

MANUFACTURING QUALITY AND CULTURAL VALUES IN CHINA

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ABSTRACT

Popular and academic publications continually remind us that China has become the global manufacturing center for many international companies. However, quality problems appear to have increased in recent years, with many Chinese products not meeting international standards for safety and quality. We consider the relationship between cultural value dimensions and the Lean Six Sigma process as a quality management solution for Chinese manufacturing problems, employing the GLOBE cultural value dimensions to assess the possible effects of introducing Lean Six Sigma in China. Even though the GLOBE dimensions predict that Chinese values may be consistent with the lean Six Sigma values, implementing the practices in China may be difficult.

Keywords: Quality management, China, Lean Six Sigma, culture, GLOBE, manufacturing

INTRODUCTION

Globalization of product prices has forced and offered opportunities for many companies to extend their supply chains and manufacture their globally distributed products in China. These companies generally take advantage of low Chinese labor costs to enhance price competitiveness. So far most of the Chinese manufacturing facilities have not focused on optimizing their business processes and product quality, because they could maintain their competitiveness by low labor costs alone. However, poor product quality and safety issues are increasingly becoming a problem for international companies who have their products manufactured in China.

Most Chinese manufacturers produce product runs in large batches, sometimes without sufficient quality inspection or specification pre-tests, which can create large scrap and rework inventories, as a defect will be replicated in a large number of the units produced before notice. Recent international product recalls such as pet food contaminated with prohibited chemicals, drug supplies filled with blood thinner, toys covered with lead paint,

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and tires that fell apart at high speed have further increased the focus on product quality. Poor quality affects the consumers' safety and welfare as well as the potential profitability or even survival of companies. To maintain high brand equity foreign firms have a strong need for their Chinese suppliers to manufacture products which meet international quality expectations.

One of the reasons behind the quality problems could be increasing labor costs and strong international competition on generic products. The Chinese market may not be able to bear any local cost increases as they will lose some of their business to other countries who are increasingly able to manufacture at lower costs.

Chinese supply chains tend to be longer than elsewhere in the world (Meyer 2008; Hui and Tan 1999). Extensive subcontracting (in Chinese *cheng bao*) creates unintended results as critical knowledge has to be transferred down the value stream, and therefore the suppliers gain more and more power (Meyer 2008).

One consequence of very low labor costs is a tendency to employ labor to correct defects, rather than expending time to insure correctly meeting product specifications and quality levels before and during manufacturing. When defective products come off the assembly line, workers repair or scrap faulty products instead of producing the correct quality in the first place (Aminpour and Woetzel 2006).

Furthermore, Chinese manufacturers are engaging in a practice that Paul Midler in his book *Poorly Made in China* calls *quality fade* (Midler 2009). Quality fade refers to a sudden, and to the buyer unexpected, deterioration in the quality level agreed upon in a contract. Midler describes this as a deliberate and unpublicized habit of manipulating product specifications to widen profit margins. In the beginning of the relationship the Chinese manufacturer delivers to the foreign importer a quality product made after the specifications of the importer. Importers negotiate prices before ordering products. Throughout the production process the manufacturer will then withdraw key ingredients or substitute inputs for inferior ones. If the manufacturer manages to cut a corner, he or she will pocket the savings. If not, then he or she will try to use the fiasco as a way to raise prices. These changes are never announced to the importer, and they may be hardly noticeable. Importers have no idea of what is going on until their products fail. Usually the manufacturers ask for full payment up-front. This places the entire risk at the importer, who in turn must deal with the problems with the retailers of their product. Choosing another manufacturer may not be a simple solution to these problems as there is no guarantee that it will not happen with another manufacturer. Leaving a manufacturer also creates a worry about counterfeit products. If the relationship is dissolved the importer is in no position to learn about counterfeit activities. Taking legal action to settle the matter for a few containers is usually also not an option as it will place the entire business on hold, and the problem is usually small compared to the overall business. If the manufacturer did take responsibility of a faulty product it would solve the problem by offering a discount on future orders. Thus, the only way to recoup losses is to offer the manufacturer new orders. The manufacturer can then later make up for the losses by increasing the prices (Midler 2009). To gain insight into societal cultural background concerning this issue, let us look at "Thick Face, Black Heart" theory.

Thick Face, Black Heart Theory

“Thick Face, Black Heart” theory publications relating to business, government, and military relationships are traced back to a work by Li Zongwu from 1911 defining the ruthlessness and hypocrisy underlying many entrenched Chinese institutions and practices. Some Chinese are not comfortable with the discussion of the concept, and related publications have often been banned. We discuss details below, however the traditional Chinese character translation of Midler’s (2009) book in Taiwan is 黑心帝国, that is, *Black-Hearted Empire* (Midler 2011). The “Thick Face, Black Heart” cultural practice is discussed in Lakey (2007):

Indeed, while in China many great leaders are enshrined as morally unblemished, there are also very competent leaders who are morally dubious. Under those circumstances, performance, not morality, is the pivotal dimension in determining who the best leader is. When the task at hand is very difficult, and leadership is expected to be highly performance oriented, those displaying a low level of moral conduct are seen as being as prototypical as, if not more prototypical than, those with high moral standards. Although this observation may at first seem puzzling, it may reflect the fact that Chinese workers hold schemata of leadership that are consistent with the old Chinese adage of “thick face, black heart”. This saying suggests that to succeed in life (especially in one’s career); one may sometimes employ a certain amount of guile and underhandedness. Thus, an effective leader will sometimes display a certain level of moral “flexibility” or expediency coupled with high performance orientation. (Hui and Tan, 1999)

