Multiskilled Labor Management of Japanese Commercial Vehicle Makers in the Chinese Market: The Cases of Hino and Isuzu

Zhongqi Wang and Youngkyo Suh

Abstract: In the fast-growing Chinese heavy commercial vehicle market, it has been claimed that the rule is “manufacturers cannot survive unless they exceed an annual production scale of 10,000 units.” However, Japanese automakers GAC Hino Motors Company (GHMC) and Qingling Motors have been producing a profit in the Chinese market even though their production scale is less than 10,000 units. This has been due to the adaptation of a Japanese production system that can maintain a constant productivity standard even when dealing with small-scale production. However, the success of this Japanese production system has been due to the development of a method of fostering multiskilled workers in accordance with the actual circumstances in China.

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Keywords: Chinese commercial vehicle, GHMC, Qingling Motors, multiskilled labor

Introduction

In the 21st century, China has demonstrated a particularly high growth rate. Against this background, the construction industry has grown as a result of a real estate boom, which has also led to a significant growth in the construction machinery and commercial vehicle markets. In the Chinese heavy commercial vehicle market, it has been claimed that the rule is “manufacturers cannot survive unless they exceed an annual production scale of 10,000 units.” Although the Japanese commercial automakers that have entered the Chinese market have gradually increased their production scales, they have not yet reached a production scale of 10,000 units. However, they have been consistently producing profits in this market.

First, this study describes the current circumstance of the heavy commercial vehicle market in China and the positions of Japanese automakers, and further explains the details of the Japanese automakers Hino and Isuzu individually within this context. Hino and Isuzu have entered China through the joint ventures of GAC Hino Motors Company (GHMC) and Qingling Motors Company (Qingling), respectively, and have secured a distinct position in the Chinese market. Finally, the high productivity of Japanese automakers demonstrates the success of their method in fostering multiskilled workers in a way that is localized to circumstances in China.
Chinese Commercial Vehicle Market

In the 20th century, exports of Chinese vehicles were primarily commercial vehicles, but after entering the 21st century, the trend shifted to passenger vehicles (Li, 2010). However, the Chinese heavy truck market is enormous, and has consistently produced more than 800,000 units per year for 11 consecutive years, from 2009 to 2020, and accounts for more than 70% of the global heavy truck market.\(^1\) The profitability of finished-truck businesses is higher than that of the makers of parts business such as engines and transmissions, and many manufacturers entered this market in China around 2009 (Kamiyama, 2009). Both Isuzu and Hino, who are the subject of this study, also entered the Chinese market at around this time.

However, against the backdrop of the thriving Chinese heavy truck market, it has been said that manufacturers will disappear within 10 years unless they produce volumes of tens of thousands of units a year. Table 1 illustrates the production volume between 2010 and 2019 of the manufacturers in the thousands-unit scale as of 2010. As illustrated in Table 1, local Chinese makers that only produced several thousands of units in 2010 have disappeared or are about to disappear in 2019, except for makers who have produced in scales of tens of thousands of units. The reason for this is that it is difficult to automate the production processes involved in producing heavy trucks compared to passenger vehicles, considering that it is labor intensive industry (Suzuki, 2010). Moreover, the wages of Chinese workers are increasing every year, and it has been difficult for commercial automakers to continue making a profit without selling

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\(^1\) In 2020, the Chinese heavy truck market has already produced 1.37 million units between January and September, despite the impact of the coronavirus. The production volume in 2019 was 1.17 million units, which means that the volume produced during the first three quarters of this year alone has surpassed the previous year’s production volume.
more than 10,000 units a year. Hence, it has been said that automakers who produce less than 10,000 units a year have only two options: either increase production to become one of the “manufacturers in the 10,000s-unit scale”\(^2\) or disappear.

Chinese makers have strived to mass produce on scales of more than 10,000 units and have adopted the Ford production system (single model, single line), while the mixed production system (MPS), which is common in Japanese commercial vehicle production, is not used. This means that most large companies choose to pursue automation via robots, but automation requires significant capital investment and the maintenance of sales stability. This is the reason

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\(^2\) Here, a “manufacturers in the 10,000s-unit scale” refers to heavy truck makers that have annual production scales in the tens of thousands of units. The terms “manufacturers in the thousands-unit scale” and “manufacturers in the hundreds-unit scale” described below, refer to heavy truck makers with an annual production volume of between 1,000 and 10,000 units, and less than 1,000 units, respectively.
why it is claimed that makers cannot survive in the Chinese commercial vehicle market without production on the scale of the manufacturers in the 10,000s-unit scale.

