fried Chicken has over 1,300 stores in China.

Tuesday, July 12, 2005

Sino Mould

While meeting with Ray on Monday, he suggested that we visit this company. I could not tell what his association was with Sino Mould, but they seemed very willing to meet with us per his request.

Sino Mould is a privately owned company that specializes in high-quality export plastic injection molds and injection molded products. Forty percent of the molds are produced for American companies. They export to 20 different companies and do not do business with Chinese companies. Julia, the vice-president and part owner, explained that they originally had problems with customers in China and the Shenzhen area. She said, “Customers made frequent visits to the factory. Too involved in the project.” The solution was to become a company that dealt with foreign companies and provide them with unique services.

I asked Julia several questions about the shipping of molds to the United States and these are some of the responses that I received: “The shipping of a mold generally takes one month or four weeks by sea. The travel time is approximately 20 days from China to New York, but it has to go through customs.” “It costs about \$1,000 USD to send a mold to the U.S. by sea.” “Fifty percent of our molds are air-freighted to the customer. You pay for air-freight by kilograms.” “Most companies are in desperate need of the mold and cannot wait for the mold to travel four weeks by sea, so we air-freight it to them. For those companies that plan ahead and can wait for the mold to travel by sea, they save money.”

Julia gave us the tour of the factory. The Sino Mould factory was the cleanest factory that I have seen in China. Our professors have visited several companies in China and surrounding countries and they were impressed with the layout and state of the factory. In discussing the cleanliness of the plant, Julia said, “This facility is a trial. We are gaining experience. We want to set up plants devoted to specific industries such as

medical, automotive, etc...” I found it interesting that Julia believed that they have the capability to shorten the lead times by using their employees.

After our tour of the factory we met the president of the company, John. His English was poor, so it was difficult to understand what it was that he wanted to say. I noted several keys points.

- “Production manager meets with the customer to determine the needs and communicates with them.”
- “U.S. customers are worried about trust, so communication is vital.”
- “Weekly report sent to the customer by email. It includes the schedule and the stage where the mold is.” They also include a picture of the product.
- “U.S. company needs to explain their desires. In-depth explanation.”
- “Do not pressure Chinese company. Encourage the Chinese company to notify all information, not just the positive information. Chinese commonly hide the negative information about the product, which widens the communication gap.”

I do not know if this is of note or not, but Julia said, “The Italian customer is the most difficult.” She explained that they are uncertain and too relaxed in business.

Shenzhen DingQiang Industry Co., Ltd.

(No activities recorded.)

Before my committee chair, Professor Miles, returned to his hotel in Shekou for the evening, I mentioned my concern about needing to survey more companies that were outside the scope of Tyler’s study and within my own. We have been trying to visit

companies that are suitable to be included in both of our research. I have found I am lacking sufficient data from larger sized companies.

Wednesday, July 13, 2005

Today was the last day of the visit by Professors Hawks and Miles. Tomorrow they will be returning to Hong Kong to travel by airplane back to the United States.

This morning Ben, the head of the engineering department at Gatehill International, was late picking them up at their hotel in Shekou, so Tyler and I waited for their arrival. We had scheduled to depart at 8 AM, but we did not know where our professors were. Upon their arrival, we found out that our means of transportation was too small to carry the entire group of us to the appointment, so our professors stayed behind to work with another student from the university, who is doing an internship with Gatehill International. Helen (our translator), Tyler, and I traveled to survey the company.

Cheng Fat Springs Mfg. Co.,Ltd.

(No activities recorded.)

The Green Couch Restaurant has been closed for the past couple of days for some strange reason. Today, the Green Couch Restaurant finally opened back up during our professors' visit, so we took them to eat at the restaurant that we normally eat at once a day. Both of them thought that the restaurant was extremely nice for the area surrounding it.

After lunch, Professor Miles and I visited another company with our translator, Helen. Professor Hawks and Tyler did not visit the company with us. They needed time to meet and discuss changes to Tyler's thesis. We were unable to visit enough companies to follow the original design of Tyler's thesis, so Professor Hawks, Tyler's committee

chair, suggested a new approach to his thesis with the information that he had collected. Professor Miles, my committee chair, discussed the direction of my thesis during our trip to our afternoon appointment.