The Thick Black theory is discussed in detail in Li (translated by An Xin Zhao & Marilyn Zhang 1911/2009), Fang (2006), Low (1997), and Low & Shi (2001). Low (1997) provides a short but detailed account, with minor paraphrasing below, and indicates the practices remain relevant today:

Securing government positions:

1. *Emptiness*. The first requirement is to empty a person’s mind of everything that does not help in securing the appointment being sought, to have no other goals and no other thoughts, and must concentrate on the appointment and meditate on it daily.
2. *Boring in*. A person must seize every little opportunity to advance their prospects.
3. *Self-praise*. A person must constantly seek to bring their qualifications and importance to the attention of those who are in positions to help them.
4. *Flattery*. A person must ingratiate himself with those who can help. He must praise them to others who will in turn carry his praises back to them.
5. *Threats*. A person must be very subtle with their threats and avoid threatening people who have the ability to harm them. Threats should instead develop naturally out of their self-praise.
6. *Bribery*. Bribes should be given not only to the person who has the power to appoint a person, but also to their relatives and friends.

Six ways to keep an official position: The *Thick Black* theory observes that a government official would need to be seen to act virtuously and to smear himself with a layer of false benevolence, while at the same time pretending to be a religious and morally upright person. The six ways to keep one’s official position include:

1. *Emptiness*. A person should talk about everything, but say nothing and do nothing.

2. *Be obsequious*. A person must bow, bend and nod before their superiors.
3. *Be imperious*. A person should cultivate a haughty and disdainful attitude towards their inferiors, and must be seen to be unapproachable by subordinates.
4. *Be ruthless*. A person must be ruthless in pursuing their objective. However, to exploit the vulnerability of others, one must continue to maintain a virtuous image.
5. *Be deaf and blind*. A person must not hear criticism, or worse still be affected by it. One must therefore not see the reproaching looks of others. Reproaches must be allowed to pass by without pricking one's conscience.
6. *Harvest*. The purpose of a person getting the post in the first place was to put himself in a situation where others would pay for his favours, just as he previously paid for the favours of others. One does not expend all one's effort simply to acquire a job; one does it to enable oneself to sell one's influence.

Two methods for *taking care of business* emphasizes the importance of avoiding accountability or responsibility for one's actions and for making one's actions seem much more important or impressive than they really are. The two methods for achieving these objectives are:

1. *Sawing off the arrow*. Traditional Chinese medicine is divided into two domains, namely the "outer practice" and the "inner practice". A man who had been hit by an arrow was brought to a Chinese doctor of "outer practice". The doctor sawed off the arrow's shaft but did not remove the arrowhead. When asked, the doctor replied that this is a job for a doctor of "inner practice". Many people thus defer accountability by sawing off the arrow. They will try to do as little as possible and will always try to leave someone else to finish the job. Nobody cares if something goes wrong so long as the blame can be laid on whoever gave the final approval or finished the job.
2. *Patching up the wok*. When a housewife saw that her wok had developed a crack, a wok craftsman was summoned for the necessary repair. The craftsman asked the housewife to leave the room to build a fire so that he could burn off the soot and examine the wok more closely. After the woman left the room, the craftsman tapped the wok with a hammer until the crack enlarged further to just beyond the point of redemption. When the soot had been burned off, the housewife exclaimed, "The crack is worse than I thought." The craftsman agreed, saying "It will be a problematic job but you are lucky that I am such an excellent repairman." The housewife replied, "You are right. It would probably be impossible to repair the wok if the crack got any worse." This episode vividly illustrates that all too frequently, it is necessary to make a situation a little worse than it actually is in order to persuade others to appreciate your work even more. However, hitting the wok is an art and one must be extremely careful not to make the problem so bad that the defect becomes beyond repair.

We approach a solution to the kinds of problems caused by a "Thick-Black" approach to business by suggesting implementation of the well-known Lean Six Sigma process. We analyze cultural value dimensions and relate them to quality management processes, in an investigation of the compatibility between Chinese values and Lean Six Sigma processes. Kull and Wacker (2009) have identified eight values for Lean Six Sigma effectiveness. These factors are:

1. Decisions should rely on factual information
2. Improvement should require long-term orientations
3. Quality problems should be understood as caused by systems not people
4. Continuous improvement should be never ending
5. Stakeholder needs should be satisfied through internal change

6. Cooperation should exist with all parties
7. Decision making should be shared
8. Financial results should follow from customer satisfaction

These eight factors fit with the overall Total Quality Management (TQM) factors for quality improvement: customer orientation, full participation of all organizational levels, focus on business processes, focus on continuous improvements, build measurements, and have a long-term commitment. Since Lean Six Sigma builds on the values of TQM these terms will be used interchangeably in this paper.

Quality Management as a Way Forward for a Sustainable Advantage for Chinese Business

As most international companies are now relying on the manufacturing of their products in China, low labor costs no longer provide a competitive advantage, and many companies face price wars and squeezed margins. Companies who want to survive must rely on other forms of competitive advantages such as innovation and quality. A way of doing this is to exercise greater control of supply chains and require the Chinese manufacturers to implement quality programs to improve the utilization of factories and improve quality.

In the western countries quality management programs such as Lean Six Sigma have become an important aspect of most businesses to ensure long-term, sustainable competitiveness. Most of these quality management practices have been developed outside China as in Europe, Japan, and the US, where the cultural values are different from the Chinese. Implementing these quality management programs in China may be more difficult than in the countries where the cultural norms better fit the practices.