However, the profit rate in Table 2 shows that only two makers in the manufacturers in the thousands-unit scale group (the Japanese automakers GHMC and Qingling (Isuzu)) have continued to achieve profits and produce profit margins at a level equivalent to that of the manufacturers in the 10,000s-unit scale. Hino and Isuzu not only exhibit small production scales but have continuously produced profits despite fluctuations in their production volumes (Table 1).

Table 3 compares the product specifications of Hino and Isuzu with local mass-producing rival makers in the Chinese market, and shows that the prices of the main models of Isuzu and Hino are mostly equivalent, but exhibit better fuel consumption, acceleration time,
and engine horsepower. However, Isuzu and Hino cannot become manufacturers in the 10,000s-unit scale, not only due to their gradual growth path (instead of focusing on rapid production expansion) but because of the fact that responsibility for the sales initiatives of their joint venture rests with China. This makes it difficult for either of the companies to transfer their sales know-how, and the joint ventures’ lack of experience in selling trucks is also a factor in this equation. Qingling is a joint venture between Isuzu and Qingling Group (a Chinese automobile maker); however, their sales channels are insufficient compared to that of other major truck companies. GAC group in China, which is the joint venture partner of Hino, is an automaker that specializes in passenger vehicles, and does not have much experience in selling trucks.

Table 3. Isuzu, Hino, and rival trucks

| Maker/Model | ISUZU GIGA | HINO PROFIA | FAW J6 | DONGFENG TIANLONG | CNETC T7H |
|-------------|------------|------------|--------|-------------------|----------|
| Standard    | 6 x 4      | 6 x 4      | 6 x 4  | 6 x 4             | 6 x 4    |
| Engine (L/PS)| 11.946/460 | 11.805/420 | 11.040/420 | 11.120/420  | 10.520/440 |
| Mobility    | Accelerate from start to 80km/h |
| Acceleration time/s | 75.7 | 76.7 | 110.4 | 102.3 | 79.0 |
| Acceleration distance/M | 1142.3 | 1143.5 | 1562.8 | 1442.4 | 1157.3 |
| Fuel economy | Fuel economy in limited conditions |
| L/100M | 34.122 | 34.237 | 36.192 | 37.467 | 34.201 |
| Failure | Initial failure / Intermediate failure / Maintenance distance |
| (10,000/km) | -20/150 | -20/150 | 1.5/15/80 | 1.5/15/80 | 3/15/100 |
| Braking performance | Cold braking: ("O": 60km/h); Thermal braking: ("I": 60km/h) |
| Cold braking/M | 24.3 | 24.1 | 31.4 | 30.5 | 24.9 |
| Thermal braking/M | 24.2 | 24.3 | 39.7 | 39.2 | 25.7 |
| Noise out of the car | 80dB | 80dB | 84dB | 84dB | 80dB |
| Noise Moin the car | 62.1dB | 62.5dB | 69.5dB | 70.1dB | 63.5dB |
| Price (Base) | 450,000(RMB) | 460,000 | 420,000 | 390,000 | 400,000 |

Source: According to the homepage of each company
https://www.fawjiefang.com.cn/
https://www.dfm.com.cn/show/shangyongche.html
http://www.cnhtc.com.cn/View/ProductIndex.aspx
https://www.hino.co.jp/profia/option/index.html
https://www.isuzu.co.jp/product/giga/index.html
Then how were the two Japanese makers able to survive until now without being affected by the rule that claims that manufacturers in the thousands-unit scale are doomed to fail? This paper looks at the reasons for this and aims to clarify the reasons for the competitiveness of Japanese JV commercial vehicle makers in the Chinese market.

