



EXECUTIVE DIGEST

The myth of the dragon: Operations management in today's China

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KEYWORDS

China;
Manufacturing;
Direct foreign
investment;
Global manufacturing;
Operations management

Abstract Manufacturing is absolutely booming in China, which has become a prime target for direct foreign investment. However, manufacturing in China does not always operate the way that Westerners expect it to. In this article, we examine China's manufacturing operations in light of the influence of the country's recent economic and social history, the diversity of its regions, and its national culture. We conclude that while Chinese manufacturing has issues to face and obstacles to overcome, things will only continue to improve, making China even more of a major player in the global manufacturing scene.

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1. Enter the dragon

As we were putting the finishing touches on this article, we tried to find a clever, Chinese-sounding twist to add to it. Conventional Western logic would suggest that the dragon is an appropriate symbol for China; as such, we searched the Web for dragon legends, hoping to find one that would provide a suitable metaphor for the current state of manufacturing in China. Interestingly, through our research, we discovered that the dragon in China is not what we might have expected. Although Westerners are keen to associate the dragon symbol with China, we learned that its usage within the country is actually extremely rare. Because the dragon was the symbol of the Emperor of China, it

has monarchist connotations that run counter to modern Chinese ideologies. In addition, its aggressive, warlike image is something that the Chinese government would just as soon avoid. Despite all this, however, the dragon still commands a great deal of respect in the Chinese culture. For example, a recent Nike ad portraying LeBron James slaying a dragon was censored by the Chinese government, due to public outcry over the sports star's apparent disrespect for the dragon.

Thus, in the following ways, the dragon actually does provide an apt metaphor for operations management in today's China:

- Like the dragon, operations management in China is probably not what you think it is.
- Both dragons and Chinese operations management have a long history, and their present status is heavily influenced by it.

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- The Chinese government plays a very active role in protecting and supporting operations management in China, just as it was willing to protect the reputation of the dragon when it was faced with disgrace.
- National cultural considerations surfaced in the outcry against the slaying of the dragon, just as they do in the relationships that are critical to modern operations management.

This article is a synopsis of a paper that was published in *Decision Sciences* in December 2006. Part of what we tried to accomplish with it was to look at the reasons why Chinese operations management is the way it is, drawing on both academic literature and the Chinese popular press. As we visited manufacturing plants and talked with researchers from China and Hong Kong, we began to see how operations management in China is inextricably linked to the country's recent history, geography, and culture. Herein, we share what we learned and give our perspective of how it has influenced modern operations management in China.

2. Recent economic and social history

Manufacturing is absolutely booming in China. World class factories are being constructed at a mind-boggling rate, and China has become a major player in global manufacturing as it makes the transition to a market economy. More and more companies are moving to China, due to its huge market potential, relatively low cost of productive resources such as land and labor, and improving business environment (Zhao, Sum, Qi, Zhang, & Lee, 2006). Although this rate of change is unprecedented, it is worth noting that it is much easier to spur rapid change in a centrally planned economy with a culture of conformance. Thus, in order to understand operations management in today's China, it is important to understand its recent history. Next, we provide a brief overview, paying particular attention to its effect on manufacturing operations.

2.1. The state planned economy (pre-1978)

We begin our summary in the pre-reform era, when Chinese enterprises were all state- or collectively-owned and there were no foreign operations. Three important Socialist themes dominated this era (Chin, Pun, & Hua, 2001). First, resources were to be reallocated to the people. Second, employment was to be provided for the entire population. Third, the provinces were to be self-reliant and in control of provincial matters. Notice, however, that there is no mention of efficiency or meeting market needs.

During this era, factories were strictly controlled by the government (Hopkins, Nie, & Hopkins, 2004), which made it easy to be a plant manager (convenient, since most were political appointees). Decisions such as which products a factory should produce, and how many, when, and how to make them, were all made centrally. Since the goal was to keep people employed, factories produced at a constant level, rather than in anticipation of market demand; thus, huge shortages and excess inventories were common.

Although China had a long tradition of high quality many hundreds of years before this time (recall its heritage of architecture, scientific instruments, silks, bronzeware, porcelain, and even fireworks), these craft skills were not evident in operations of the pre-reform period. Because there was no competition for production, there was no clear definition of quality, or even an awareness of quality as a factor which could be improved.