This study investigates how national culture can affect implementation of Lean Six Sigma processes in China. Understanding the cultural influences on the effectiveness of quality management practices can help managers overcome the challenges they may face in the pursuit of improvement of products and processes.

The remainder of this paper is divided into sections. Section two gives a short introduction to the evolution of Lean Six Sigma. In section three cultures according to the GLOBE study is defined. Section four elaborates on the cultural implications for the effectiveness of Lean Six Sigma in China. Section five describes gaps in the literature and gives suggestions for further research within this field. Lastly, the conclusion will sum up the findings.

THE EVOLUTION OF LEAN SIX SIGMA

Before conceptualizing the conditions facing managers in their effort to implement Lean Six Sigma practices in China, it is necessary to define the values of Lean Six Sigma. Lean Six Sigma is developed on the framework of total quality management (TQM). Originally Lean and Six Sigma were two separate approaches to continuous improvement, but when integrating both systems in the supply chain companies can benefit from synergies. TQM systems have been recognized for improving operational performance through the increase in the quality of products and services (Jung et al. 2008). The success factors of TQM implementation are based on the effectiveness of the company's customer orientation, full

participation of the organization in the process, focus on business processes, focus on continuous improvements, building measurements, and having a long-term commitment (Lagrosen, 2002).

Lean Management

A way to improve operational performance is to use lean manufacturing. Lean management originates from the Toyota production system developed in Japan after the Second World War (Lagrosen 2002). The foundation of the lean philosophy is to focus on the individual product and its value stream to reduce waste (Pepper & Spedding 2010). Waste (or *muda* as it is called in Japan) refers to anything other than the minimum amount of input that is required to produce the product such as time, effort, materials, and know-how. Womack and Jones (as cited in Pepper & Spedding 2010) have identified seven forms of waste under the lean philosophy: over production, defects, unnecessary inventory, inappropriate processing, excessive transportation, waiting, and unnecessary motion. The lean management approach to operational excellence will eliminate waste by identifying the value-added and non-value added activities in the organization.

Originally, the lean philosophy was applied to large manufacturing operations where a high volume of relative homogeneous products were produced (Pepper and Spedding, 2010). In operations where the product portfolio is relatively high it is harder to standardize the production. But the approach has also been successful in other industries.

Six Sigma

The Six Sigma approach to quality management has been recognized as being developed at Motorola by Bill Smith, but has gained more recognition after being implemented at General Electric by Jack Welch (Pepper & Spedding 2010). Six Sigma focuses on customer satisfaction through the objective of increasing product quality and decrease the defect rate (Turney 2007). The application of Six Sigma has mainly been used in the mass-manufacturing sector to reduce defects and variations, eliminate errors and to achieve excellence (Turney 2007). But recently it has also been used in the service sector as a change management tool (McAdam et al. 2005).

Lean Six Sigma

Whereas Six Sigma emphasizes quality, the lean philosophy emphasizes speed. Lean Six Sigma (LSS) is an integration of the two philosophies. Lean Six Sigma is a TQM tool where the objective is “to create a company culture that is characterized by increased customer satisfaction through continuous improvement, in which all employees actively participate” (Dahlgard & Dahlgard-Park 2006). Lean Six Sigma improves customer satisfaction by continuously improving the operational performance in regard to quality, manufacturing, and speed and variability issues (Salah et al. 2010). When implemented correctly the lean Six Sigma process should increase the organizational efficiency and thereby also profits.

Implementing Lean Six Sigma requires an organization that supports continuous improvement. The responsibility of a leader is to create a vision and to get followers to

pursue that vision through motivation (Kotter 1990). Thus, creating an organizational culture that supports continuous commitment has to be initiated from the top management team. The responsibilities of managers are to plan, organize, and push people in the right direction by setting goals and measurements for their performance (Kotter 1990). Managers are responsible for the day-to-day manufacturing processes and acts as an enabler of quality improvement processes by providing tools and by removing barriers (Wyman 2007). Employees play a significant role in the Lean Six Sigma effectiveness as they are the best for identifying problems and ideas for improvement. Thus, it can be said that Lean Six Sigma depends on the voice of the employee, and thereby the surrounding culture allowing for this.

CULTURE

Culture can be defined as “shared motives, values, beliefs, identities, and interpretations or meanings of significant events that result from common experiences of members of collectives that are transmitted across generations” (House et al. 2004). Many scholars have defined national culture and proposed some cultural dimensions that can determine a society or group of people, e.g., by Hofstede, Trompenaars, Schwarz, Hall, and House. We will use the cultural dimensions developed by the GLOBE (Global Leadership and Organizational Behavior Effectiveness) study (House et al. 2004) to identify the cultural influence on the effectiveness of Lean Six Sigma.

The GLOBE study proposed nine cultural dimensions: assertiveness, future orientation, gender egalitarianism, humane orientation, in-group collectivism, institutional collectivism, performance orientation, power distance, and uncertainty avoidance (House et al. 2004). In Table 1 the GLOBE cultural dimensions are briefly described. In the following section these dimensions will be compared to the Lean Six Sigma values to give a view on what difficulties managers implementing Lean Six Sigma in China may come across.

Lagrosen (2003) and Jung, Su, Baeza, and Hong (2008) have argued that a successful implementation of TQM systems require a harmonization of the organizational values and the quality management values. Organizational values are grounded in the organizations culture, and therefore it is sometimes necessary to change an entire organizations culture to implement Lean Six Sigma.

Several studies have found that national culture has an influence on organizational cultures (among others, Hofstede 1981). Companies will develop an organizational culture that is similar to the prevailing national culture in which it is operating (Lagrosen 2003).