**Case of GHMC**

Hino entered into the Chinese market in 1978, when they started providing technological support to the local manufacturer First Automobile Work shop (FAW). This was a comparatively early entrance into the market for a foreign automaker. At the time, they helped to support the development of the technology used in medium trucks and played a significant role in changing Jiefanghao’s model line-up. However, they only provided technological support until 2003, when they officially established their engine factory in Shanghai. In 2007, they constructed a finished-vehicle factory through a joint venture with GAC Group.

Hino’s main business involves finished heavy trucks; it has taken time for them to become established. Regarding their entry into China, Hino stated, “our original plan was to establish a finished-vehicle plant as soon as possible, but the Chinese government did not approve foreign sole funding in the finished-vehicle market, so we

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3 The “Jiefanghao” is a four-ton medium truck developed with the technological support of the former Soviet Union, and is well known as an improved version of the Soviet military truck GS150. It has an important meaning in the history of Chinese automobile industry as it was produced by FAW as the first domestically-produced truck. However, due to the Sino-Soviet conflict from the 1960s, the Soviet Union’s technological support was cut off, and although they continued to make partial improvements for approximately 20 years, they were unable to make any model changes. Finally in 1978, with Hino’s technological support, they were able to make some model changes.
had to take a strategic detour by first establishing an independent engine plant and then establishing a finished-vehicle company” (source: interview with GHMC, 2017). They were finally able to launch their finished-vehicle business in this way, but due to a problem with GAC, they were not able to officially start mass production until 2008. This mass production was of the N700 model, which is sold in Japan as the Profia. Despite it only being initially sold in Guangdong, they were able to maintain a production volume of 1000–1500 units between 2009 and 2011, as the model was designated by the government as an approved industrial vehicle for the construction of infrastructure for the 2010 East Asian Games. In 2013, they achieved a total production volume of 10,000 units. They nationally expanded their sales area from 2013, but initially lacked sales bases that were dedicated to heavy trucks, and therefore, had to use the passenger vehicle sales bases of GAC, which has no commercial vehicle department. They currently have 52 major sales bases (with after-service functions) in China nationwide, but these bases are concentrated in the coastal regions, and none are located in the inland regions that have seen rapid growth in recent years. Hence, their production growth is stalling, and their annual production from 2014 until now has remained between 2000–3000 units.

GHMC has 2500 employees and a 50:50 shareholding ratio. They produce heavy trucks as well as other special vehicles (carrier cars, cement mixers, etc.). Their Chinese heavy trucks exhibit mostly the same functions as the products they sell in Japan, including characteristic Hino features such as the HMMS (Hino Micro Mixing System) engine, SCR (Selective Catalytic Reduction) exhaust gas water-purification tank and double ECU (Electronic Control Unit) auxiliary system, and they have been able to maintain a price that is two-thirds of that in Japan.

In China, GHMC has implemented two factories in which only assembly is conducted at their Chonghua factory, with engine
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production being performed at their Shanghai engine factory. Their Shanghai engine factory produces diesel engines for three types of heavy trucks. It provides engines to both GHMC and other local Chinese truck makers. The Chonghua factory has two heavy truck production lines onsite and has an annual production capacity of 20,000 units, but it currently only produces approximately 5000 units annually. Due to the thorough training of a multiskilled workforce, which we will touch on later, they have been able to maintain the same level of shop-floor flexibility as that found in their headquarters (Hamura Factory).

Case of Qingling

Qingling Motors is a joint venture that was launched in 1985 by the Japanese firm Isuzu and the Chinese company Qingling Motors Group (originally established as Chongqing Motors, in 1969), and it was also the first foreign joint venture to be set up in China after the introduction of economic reforms in China. Currently, the Qingling Motors Group is a commercial vehicle manufacturer and sales company with a total of 17 affiliate companies (13 joint ventures between Chongqing and Isuzu, and four joint ventures between Chongqing and the government of Chongqing City) and total assets of 1.3 billion yuan. Many joint commercial vehicle manufacturers in China specialize in the production of heavy trucks, but Qingling’s joint ventures are the only ones in China with a full commercial product line that includes light, medium, and heavy trucks. They not only produce finished pick-up vehicles but also essential components that include five types of diesel engine (100–520 horsepower), a type of gasoline engine, and two types of transmissions (AMT, AT), and they supply approximately 10% of their production to external entities.