Plant managers didn't need to be concerned with distribution issues, either, since resources were reallocated centrally (Jiang & Prater, 2002). Distribution channels were rigidly controlled in a vertical system (Luk, 1998) which was adequate for moving products to people, particularly considering China's size and geography. Each distribution tier added hefty margins to product prices, which led to significantly increased prices for consumers, in the absence of market forces.

Human resource practices of this era were characterized as "iron rice bowl" employment. Workers were guaranteed their jobs until retirement, after which their child could inherit the position. Thus, workers were selected based on occupational inheritance, rather than for their competencies. Once in the system, there was very little incentive to improve performance, as no reward system existed to honor exceptional employee output.

2.2. Economic reform and rapid development (1978–2001)

When Deng Xiaoping opened China to market competition in 1978, he spearheaded a number of sweeping reforms, including reduced reliance on central planning, moving factories closer to markets, stimulating competition, developing managers who were more autonomous and accountable, restructuring state-owned enterprises, establishing privately-owned enterprises, and encouraging direct foreign investment.

The central government established Special Economic Zones (SEZs) as a laboratory for its economic reform policy experiments. Foreign investors in the SEZs received preferential treatment, in order to help establish modern manufacturing facilities and

import management know-how, and local governments and enterprises were given more freedom to make economic decisions. The government took the knowledge it gained from the SEZs and applied it in 14 coastal cities in the southern and eastern part of China. Because foreign investors provided knowledge of how a market economy works and how to compete in a market economy, some of the economic zones developed very rapidly, hastening the economic development of entire regions. Growth in light manufacturing, financed by direct foreign investment, was the hallmark of this era. It was stimulated by massive funding initiatives from the central government, including investments in employee housing, currency valuation, consumer goods pricing, and manufacturing subsidies (Handfield & Withers, 1993).

Modern quality control was reintroduced to China during this era as Chinese manufacturers were exposed to the knowledge, expertise, and high quality products of foreign organizations. Laws established TQM standards, and manufacturers were pressured to be attentive as TQM was phased into state-owned enterprises (Hopkins et al., 2004). Reforms to the human resource system caused workers' iron rice bowls to be smashed. Rather than lifelong employment, many started to have labor contracts, and the compensation system gradually changed to provide higher pay for those with more expertise and better performance. While such reforms helped enhance the competitiveness of state-owned enterprises, they also created new social problems, including what to do with workers who were no longer needed and how to deal with workers whose companies had gone bankrupt.

Control of manufacturing and logistics gradually shifted from the central government to the provinces and municipalities during this era (Jiang & Prater, 2002), and there was a transition from the strict central plan toward more of a guiding central plan. However, the legacy of China's history of reliance on central planning was passive working behavior, poor product quality, bureaucratic bloating, and a disregard for market and customer needs (Li, Anderson, & Harrison, 2003). The uneven economic development across regions created inequity issues for people who were accustomed to the egalitarian rewards of the Socialist system. Although logistics systems improved substantially, they were still riddled with major problems (Pollitt, 1998), including unreliable, slow, expensive rail transport (particularly for shipments to China's rural interior), poor road conditions, lack of bridges, numerous roadblocks and checkpoints, and even highway robbery.

The move to shift manufacturing control away from the central government was heralded as an action that led to substantial improvements in matching supply with demand; however, the strong regional and provincial loyalties that the government encouraged led to the creation of a new set of issues. Provinces instituted stiff tariffs, mountains of red tape, and other barriers that were enforced when regional boundaries were crossed (Handfield & McCormack, 2005), causing cargoes to be loaded onto different trucks at provincial boundaries. Local governments took seriously their charge of focusing on local economic growth; for example, by protecting local breweries from outside competition by mandating dubious health regulations (Jiang & Prater, 2002), and safeguarding local auto makers by imposing huge licensing fees on cars made in different provinces.

In general, however, the economic reform era was a period of dramatic improvement to manufacturing operations in China. The next step was to gain acceptance in the global market.