The implications of the cultural differences can have a large effect on the effectiveness of quality management systems. Therefore, understanding the cultural differences and similarities is fundamental when working with people from other cultures.

Table 1: GLOBE Cultural Dimensions

Assertiveness: The degree to which people are assertive, confrontational, and aggressive in relationships with others. High: society values assertiveness, dominance, and tough behaviour for all members of society; sympathy for the strong; value competition; belief in success through hard work; prefer direct and unambiguous communication. Low: society prefers modesty and tenderness to assertiveness; sympathy for the weak; values cooperation; often associates competition with defeat and punishment more than with victory; values face-saving in communication and interpersonal interaction.
Future Orientation: The extent to which people engage in future-oriented behaviours such as planning, investing, and delayed gratification. High: Greater emphasis on economic success; tend to save for the future; organizations tend to be flexible and adaptive. Low: Less emphasis on economic success; tend to favour instant gratification; organizations tend to be bureaucratic and inflexible.
Gender Egalitarianism: The degree to which gender differences are minimized. High: widespread participation of women in the workforce; more women in positions of authority; women accorded equal status in society. Low: Low participation of women in the workforce; fewer women in positions of authority; women not accorded equal status in society.
Humane Orientation: The degree to which a society encourages and rewards fairness, altruism, and generosity. High: Interests and support of non-kin others are important; low: self-interest and close kin are important.
In-Group Collectivism. The degree to which individuals express (and should express) pride, loyalty, and cohesiveness in their organizations or families. High: People take pride in their families and also take pride in the organizations that employ them.
Institutional Collectivism: The degree to which organizational and societal institutional practices encourage and reward (and should encourage and reward) collective distribution of resources and collective action. High: Organizations tend to emphasize group performance and rewards: Low: organisations tend to emphasize individual achievement and rewards.
Performance Orientation: Degree to which high performance is encouraged and rewarded. High: Belief that individuals are in control of their destiny; values assertiveness, competitiveness, and materialism; emphasizes performance over people. Low: Values harmony with environment over control; emphasizes seniority, loyalty, social relationships, and belongingness; values who people are more than what they do.
Power Distance: The degree to which people expect power to be distributed equally in a society. In High Power Distance Societies there are rigid with limited mobility, stable class structures; power is rationed and restricted to certain classes; power is used to enforce order in society. In Low Power Distance societies we generally find a large economic middle class; power can be transient and shared. Power is often seen as a source or cause of corruption, coercion, and dominance. Opportunities for class mobility are high.
Uncertainty Avoidance: The degree to which a society is comfortable or uncomfortable with uncertainty, and the degree that they institutionalise norms, rules, and fixed procedures to reduce the unpredictability of events. High many norms and rules; low, fewer rules, more reliance on interpersonal networks and trust-building.

Source: (House et al., 2004)

Table 2 shows the GLOBE scores for China. The country scores for Japan and USA have been added to get an impression of the cultural differences.

Table 2: Selected GLOBE Project Country Means for China and LSS Developers

Dimension (No. of Bands)*	China		USA		Japan	
	Practices Score	Band	Practices Score	Band	Practices Score	Band
In-group collectivism (A, B, C)	5.80	A	4.25	C	4.63	B
Power Distance (A, B, C, D)	5.04	B	4.88	B	5.11	B
Uncertainty avoidance (A, B, C, D)	4.94	A	4.15	B	4.07	C
Institutional collectivism (A, B, C, D)	4.77	A	4.20	B	5.19	A
Performance orientation (A, B, C)	4.45	A	4.49	A	4.22	B
Human orientation (A, B, C, D)	4.36	B	4.17	C	4.30	B
Assertiveness (A, B, C)	3.76	B	4.55	A	3.59	B
Future orientation (A, B, C, D)	3.75	C	4.15	B	4.29	B
Gender egalitarianism (A, B, C)	3.05	B	3.34	B	3.19	B

Source: (House et al., 2004), * "Bands" refers to the grouping of country means; the highest and lowest means in a band are not significantly different, see House et al. (2004, pp. 219-221).

IMPLICATIONS OF CULTURAL VALUE DIMENSIONS ON LEAN SIX SIGMA

This section describes the impact of national culture on Lean Six Sigma values. Cultural values set the environment in which particular quality management practices will be more or less effective (Kull & Wacker 2009).

Assertiveness

Societies scoring high on assertiveness are likely to be competitive, confrontational, and confident in their opinions. Societies scoring low on assertiveness are more empathetic towards the weak in the society, and they value harmony, loyalty and solidarity rather than competition (Javidan & Dastmalchian 2009). Kull and Wacker (2009) have found that employees with high assertiveness scores use rational decision-making to achieve personal advancement. Further, employees high on assertiveness would blame people rather than the system for mistakes. These employees would also see collaboration as uninspiring and as a hindrance for their performance. Building a shared vision in organizations that see team-work as a demotivating factor can be difficult. Lean Six Sigma practices such as control charts may be misused by employees to punish each other for bad performance instead of as a progress tool for improvement. Contrary, societies low on assertiveness may emphasize a warmer and supportive environment that could positively influence the success of Lean Six Sigma. However, Lean Six Sigma also focuses on results which are in agreement with the values of individuals with high assertiveness. This should not offset the strong influence of harmony and loyalty, and therefore a low assertiveness score is anticipated to be associated with higher effectiveness of Lean Six Sigma.