SWE Plastic & Metal Co.,Ltd.

Founded in 2001, SWE Plastic & Metal provides semi-manufactured goods and other services to large-scale enterprises.

Thursday, July 14, 2005

This morning Professors Hawks and Miles went back to Hong Kong to prepare for their flight back to the United States.

Today we were scheduled to visit four companies with Tony and we were successful in meeting with all four. Tony effectively scheduled four companies that were relatively close to each other, so we were able to meet with all of them in a single day. We have struggled with Michael to schedule appointments with companies that are in the same area, so we have only been visiting two companies per day.

Shenzhen Kingcera Electronics Co.,Ltd.

(No activities recorded.)

Shenzhen Huachi Science and Technology Co.,Ltd.

(No activities recorded.)

Neich Medical (Shenzhen) Co.,Ltd.

(No activities recorded.)

Shenzhen Malata Mobile Communication Co.,Ltd.

(No activities recorded.)

Friday, July 15, 2005

This morning, Michael went with us to visit several companies. Tyler and I were not aware of the companies that we would be visiting, but as we got close, we recognized the area and asked what company we were going to visit. Michael replied, “Cheng Fat Springs Mfg. Co.,Ltd.” We had already visited that company two days earlier, so we turned around and went to Shenzhen Heweihong Anti-static Instrument Co.,Ltd.

Shenzhen Heweihong Anti-static Instrument Co.,Ltd.

(No activities recorded.)

Saturday, July 16, 2005

This morning I finally got to talk to my wife after she had been away to girls’ camp for the entire week. This year she was in charge of the entire camp. She was a little overwhelmed with the responsibility of the assignment, but everything went well. The camp was a success and the experiences unforgettable. I could sense feelings of accomplishment and relief in her voice. I was just glad to have the opportunity to talk to her on the phone again because she did not get mobile reception up at the camp.

After talking to my wife for quite awhile, Tyler and I took Joseph to visit a manufacturing company. Our driver had no idea where he was going. I have never seen a person ask for directions so many times. It was a bit frustrating. I finally dialed the telephone number of the company that we were supposed to visit and gave the phone to him to ask for directions. He had me call the company back four or five times before we found the location of facility. We were relieved when we finally arrived.

Taiwan Strong Sporting Goods, Inc.

Lewis, a general manager at Ten Tech Composites, contacted Taiwan Strong Sporting Goods and helped us to set up an appointment to visit the facility. Barry, a former graduate of the manufacturing program at Brigham Young University, is currently working with Ten Tech Composites and Taiwan Strong to set up the production of a couple different product lines for Trek Bicycles. Barry is working with Taiwan Strong to set up the production of a baby carriage that is pulled behind a bike, hopefully a Trek bike.

Lewis's wife, Wendy, a special assistant to the president, met with us and gave us a tour of the facility and an overview of the company. Taiwan Strong Sporting Goods is a Taiwan company that specializes in the production of tennis racquets, racquetball racquets, hockey sticks, golf shafts, women's softball bats, badminton racquets, squash racquets, walking sticks, ski poles, and other sporting goods.

The process for the producing of their products was virtually the same as the processes used at Ten Tech Composites. The process however, is much simpler for the products at Taiwan Strong. The bicycle frames of Ten Tech Composites are more complicated and require more precision and assembly. One difference in the two companies is that Taiwan Strong produces more of their own carbon fiber for their production, instead of importing rolls of carbon fiber, like Ten Tech Composites.

At the conclusion of the tour, Wendy gave us each a tennis racquet. I told her that I would use the racquet and send her feedback on the racquet. Later, I mentioned to Barry the gift that we had received from Taiwan Strong Sporting Goods and he said, "Those

tennis racquets are so cheap for them to make. They cost about five bucks to make. The mark-up on tennis racquets is incredible.”

In the afternoon we relaxed. We have been so busy and working so hard that the tiredness finally caught up to us. We did purchase a basketball from a local street vendor and we spent some time playing basketball. Several people gathered around to watch us play and we eventually developed some teams to play a game. It was enjoyable.