2.3. WTO membership and continued rapid development (2002–present)

In December 2001, China became a member of the World Trade Organization (WTO), signaling its presence as a player in the global economy and taking a large step forward toward increased economic exchange with international trading partners (Hopkins et al., 2004). Since then, market access has been vastly improved, and there has been a substantial increase in China's exports to industrialized markets, as well as fierce competition in domestic markets.

Manufacturing has perhaps made the greatest contribution to China's stunning rate of growth, capitalizing on its competence in low-cost manufacturing based on inexpensive labor. As the global market has become most cost competitive, however, Chinese manufacturers are beginning to understand the importance of competing on quality and other competitive dimensions. Although product quality has improved substantially, current understanding of quality management concepts is still uneven, at best, and the quality of many Chinese products is relatively low. Problems include an economic system that works against effective implementation of quality management in state-owned enterprises, management practices that are not conducive to good quality practice, and a scarcity of modern plants in many areas (Li et al., 2003). Although the government has invested a tremendous amount in developing manufacturing capabilities, its investments have focused on the largest corporations, to the exclusion of the vast

majority of Chinese manufacturers, which are quite small.

Although there are some world class manufacturing plants in China, moving goods to and from those plants continues to be a challenge. China's sheer size presents a formidable logistics barrier, with over 350 cities greater than 250,000 in population and many more being built and expanded. The current distribution system remains a hybrid combination of elements from the rigid, planned, and free market systems, and a large portion of Chinese logistics still remains in the hands of state-owned entities. Moreover, construction projects seem omnipresent in the large coastal cities, making transportation of goods a challenge.

Rapid modernization and growth have been accompanied by substantial environmental problems (Zhu & Sarkis, 2004), including disposal of byproducts, use of non-sustainable resources, and the use of China, by industrialized nations, as a dumping ground for end-of-life products. Manufacturing's rapid development has led to high consumption of energy, and resulting shortages of electricity and petroleum.

In addition, the income disparity between urban and rural areas is widening, leading to more migration to the urban areas. There is labor exploitation, particularly in the less-regulated first-tier suppliers and in the networks of home-based workers known for unsafe working conditions, unmonitored work hours, sub-minimum wage levels, and the use of child labor (Handfield & McCormack, 2005).

On the positive side, China has become an attractive target for direct foreign investment, and it is now the world's largest exporter of many consumer products. There have been vast technology transfers in some industries, with electronics emerging as the most prominent and rapidly developing (Lau, Zhao, & Xiao, 2004). Furthermore, foreign entry into some highly protected industries, such as telecommunications, financial services, logistics services, and motor vehicles, has resulted in major restructuring (Bhattasali, Li, & Martin, 2004).

3. Characteristics of China's regions

The very size of China has always made it hard to ignore; now, it is the largest emerging economy in the world, with exports of \$428.6 billion. It must be pointed out, however, that China is an extremely diverse country. Hearing so often about the Chinese economic miracle, it is easy to forget about the vast interior of China, a Third World region that is more than twice the size of the United States. Thus, although economic reform has helped all regions to

develop, it has also served to increase regional disparities (Lin, Cai, & Li, 2002).

If your company has operations in China, chances are they are located in the Pearl River Delta, the Yangtze River Delta, or the Bohai Sea Economic area. Each of these has been designated the region for development of a particular type of manufacturing, and all have become magnets for direct foreign investment.

3.1. Pearl River Delta

The Pearl River Delta (PRD) area was the first to be developed after the open-door policy was initiated, containing two of the first four SEZs. Shenzhen is little more than a trip over the bridge from Hong Kong and has rapidly become a modern city, with attractive housing, Western restaurants, and world class manufacturing facilities. A number of other cities in the PRD have been transformed from rural areas into modern manufacturing bases, and most Hong Kong manufacturers now have all their manufacturing plants in this region. Light industry dominates, with a high percentage of privately- and foreign-owned companies. The PRD's rapid growth in manufacturing was paralleled by the fast development of services, and Shenzhen has developed into a financial center, home to one of China's two stock exchanges. The newly created Pan-Pearl River Delta, or "9+2" zone, links a number of cities in the PRD with Hong Kong and Macau, providing a new network of road, rail, and air routes. Elimination of trade and non-tariff barriers will enhance the future competitiveness of the PRD by allowing free labor movement and the development of new markets.