Kull and Wacker (2009) find that low assertiveness is positively related to quality management process implementation effectiveness. Societies valuing competition and individual responsibility are less effective in group decision-making and will therefore be less effective in the collaborative process of implementing Lean Six Sigma. Societies high on assertiveness tend to not recognize that quality issues are caused by systems and not the people.

China scores in the middle band in the assertiveness dimension. Considering this single dimension, Chinese values should therefore be positively related to the acceptance of the implementation of Lean Six Sigma.

Future Orientation

Societies high on future orientation tend to have a longer timeframe for decision-making and a more systematic approach to planning. Societies low on future orientation have a less systematic approach to planning and are more likely to engage in opportunistic behaviors and actions (Javidan and Dastmalchian 2009).

Continuous improvement is one of the key elements of the Lean Six Sigma philosophy. Continuous improvement is related to long-term commitment, strategic thinking, and behaviors that emphasize delayed satisfaction. Since Lean Six Sigma practices takes a long time to become highly effective the rewards for implementing these will be delayed. Customer satisfaction will not increase the minute an organization commits to the Lean Six

Sigma philosophy, but it will gradually improve as the organization improves its processes. Therefore it is expected that societies with a high future orientation mean will be more successful in the implementation of Lean Six Sigma. China's mean is in band C of four bands, i.e., in the bottom half of the ranking of country means.

It can also be argued that future oriented employees are easier to motivate in order to achieve long term goals, because they can better understand that short-term setbacks are sometimes needed to get to the goal. For example when a production process has to be redeveloped, i.e. waste must to be reduced, non-value- and value-added input has to be determined, and a statistical tool has to be implemented to decrease defects. The teams working with this process needs to invest time in the development of new ideas for the production and to try these ideas out. This may initially slow down current production as they have to adjust to the new way of doing things. But when the teams have adjusted to the new processes they will be producing goods faster, cheaper, and at the correct quality and thereby in the end increase customer satisfaction. Employees motivated by instant satisfaction and rewards may feel that they are wasting time with new processes and therefore resist the change. To gain long term value it is therefore also important to have a strong work ethic.

China scores very low on future orientation. Under the Communist regime China was characterized by central economic planning and bureaucratic control. This meant that state-owned companies were not involved in independent decision-making, and were more interested in maximizing production output and sticking to the plan made by the government. Companies were not interested in innovation or customers, because the government provided the technology, resources, market sales and even wrote off debt (Tsui et al. 2006). The traditions of this era still prevail in many companies even after being privatized.

Chinese employees change their jobs frequently to companies offering better prospects (Lee et al. 2011). This may indicate that Chinese are more interested in short-term gains because they seek immediate rewards such as money. The Chinese manufacturing companies also rely on unskilled workers and do not invest a lot of time and money in training and development for these employees. Furthermore, leadership is short term oriented and relationships with customers are not being maintained because of low compliance with contractual agreements.

Japan has had great success with Lean Six Sigma management systems. A reason for this could be the career-long employment for core employees in many companies. Japanese tend to be interested in the long-term competitiveness of their organization, because they will work there for their entire career. China seems enthusiastic about learning and developing new products which indicate an interest in continuous improvement. But they might only be interested in the short term benefits of being able to copy and sell these products to other customers to gain profit.

Gender Egalitarianism

Societies with a high score on gender egalitarianism give men higher status in the society. Societies with low gender egalitarianism have a higher proportion of women on the labor market and more women in authority positions. Women are also involved in more decision-making (Javidan & Dastmalchian 2009). This dimension does not seem to have an influence on the effectiveness of Lean Six Sigma. Scholars have also excluded this dimension when linking culture and quality management. However, there could be a correlation between

gender and Lean Six Sigma effectiveness if the organization or teams did not respect the participation of women in the quality improvement process. China's mean is in the middle range of country rankings.

Humane Orientation

Societies with high scores on humane orientation value support and sympathy for the well-being of others, and emphasize human rights and informal processes. Societies scoring low on humane orientation are more materialistic and emphasize power, self enrichment, and autonomy (Javidan and Dastmalchian 2009), and individuals are more interested in solving their own problems than involving others. Lean Six Sigma focuses on cooperation, strong relationships, intrinsic motivation, and knowledge sharing. Focusing on others well-being could increase the team-work. Managers high on humane orientation would be highly interested in developing and training subordinates to grow and succeed. Thus, a high humane orientation is expected to positively affect Lean Six Sigma.

Kull and Wacker (2009) suggest that societies low on humane orientation will only ask customers for their opinions if required by organizational rules, and tend not use this information in the decision making. They also suggest that societies high on humane orientation will be more genuine and take customers feedback into consideration when developing innovations to products and procedures. China scores in band B of four bands on this dimension, in the top half of the country rankings.

Under the post 1949 Communist regime civil administration retained the decentralized practices of the emperors, and in fact put plans in place to make provinces more independent and self-sufficient. The enforcement of quality standards and intellectual property rights has been delegated to the provinces and municipal officials. More often these officials are more interested in meeting local employment and provincial GDP goals than adhering to laws on intellectual property and quality standards (Meyer 2008). Generally, Chinese manufactures are not known for their cooperation with customers as they produce what they are told, and may not engage in process or product improvement. A strong barrier is the Chinese view on ethics and intellectual property rights. China has a reputation for low respect for intellectual property. They do not seem to mind selling products copied from foreign manufacturers in China, or sometimes overseas, nor seem to have any problems with decreasing the product quality below contractual agreements in order to gain short-term profit (Midler 2009). Meyer (2008) has argued that the Chinese Cultural Revolution distorted traditional Confucian values such as moral rightness and trust. These values are being replaced by a short-term need to create wealth at any cost.