Sunday, July 17, 2005

We attended church at the Shenzhen international church branch, which meets in Shekou. This week there were several new visitors. We had arrived more than forty minutes early for church because the driver drove really fast. At some points in the trip he was pushing over 140 kilometers per hour. I prefer to go a little slower than that. Other visitors showed up early to church services too. I suppose we all wanted to make sure we arrived on time.

Before the meeting began I met Ray, the president of a company called JLI. He works in the manufacturing of digital storage devices or external hard drives. He was visiting some of his suppliers this week up in the city of Dong Guan. He agreed to see if some people would fill out our surveys for our research.

The church meetings lasted almost two hours this particular week. We had a single speaker during the meeting, a gentleman from the Philippines. It was difficult to understand what he was saying during the talk, but understood every word of his testimony at the conclusion of his talk. As we prepared to sing the closing hymn, I noticed that the lady who had led the music had stepped out of the room to take care of a child, so I quickly stepped up and filled in. The song was one of my favorites, “Nearer

My God to Thee.” I prefer the sound of the words in Spanish, but the meaning is the same. “There let the way appear, steps unto heaven; all that thou sendest me, in mercy given...still all my song shall be, nearer, my God, to thee; nearer, my God, to thee, nearer to thee!”

Scot, the branch president, returned from traveling this week, so we got to chat with him for awhile. He served a mission in Taiwan, so he speaks Mandarin Chinese. He has been in China for more than a year working for Petters Consumer Brands, LLC. Scot is currently working with the Polaroid brand. They have developed and sell digital cameras, portable DVD players, and plasma televisions, all under the Polaroid brand. A couple of years ago they purchased the rights to the Polaroid brand as the company was struggling and eventually filed for bankruptcy. Scot explained that Polaroid had enjoyed a monopoly on the industry for decades and they could not handle or adapt to the competition that arose in the industry. The Petters Group purchased the brand and has been using it to introduce products and market them. Scot has been heavily involved in the production of those products here in China.

During the conversation, he said that he believes that there are currently three types of companies in China. First, there are entrepreneurial companies from Taiwan and Hong Kong. Scot explained that these companies have a greater understanding of business principles and strategies. Second, there are Chinese entrepreneurial companies. In talking with Scot, I asked, “Where do these companies get their funding?” He responded that he did not know. Third, there are Chinese state owned companies. Some of these companies have become private companies, but they have a culture that is hard, if not impossible to break.

On a spiritual note, Scot had some interesting comments about what is going on with the LDS church in China. It was announced during the church meeting that it was the last Sunday for a young couple and that they would be attending another branch. The couple was sitting behind me and I thought nothing about the announcement. Members are constantly moving and changing wards. This couple however, was not moving. Scot explained that the Chinese laws have changed. They state that Chinese citizens are allowed to meet together and hold services, whatever the religion. There is to be no sharing of the gospel with non-members, but current members can meet together. The LDS church understands that law to mean that all Chinese can meet together, so the young couple that sat behind me was invited to attend the branch for Chinese members. Both of them are from Taiwan and are technically Chinese. They have both served missions, so they understand the function of the LDS church better than most of the current members of the Chinese branch and they can help to develop leadership in the branch. This change seems like a small thing, but the results will be great.

After church and during lunch with the church branch, I talked with Robert, an industrial designer that works in product development. He has been in China verifying the quality of different gear and clothing used in extreme sports such as motor bikes, snow mobiles, etc... Robert is visiting several different suppliers that manufacture goods for his company and agreed to give us some contact information for them.

Monday, July 18, 2005

Today was a catch up day for Tyler and me. We have been visiting so many companies that we have been unable to keep up with writing summaries and analyzing responses. We spent time checking on the translations that Helen had done for us and had

her translate new surveys that we had received. Tyler's survey has more open ended questions than my survey, so it takes her much longer to translate his surveys. I worked closely with Tony and Michael today in order for them to continue sending my survey to manufacturing companies. We will not be visiting many more companies due to the time that is required to visit them, but we can still have companies fill out our surveys.