3.2. Yangtze River Delta

The Yangtze River Delta (YRD) area, which contains Shanghai, was designated by the Chinese government as the region for high technology and heavy manufacturing. While Hong Kong continues to serve as the gateway to southern China's light industry, the YRD is emerging as the gateway to central and northern China's high technology and heavy manufacturing industries, as well as its vast interior markets and natural resources (Yam & Tang, 1996). It is growing at an astonishing pace; for example, in the Suzhou Industrial Park, approximately one new plant is opened every day. Not only host to a strong manufacturing base, Shanghai is also home to one of the largest container ports and to the other stock market in China. Thus, Shanghai is a major financial, logistical, and manufacturing center, playing the leading role in the economic development of the YRD.

3.3. Bohai Sea Economic area

The Bohai Sea Economic (BSE) area includes Beijing and a number of other large cities which are surrounded by the Bohai Bay (Xie, 2004). As the country's capital, Beijing is the political, economic, and cultural center of China. This area has one of the largest ports in northern China, a fairly good transportation infrastructure, and a large manufacturing base (Zhao et al., 2006). Furthermore, the Technological and Economic Development area of Tianjin is one of the largest direct foreign investment destinations (Jiang, 2006). This area is expected to experience the fastest economic growth in the future, since it has been designated a main focus of economic development in the 11th Five-Year Plan.

3.4. Other regions

The PRD, YRD, and BSE encompass the southern and eastern coastal regions of China. The vast interior regions of the country have not developed at nearly the same rate. The northeast part of China once had a strong heavy manufacturing base and is still home to some of the largest state-owned enterprises; for example, Changchun boasts several large automobile, train, and chemical manufacturers. Due to the inefficiency and ineffectiveness of these state-owned enterprises, however, the relative competitiveness of this area has decreased. The southwest region, including Tibet and Hainan, contains most of China's ethnic minorities and has developed more slowly than most of the rest of the country. Chongqing is the largest city and is under the direct guidance of the central government. The northwest region has both the lowest GDP per capita and the lowest disposable income. Although Xi'an, the ancient capital of China, has a fairly good manufacturing base and some quality universities, the pace of development in this region is still quite limited, due to the lack of infrastructure and foreign investment.

Thus, economic development in China is not balanced across regions. The coastal metropolis of the PRD, YRD, and BSE has a population of over 400 million people, more than the population of the entire United States. It was the earliest beneficiary of economic reform efforts and has benefited from a faster pace of economic development, with higher per capita income, a highly educated populous, and a global perspective. In stark contrast lies the vast inland region, with a population of 900 million people, which has endured a much slower pace of development, enjoys few modern amenities, and exhibits a Third World perspective.

The significant disparity in the standard of living between areas has led to the development of the *liudong renkou*, or "floating population" of workers,

comprising the majority of factory workers in China (Handfield & McCormack, 2005). In fact, remittances sent home by the *liudong renkou* are now the largest source of wealth accumulation in rural China. The mostly non-urban young people, attracted to the excitement and high wages of the big cities, typically work long hours, are given few benefits, and are housed in cramped dormitories. Recently, there has been a tendency for them to seek better employment opportunities, which presents interesting issues in a country that has been known for its inexpensive, captive labor market.

4. National culture

The idea behind national culture is that we all have a cultural heritage that has been shaped by the institutions that surround us, including education, national history, religion, architecture, art, and the media. These forces exert a very strong influence on what we believe to be right and wrong, beautiful and ugly, and so forth. What is interesting is that we have a difficult time even recognizing how these influences affect the way we make decisions.

Chinese national culture is extremely strong, dating back 5000 years to the teachings and traditions of Confucianism and Taoism (Li et al., 2003). Confucianist principles emphasize the importance of interpersonal relationships, avoidance of conflict in order to cultivate harmony, the concept of "face," and respect for age and hierarchy. Taoism, for its part, focuses on creativity and harmony with nature. Next, we consider a few dominant themes of Chinese national culture that are particularly relevant to operations management.