The Lean Six Sigma approach is based on the western philosophy which is systematic and analytic. In China more often a holistic approach is adopted. Cheng and Wong (as cited in Zou & Lee 2010) have proposed that a consequence of the holistic approach to quality management is that "Chinese people prefer to have a rough understanding on the whole approach and then apply some flexibility in using it". This may therefore indicate that Chinese Lean Six Sigma team will not adopt the entire methodology, but instead just parts of it.

In-group Collectivism

High in-group collectivism societies value the close relationship and traditions between family members, close friends, and close organizational groups. These societies are striving to satisfy the expectations of their in-groups. There is also a high expectation that members of the in-groups should take care and help each other. Societies low on in-group collectivism do not expect in-group members to treat each other any different than members outside the group (Javidan & Dastmalchian 2009). Lean Six Sigma focuses shared goals within the organization, which can be supported by a high score on the in-group dimension. However, societies valuing in-group goals and harmony also value traditions making it difficult to implement changes.

China scores in the top band A on in-group dimension. Implementing Lean Six Sigma requires knowledge sharing across teams and departments. Within Chinese in-groups there is high knowledge sharing, but this information is not likely to be shared with people from out-groups (Zou & Lee 2010). Generally high in-group collectivism is positively related to the effectiveness of Lean Six Sigma, but the limited knowledge sharing with the out-groups can be a barrier to the effectiveness.

Institutional Collectivism

Globally, in-group collectivism and institutional collectivism have a very low, non-significant correlation (House et al. 2004, pp. 734-735); however China's country means are in band A, the highest, for both dimensions. Institutional collectivism refers to the broader organizational environment in which the individuals engage and form in-groups. Societies scoring high on institutional collectivism prefer group harmony across the organization, cooperation, as well as rewards for the entire group over an individual. They may see organizational membership as defining an important in-group. Societies scoring low on institutional collectivism are more individualistic and prefer independence such as individual decision making and individual rewards for performance (Javidan & Dastmalchian 2009).

Cooperation is important for the success of Lean Six Sigma because it relies on the collaboration among cross-functional teams to improve production processes and quality. Group decision-making and the desire to achieve group goals are very important for successful Lean Six Sigma effectiveness. Increased in-group collectivism may interfere with Lean Six Sigma processes in the institutional collectivism because of group resistance to organizational changes. If the change goes against the group norms and traditions the group may resist the change (Coghlan 1994).

Increased institutional collectivism may provide better communication across the organization and increase the acceptance of change. It is expected that societies with a high emphasis of institutional collectivism will have a positive effect on Lean Six Sigma as these societies put emphasis on group harmony, long-term relations, resolve conflicts through compromise, and rewards for the group and not the individual.

Chinese relationships are based on *guanxi*, which is an alliance based relationship where both parties have to benefit from the relationship and benefits must be maintained to ensure the continuation (Pun et al. 2000). China scores high on institutional collectivism and should therefore be well prepared for Lean Six Sigma practices. However, Chinese workers are

usually not empowered to make their own decisions. They work by strict instructions, and tend to not take any initiatives on their own.

Performance Orientation

Societies scoring high on performance orientation are more likely to invest in training and development. Employees are selected on the basis of their skills. In societies with a low performance orientation employees are selected on the basis of their family connections and background (Javidan & Dastmalchian 2009). High performance oriented employees feel personally responsible for success and have a need for achievement to reach the goals. This is good if it is combined with a group orientation. It is difficult to predict the relationship between performance orientation and Lean Six Sigma values. Emphases on development and learning as well as focus on goals are consistent with the Lean Six Sigma values. However, employees valuing individual rewards and responsibility are more motivated to solve problems alone than in a group (Kull & Wacker 2009). Thus, when implementing Lean Six Sigma the employees' attitude towards the goals should be taken into consideration.

China scores high, band A, on performance orientation. However, Chinese people generally do not feel personally responsible for success and do not take responsibility for process improvements because they are not empowered to do so. Lee, Wong, and Yeung (2011) stated that some barriers to implementing Lean Six Sigma in Chinese companies are the low level of education, lack of cognitive skill development, and high employee turnover. Chinese manufacturing workers usually are promoted to supervisors and manager directly from the shop floor. These managers lack education and perhaps expertise in the industry technical know-how, problem solving, and in performance management. The need for achievement and the employment based on skills and experience could be related to the high employee turnover mentioned before. So in the case of China, the high performance orientation is expected to be negatively related to Lean Six Sigma effectiveness.

Power Distance

Societies high on power distance expect conformity to directions from higher level managers. High power distance societies are characterized by organizational hierarchy, top down control, formal rules, and standard operating procedures, as well as resistance to change. Societies with low power distance are expecting less separation of power (Javidan & Dastmalchian 2009). Low power distance societies are more democratic and favor stronger involvement in decision-making. Employees expecting a high power distance fear disagreement and tend to do anything their superior tells them to. Managers in high power distance societies are generally not dependent on their employees in their performance evaluation. Employees will therefore not participate in the discussion of solutions to quality improvement, and managers will not allow lower level employees to be empowered and to express their opinions. However, top managers can create a strong vision and get the employees to follow strict operating procedures. As collaboration across organizational departments and managerial levels are important for quality management, it is expected that societies high on power distance will be ineffective in implementing Lean Six Sigma. A low power distance may reinforce the qualities of the team members and allow the person with most knowledge in a specific area to lead the team towards quality improvement.