In the afternoon, Tyler and I went shopping and we both purchased suits for less than seventy dollars. My wife requested that I purchase a tan suit, so I purchased a tan suit. I am very pleased with the suit and I am excited to wear it. I do not know however, if my excitement is strong enough to wear it in Utah where it is currently one hundred five degrees Fahrenheit.

Tuesday, July 19, 2005

Today I worked on the written portion of my thesis, specifically the first two chapters. I have been worried about not getting enough data from companies, so I spent some time following up with Tony and Michael on companies to survey. We sent out surveys to several companies, so hopefully I will hear back from them shortly.

In the evening we played some basketball with some of the Gatehill employees. One of the Chinese ball players spoke a little bit of English and said, "Let's just play for fun." He said that we would play three-on-three and that it would be the three Americans on a team. In a humble summary, we beat up on them. They play winner keeps the ball, so we had possession of the ball the majority of the time. A group of spectators formed and they would applaud at a three-point shot or a nice drive. It was a fun game and great workout.

Wednesday, July 20, 2005

Still needing more data from companies, I asked Helen, our translator, to call different companies to request their help in taking a survey. I currently have data from 18 different companies, but I need to collect data from at least 14 more companies in the area.

Thursday, July 21, 2005

(No activities recorded.)

Friday, July 22, 2005

(No activities recorded.)

Saturday, July 23, 2005

We had high expectations for the day. It was out last Saturday in China and we had a lot in mind to do. The day before we had arranged with Cliff and took them up on their offer to take us to buy different items for ourselves and our families. Sarah, Cliff's wife offered a couple weeks earlier to negotiate prices with the local merchant for us. After being in China for several weeks we knew that she would get much better deals than we could get on our own.

Cliff said, "We lost face."

Sunday, July 24, 2005

We were scheduled to be picked up at 9:30 AM to travel to Shekou to attend church services, but our driver over-slept. We had no idea what to do or who to contact. The driver tried to find a taxi to take us, but he was unsuccessful and we eventually met up with our designated driver. The driver was the one that normally took us to church on Sunday and he always seemed upset or angry.

We arrived late to church today, but quickly entered in and sat down. Several new people were in the congregation. Later, I found out that those who I assumed were new and visiting, were actually regular members that were back from vacations in the United States.

After church we walked over to Cliff's house. The distance was not far from the church house, but the heat and humidity made the walk brutal. I quickly rolled up my sleeves and tried to walk in the shade instead of in the direct sunlight. We got plenty of stares from the locals. Two short blond guys and one tall dark-haired guy walking down the street. We must have been an amazing sight in our white shirts and ties. We looked like LDS missionaries. I wonder if LDS missionaries wearing white shirts and ties will walk the streets of China someday. I think it will happen.

It was a relief to reach Cliff's house. The air conditioning was perfect. I just stood in front of it for several minutes and tried to stabilize my body heat. Meanwhile, kids were poking and pushing me. They, especially the kids, were anxious and eager to see us. They have really enjoyed our visits. It will be sad to say goodbye.

Tyler and Joseph played some Chinese game with Cliff and his mother-in-law, while I fell asleep. I was exhausted and could not fight it any longer. When I awoke, I could smell the food that Sarah and her domestic helpers had prepared. It smelled wonderful. Soon after I woke up, we sat down to a great authentic Chinese meal. Sarah had prepared several different dishes for us to try, such as shrimp, chicken, beef, pork, green beans, cucumbers, and much more. Some of the food was spicy, while other dishes were sweet. It all tasted good.

At dinner Sarah talked about her experience as a child in a village far inside China:

Sarah's grandfather, on her mother's side of the family, had three wives. The number of wives that a man had indicated how much wealth he had. The second wife was his favorite wife. The first wife however, had more rights and privileges than any of the other wives. Sarah gave the example of her grandfather's birthday celebrations. The second and third wives would not ever attend the celebration.