Guanxi is the granting of preferential treatment to business partners, in exchange for favors and obligations (Lee, Pae, & Wong, 2001). *Guanxi* requires reciprocity, or the obligation to return a favor. If the obligation isn't fulfilled within a short amount of time, social harmony between the managers involved will be disturbed because the non-reciprocating manager will have lost face. *Guanxi* networks are essential for doing business in China and are particularly relevant to supply chain management.

At the heart of *guanxi* is the cultural value of collectivism. Chinese national culture is highly collective (Hofstede, 1980), characterized by a preference for tightly-knit social networks, the expectation that in-group members will support each other, and a strong urge to maintain social harmony within the in-group. Interestingly, although there is a high level of trust between in-group members, there is none for "outsiders," a

phenomenon which has strong implications for organizations trying to establish relationships with Chinese manufacturers.

A second dimension of national culture that is particularly relevant to China is power distance, which is the expectation that power is distributed unequally (Hofstede, 1980). High power distance is evident in China's pervasive centralized authority and hierarchical structures. Chinese people expect that power is unequally distributed and naturally defer to those they perceive to be their superiors, whom they expect to be benevolent and treat all people fairly, providing them with stability, close supervision, and explicit rules (Pun, 2001). Power distance is consistent with the focus on *guanxi* relationships with upper-level authorities, particularly in state-owned enterprises, and the strong hierarchical ordering that makes empowerment challenging. The long-term orientation of Chinese culture traces its roots to Confucian dynamism, which values stability over change (Li et al., 2003). In China, this is reflected in bureaucracy and difficulty incorporating the voice of the customer, as well as in dedication to a lasting *guanxi* relationship, once established. Long-term orientation has tremendous potential as an explanatory variable in many areas, including supply chain management, TQM, and human resource issues.

5. Lessons from the dragon

So, what can we learn from all this? First, China is not like the rest of the world and never will be. Its recent economic growth is truly amazing. It is important to remember, however, that manufacturing operations there will always be very different from operations in industrialized countries because China continues to be, above all, a Socialist country (Leung, Lai, Chan, & Wong, 2005). The magnitude and pace of change is possible because China remains rigidly centrally controlled, and its transition to a market economy was very deliberately planned and orchestrated by its totalitarian government. For example, the rapid modernization of Shanghai was accomplished by mandatory displacement of some of its citizens, followed by the leveling of existing residences and businesses, which were rapidly replaced by a gleaming, new, world class city. This same single-minded and controlled purpose has been applied to the modernization of China's economy. The central government continues to remain very actively involved in basic business affairs, to both the benefit and detriment of economic progress (Lau et al., 2004).

A second lesson that can be culled from the information presented is that manufacturing in China is heavily influenced by its past. Although world class manufacturing facilities are being constructed at an astonishing rate, management of those factories is still catching up, due to the legacy of central control. The human resource management system still has Socialist leanings, and the iron rice bowl is alive and well in some parts of the country. However, don't expect this to continue forever. Manufacturing in China will become even more significant on the global scene as its managers become more experienced with planning and managing for a market system.

Third, if you are considering establishing a presence in China, think long and hard about where you are locating. The logistics infrastructure is quite well developed and continues to evolve in the southern and eastern coastal regions. Many other parts of China, however, are more like Third World countries. While locating in such areas might be beneficial in terms of workforce availability, shipping products in and out of the facility could prove difficult and the labor base might well lack essential skills and training.

Finally, relationships in China may be difficult for Westerners to understand or participate in satisfactorily. That being said, they are critical to getting things done. Often, the best approach is to employ a Chinese agent as a go-between to capitalize on *guanxi* relationships and understand how in-group relationships operate, in order to maneuver through the system.

The Chinese manufacturing dragon is rearing its head, and it isn't going to back off. We may look at the dragon and think we understand it, but that is difficult, if not impossible, to do without understanding where it has come from, what it has been through, and the culture in which it lives.

Note: This article is based on Zhao, X., Flynn, B. B., and Roth, A. V. (2006). Decision sciences research in China: A critical review and research agenda – foundations and overview. *Decision Sciences*, 37(4), 451–497.

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