Societies with low power distance have been found to emphasize employee training, whereas societies with high power distance emphasize leadership and the role of leaders (Lagrosen 2002). Formal training on the Lean Six Sigma technology is important for the effectiveness as teams acquire knowledge, internalize this knowledge and share it with their team members (Zou & Lee 2010). Lagrosen (2002) also found that societies with high power distance relied on the leader to achieve higher quality, whereas societies with low power distance relied on the employees. Similar to this, Lin (2009) found that low power distance had a positive effect on quality management as it related to more decentralized structures, which may empower people and make them build trust across the organization.

China's country mean is in band B of four bands, in the top half of rankings. Chinese organizations are characterized by strong hierarchy and low employee involvement. Confucianism is related to respect for authority and discourages free expression of ideas of both individuals and groups (Zou & Lee 2010), which can prove a strong barrier to Lean Six Sigma effectiveness. The hierarchical structure tends to isolate employees and to fragment the production system. Managers are usually leading by fear: any behaviors deviating from the official doctrine will be reported to management. This in turn creates a culture of distrust and communication based on the right thing to say.

Uncertainty Avoidance

Societies with high uncertainty avoidance favor order and consistency. They have structured lifestyles, clear requirements of social expectations, and rules and laws to control any situation (Javidan & Dastmalchian 2009). Employees with high uncertainty avoidance require a lot of feedback, and are afraid of innovations, changes, and risks. Therefore these individuals are motivated by choices that increase predictability and prefer to maintain the status quo (Kull & Wacker 2009). Societies with low uncertainty avoidance have a stronger acceptance of uncertainty. Individuals are used to less structure in their lives and are not as worried so much about following regulations and procedures (Javidan & Dastmalchian 2009).

To increase the reliability of the production Lean Six Sigma focuses on making changes and to systemize processes and procedures. The importance of feedback, standardization, and consistency are highly valued by societies with high uncertainty avoidance. However, the resistant to change, which is very essential in Lean Six Sigma process optimization, is inconsistent with the values of the societies with high uncertainty avoidance. Therefore, to be able to implement Lean Six Sigma in an organization there is a need to choose some teams who are not opposed to change and innovations. Although resistance to change is associated with high uncertainty avoidance, it is expected that high uncertainty avoidance will have a positive effect on Lean Six Sigma effectiveness.

Kull and Wacker (2009) have found that high uncertainty avoidance has a positive effect on quality management effectiveness. Employees from a society with high uncertainty avoidance are motivated by applying systematic approaches to quality management, whereas employees with low uncertainty avoidance will not be concerned about not sticking to the defined procedures.

China scores in band A on uncertainty avoidance. This may indicate that implementing Lean Six Sigma in China may be positively influenced by their need for control and reliance on rules. But when it comes to business transactions they do not seem to stick to contractual

agreements on product specifications, and there seem to be a high tolerance for breaking the rules – as long as they can save “face” when it may be discovered. Or face may become irrelevant if a “thick face, black heart” philosophy is adopted. As mentioned before, the traditional Confucian ethics and morality seems to be replaced by a focus on economic wealth which precedes all other cultural values.

Summary

Some authors (such as Lagrosen 2003) have claimed that introducing quality management systems requires an organizational cultural transformation if the societal cultural values do not fit with those of Lean Six Sigma. Barriers of Lean Six Sigma effectiveness will be different in different countries due to cultural diversities. Some values may be easy to adopt for some organizations, whereas organizations in another culture may find it harder. For organizations operating internationally Lean Six Sigma effectiveness can be quite a challenge, as they have to manage operations all over the world in different societal cultures. It can be very hard, if not impossible, to change ingrained societal cultures. Therefore, a uniform solution on how to implement Lean Six Sigma may not be a successful approach.

Since collaboration, communication, and empowerment of individuals and groups are some of the values of Lean Six Sigma, the Chinese societal culture can impose a significant barrier for quality management. There are four strong barriers for implementing Lean Six Sigma in China:

- The focus on short-term economic gain versus the long-term commitment to continuous improvement of Lean Six Sigma.
- The potential loss of “face” versus the Lean Six Sigma way of getting the problems out in the open.
- The Chinese adherence to authority versus the consensus seeking Lean Six Sigma team leader.
- The incapacity of getting the Chinese to take responsibility versus the Lean Six Sigma way of empowering individuals.

On the positive side, the adherence to group harmony and rewards as well as the need for achievement may be strong indicators that Lean Six Sigma can be effectively implemented in Chinese manufacturing companies. Successful implementation of Lean Six Sigma is first of all commitment from all layers in the organization (Jung et al. 2008). If the Chinese management can create a vision and make the employees follow that vision it could positively affect Lean Six Sigma effectiveness. Table 3 below summarizes the discussion of the influence of the Chinese culture on the Lean Six Sigma effectiveness. The inconsistency of the effects described above and summarized in the table imply a relative lack of cultural value dimensions effects on quality management oriented business practices, at least in China.