Sarah's mother was born to the first wife, but the grandfather thought that the first wife had too much to do and was too tired, so he had the second wife raise her. From that point on, the second wife took over and essentially became the mother of Sarah's mother. Sarah's mother was not breast fed by either of the wives, but she was fed by another lady in the village. Because the second wife was favored above the other wives, Sarah was a favored grandchild.

Sarah said that one time the first wife said that Sarah's hair was too short and that she needed to grow it out. The grandfather immediately slammed down his walking staff and sternly said, "You have no right to tell her that."

At birthday celebrations for her grandfather, Sarah was shown favor. Each grandchild would approach the grandparents, which would be the first wife with the grandfather, since the other wives did not have rights at the celebration. The grandfather would give them each an envelope of money and touch their heads. Sarah remembers the grandfather showing her preference above the other children and scolding the first wife about not having any right to criticize to Sarah.

Sarah's mother and father had periodically threatened to take Sarah away from the grandfather and the village. Sarah said that her parents made a plan to take her away. Her parents gathered all the people of the village for a dinner and celebration. At the dinner the father announced that his family would be leaving and asked for the permission of the grandfather. The strategy included the fact that the grandfather could not say no in front of the entire village.

The plan worked and Sarah was taken away from her grandparents, which consisted of the grandfather and his second wife. She did not have contact with them for ten years. Eventually Sarah's parents had contact with the grandparents and Sarah was allowed to return to the village and the grandparents.

Sarah traveled to the village alone; her parents were not permitted to return to the village. As she approached the village, she encountered a person on the outskirts of the village working in the fields that immediately recognized her and said, "You have returned to us." I am positive that my eyes got big as she told us about the reaction of the person in the field. I had never heard of such a thing. I certainly have never received that type of treatment upon returning back to Mesa, Arizona, or anyplace for that matter.

Sarah's parents felt remorse for taking Sarah away from the family or the grandparents and they, especially Sarah's mother, continually told Sarah of their remorse as she grew up. There must be a greater sense of family in China, by that I mean extended family.

Sarah's grandmother, the second wife, has been dead many years. Sarah's mother constantly reminds Sarah that she must visit the grave of her grandmother before she can go and visit the house of the first wife, who is her actual grandmother. Sarah's mother

does the same thing before visiting the house of the first wife, her biological mother. Sarah's mother also visits her grave before calling her.

There are many traditions that remain in the Chinese culture; however, they are fading fast. Even between the generation of Sarah and her mother the culture is changing. During our visit, Sarah's mother refused to eat with us. Sarah set out a place for her to sit and eat with us, but still she refused. She later ate with the domestic helpers. Sarah ate with us, us being, Cliff, Tyler, Joseph, and myself. Sarah said that the women did not eat with the men, so her mother did not eat with us.

After dinner, and what I considered to be a fascinating discussion, it was hard to say goodbye. I knew that the chance of me coming back to China was slim, so it was a goodbye with little possibility of seeing them again. I had Cliff's daughter write her name on a note card and then, with the assistance of her dad, their address. I hope to stay in contact with them. We then said our goodbyes and headed for YuLu in a taxi.

Knowing that it was my last trip from Shekou to YuLu, I hung my head out the window and took as many pictures as I could. I do not think the taxi driver liked having the window rolled down, but I did not care. I was paying him for the ride. Pictures will help me to remember what it was like.

The evening was full of cleaning and packing up for our departure the following day. I was overwhelmed with feelings of how short the trip had been, but at the same time remembered the feelings I had had two weeks earlier of how long the trip seemed to be going. I had mixed emotions, but wanted to return home.

Monday, July 25, 2005

Today was my last day in China. It is hard to believe that it is time to head back home. The phrase, 'it seems like just yesterday that I got here' rings true. I got up early in order to facilitate everything that I needed to get done before leaving. The morning was filled with tying up loose ends.

We spent more than an hour waiting for the general manager of a toy factory in YuLu to fill out our surveys. They had previously indicated that the surveys were done and ready to pick up, but that was not true. The Chinese seem to tell you what you want to hear and disregard the fact that it is a lie. Several different people have mentioned that to us during our visits. While he filled out our surveys, Tyler, Helen, and I looked at the displays of all the toys that the company has done. The display cases were stuffed with different toys. I was not sure if there was a toy that they did not make.