Table 3: Summary of Cultural Value Dimension Influences

Dimension	Expected effect	Mean	Score band	High score	Low scores
In-group collectivism (A, B, C)	High score positively related to LSS implementation	5.8	A	-Good knowledge-sharing within in-group -Group harmony - Group rewards	-Poor knowledge-sharing with out-groups
Power Distance (A, B, C, D)	Low score is positively related to LSS implementation	5.04	B	-Top managers can create a strong vision -Standardisation is easy	-Low participation in decision-making Strict hierarchy Little openness Little empowerment -Managers evaluations not dependent upon employee input Centralised organisational structure
Uncertainty avoidance (A, B, C, D)	High scores positively related to LSS implementation	4.94	A	-Low UA open to change -Protecting others' "Face" is important	-Tend not to stick to agreements if loss of "Face" can be controlled
Institutional collectivism (A, B, C, D)	High score positively related to LSS implementation	4.77	A	-Group-oriented rewards Group harmony important	-Empowerment uncommon Strict adherence to instructions -Employees reluctant to take initiatives
Performance orientation (A, B, C)	Situationally dependent	4.45	A	-High need for achievement	-Tend not to invest in training & development, hence low technical & cognitive skills -Employees tend not to take responsibility
Humane orientation (A, B, C, D)	High score positively related to LSS implementation	4.36	B	-Support of others	-Low respect for intellectual property rights & contracts
Assertiveness (A, B, C)	Low score is positively related to LSS implementation	3.76	B	-Solidarity valued -Problems due to system, not people	-Less results oriented
Future orientation (A, B, C, D)	High score positively related to LSS implementation	3.75	C	-Continuous improvement important	-High employee turnover -Less investment in employee development -Immediate rewards important
Gender egalitarianism (A, B, C)	No known culture effect, situational effects significant	3.05	B		

GAPS IN THE LITERATURE

The Lean Six Sigma methodology increases customer satisfaction by addressing the operational performance through improvement of quality and manufacturing processes such as speed and variability. However, it does not take into consideration the effect of human capital and their needs. If the employees are not motivated to work with the Lean Six Sigma method, then the process and product improvement will not work. Motivation factors for quality improvement have not been regard as a factor in the Lean Six Sigma approach to organizational excellence. The Lean Six Sigma model assumes that all employees are fully motivated and possess the same values as the system itself. However, Lean Six Sigma is in

many companies seen as a method for downsizing which makes employees anxious. Therefore many employees are resistant to the practices. Lean Six Sigma should be used as a tool for strategic development and employees should feel comfortable participating in the process. Motivation should be a critical factor in assessing whether Lean Six Sigma will be a success in other countries and cultures. However, it has not been considered in any of the articles found.

The history of quality control in China goes a long time back. It has been one of the first countries to use quality control through rigorous inspection (Dian-Xiang & Willborn 1990). Chinese are aware of the quality management systems such as Lean Six Sigma, but as it was not possible to introduce new technology for product quality control under the early Communist era, the Chinese have fallen behind in these practices. Many Chinese quality programs already exist, but they are not yet up to date with international standards (Dian-Xiang & Willborn 1990). This shows an interest in the improvement of product quality, which is not taken into consideration when evaluating the effectiveness of Lean Six Sigma. China has shown an interest in continuous improvement, and is aware that failing to comply with international standards may force companies to move their production out of China. Additionally, the GLOBE project sample was taken only in Shanghai, and other results might be observed in other regions of China.

Since the death of Mao Zedong in 1976 China has changed from a planned economy to a more market-oriented economy. The reforms and opening of the markets to foreign investors have contributed to the fact that China is now the world's second largest economy after the US. China has been fast in their ways of adapting to the new environment, and this trend may also prove important in their ways of implementing Lean Six Sigma in their manufacturing companies in order to keep the competitive advantage. None of the articles found took the evolution of the Chinese history into consideration.

Companies implementing Lean Six Sigma should take into consideration the cultural differences and be aware of the cultural barriers. The country scores of the GLOBE study may not be a good way to evaluate a country's Lean Six Sigma effectiveness. Using culture as a stereotype of how individuals react is not necessarily the best way to determine the effect of Lean Six Sigma. Since a culture has many subcultures it requires a deeper understanding of the specific culture. Researchers have not distinguished between cultures within China. It is important to notice that there are more cultures within China. For example, cultural differences exist between north and south as well as coastal and rural China. Therefore it was not possible to find any studies that looked at a specific part of China.

CONCLUSION

China has been developing into the world capital of product manufacturing due to their low labor costs. Recently, quality fade has been a big problem for many international companies who had to recall their products because they were found to have a negative or dangerous effect on the welfare and safety of the end consumers. This has in turn created lower brand equity for the companies selling to retailers and consumers, and they are now trying to get everyone in their supply chain to use quality management systems such as Lean Six Sigma to improve the product quality. If Chinese manufacturers are not complying with international quality standards, they might face a loss of customers to other countries. Since the low cost of labor may no longer be a competitive advantage, Chinese manufacturers need to focus on the

optimization of production processes and product quality to stay competitive. Lean Six Sigma is a quality management tool used to improve the customer satisfaction through continuous improvement in quality and processes to reduce, speed, waste and variability. It relies on full participation from all levels in the organization, empowerment of people, long-term commitment, team-work, measurements and statistical control.

This study has used the GLOBE project's cultural dimensions to evaluate the effectiveness of Lean Six Sigma in China. It is estimated that a low assertiveness and power distance is associated with Lean Six Sigma effectiveness. A high score on future orientation, humane orientation, in-group collectivism, institutional collectivism and uncertainty avoidance is related to Lean Six Sigma success. The study finds that even though the GLOBE study predicts that many of the Chinese values are consistent with the Lean Six Sigma values, a closer look shows that Lean Six Sigma implementation in China may be more difficult than anticipated.

Cultural values as well as the country history and personal motivational factors should be taken carefully into consideration when implementing Lean Six Sigma in China. Managers should be aware of the cultural barriers such as the short-term focus on economic gains, the potential loss of "face" when speaking up, the hierarchical structure not allowing for empowerment, and the inability of Chinese employees to take responsibility. However, Chinese values for group rewards, group performance, solidarity, and the Chinese recent history of fast growth and improvement could prove a strong facilitator for Lean Six Sigma.

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