We quickly returned from the toy factory and met up with Cliff, at Gatehill, to give us a tour of Gatehill International. We had been at Gatehill for five weeks and had never taken a step into their manufacturing facilities.

Before touring their manufacturing facilities, Cliff gave me a large box. I did not know what it was until he told me. A couple of days earlier I had spotted a vase that I wanted to purchase, but we failed to get the owner to lower the price to what I was willing to pay. Cliff told me that Sarah returned to the shop and negotiated with the owner to get the vase for \$150RMB. My mouth dropped. Cliff and I could not talk the owner down to \$240RMB. I later paid Cliff the equivalent of \$150RMB in USD.

We ate one last time at the Green Couch and hustled to the gather our bags for departure. We said some goodbyes to those that we became acquainted with during our

stay. We had a small mix-up with who was going to drive us to the airport, so we were worried about arriving on time for our flight.

The flight was short and sweet. We flew to nearby Japan to wait approximately 21 hours for our flight to LAX. Our one night stay at the Nikko Hotel was purchased by Japan Air Lines (JAL). The hotel is located next to the airport.

Tuesday, July 26, 2005

Tuesday was longer than normal due to crossing the International Date Line during the flight back to the United States.

Tyler and I could not help but sleep in this morning. The hotel beds were much softer than the beds that we had been sleeping on in YuLu Village and we were exhausted from the research that we had been doing. We did manage to get up in time to have our free breakfast at the hotel.

After breakfast we decided to venture out of the hotel and airport area to see a little bit more of Japan, so we visited the tourism area in the airport. We were disappointed with the options due to our limited time, but decided to visit the Kishiwada castle and the museum dedicated to the Kishiwada “Danjiri” Festival. We exchanged some US dollars into yen and after some difficulty, managed to get on the right train to the museum.

We arrived at the castle to find the doors shut and locked. A nearby sign in Japanese indicated two dates: 7/26 and 7/27. The Japanese letters were in red, so we assumed that castle was closed for some reason on those two days. Disappointed with the closure, we headed to the museum hopeful that it would be open.

The museum dedicated to the Kishiwada “Danjiri” Festival was small, but interesting. For two days every year, on the 14th and 15th of September, 34 danjiri floats decorated with fine, intricate wood carvings are pulled around the castle town by local townsfolk dressed in marching “happi” coats. It is said that the Kishiwada Danjiri Festival dates back to the Genroku Era (1703), and almost 300 years later, the tradition is still being perpetuated.

Fearful of not making it back on time for our departure, we hurried back to the hotel by train. The process of purchasing a ticket was much more difficult than when we left earlier. We managed to somehow persuade an attendant to show us how to purchase the tickets and where to go.

The flight home was long. A nearby typhoon caused a great deal of turbulence, which made me uneasy. During the turbulence I noticed how tight my grip was on the arm rests and how much I was perspiring. The plane was shaking, sometimes jerking back and forth. All that I wanted was a relatively smooth ride and some good movies to watch. To my disappointment, I did not get either one. I watched the movies that they offered just to kill time. I had purchased a copy of the Harry Potter book that was released the previous week, but was unable to read it on the plane. The motion and movement of the plane made it impossible to read and not get sick.

We departed Japan at approximately 5:30 in the afternoon and within two hours we were in total darkness. The darkness did not last long. Within two and a half or three hours more hours the sun was shining again. The amount of sun that was pouting through the windows of different passengers made it impossible to sleep. I tried but was unable to get any sleep during the flight. We arrived at LAX a little late, so we were pressed to

transfer to our next flight. We picked up our baggage, quickly got through customs and immigration, rechecked our baggage, and then ran to our next terminal. We checked-in to receive a boarding pass then went through the security screening. We got to the gate of our next flight and sat for no more than ten minutes before we boarded a small plane of less than 40 passengers.

The last leg of the trip was the longest. I wanted to be home. The day had been too long. I was happy when we finally landed in Salt Lake City and I saw Kimberly, my lovely wife. This trip will be one that I will never forget.