Qingling’s production base in Chongqing has an annual capacity of
100,000 units across all of their products. This includes the capacity
to produce 8000 units of heavy trucks, but their current annual
production of heavy trucks has hovered approximately 3000 units.

To begin with, Isuzu’s capital ratio in Qingling was not high (it was
initially 6%, and is currently 20.3%), and the remainder is comprised
of Chongqing Motor (50%) and other entities including the
government of Chongqing City (29.7%). Therefore, Isuzu was limited
to implementing in-factory initiatives (Fujiwara, 1997), and has been
focusing on building the capacity of the production teams of Qingling
(with a special focus on having multiskilled workers). As a result,
Qingling’s heavy truck production sites have more shop-floor
flexibility than its Chinese rivals. The Chongqing factory is the only
assembly factory that incorporates a MPS for heavy and medium
trucks among Isuzu’s global factories (including their headquarters).

Multiskilled Labor Management in China

Multiskilled labor and commercial vehicle production

It is difficult to standardize automobile production without meeting
a constant level of production because it requires handling variations
in client orders by making adjustments to take time and overtime
hours. Furthermore, in the case of heavy trucks, the production line
itself is simple and characterized by its dependency on onsite
operators and its nondependency on equipment. It is not difficult to
update and maintain line equipment, but it is difficult to develop and
organize operators and build the organization structures and
management systems that are necessary for operating the lines. In
truck production, the final assembly line for making cabs and the
chassis line for docking cabs with chassis are completely
independent of each other. Frame dimensions and chassis weights
differ depending on changes to the specifications of each
Assembly lines require more flexibility and higher response capacity, which cannot be accomplished by improving the function of equipment, but can be achieved by “developing systems and mechanisms that can accommodate various specifications” (i.e., by fostering shop-floor workers).

This means that for makers that cannot ensure sufficient production scale, the fostering of multiskilled workers is the key to ensuring productivity and production quality. The American mass production system utilizes single-purpose workers and dedicated equipment to heighten productivity; however, the Japanese system utilizes generic equipment and multiskilled workers to promote high-mix low-volume production (Fujimoto, 2003). This is derived from the historical background of the production system of Japanese companies and is best embodied by the Toyota production system (Ohno, 1978).

Although Japanese manufacturers in the Chinese commercial vehicle market have also focused on multiskilled workers to meet the challenge of low-volume production, the social climate of personnel evaluation based on performance-based criteria has hindered their ability to systematically and intentionally cultivate multiskilled workers in their usual way (Wang, 2014). Although the Japanese production system can be a source of competitive advantage in overseas markets, in many cases it cannot be directly transferred as-is to local environments (Abo, 2007).

Multiskilled worker training system of Isuzu and Hino

As such, the Japanese makers Isuzu and Hino have heavily focused on cultivating multiskilled workers; however, they lack onsite workers in China (leading to skyrocketing labor costs) and have had to procure human resources through staffing companies, which has increased the ratio of temporary shop-floor staff in the 2010s to approximately 50% in some factories. Therefore, to better align
themselves with the circumstances of the Chinese labor market, Isuzu and Hino have promoted multiskilled worker training not only to their full-time employees but also to their temporary staff, and have made efforts to choose labor agencies with top executives who have studied in Japan or who thoroughly understand Japanese culture. They have regularly dispatched their veteran employees to these labor agencies and have had new entrants train for roughly half a year at the staffing agency or its technical school. They have also implemented a full-time employee system for their temporary staff and have tried to acquire talented individuals by contacting them during the dispatch period. Furthermore, Isuzu and Hino have been sharing their talents with each other through labor agencies that specifically cater to Japanese companies.

WuxiTongzhong Labor Agency is an example of the Isuzu and Hino’s multiskilled training system. They are the second largest labor agency in the Jiangsu Province and its founder is a woman who has studied abroad in Japan. They have been operating their business as a labor agency that specifically caters to Japanese companies for 10 years. They dispatched talent to electronics companies such as Panasonic and Renaissance Electronics during the early stage of their business, and to Hon Hai Precision Industry Co., Ltd., two years ago. However, they currently only cater to Japanese companies as a general rule, and they exhibit strong competitiveness in the truck industry, particularly as a result of the support they have received from Isuzu and Hino (i.e., technical guidance, equipment donation, etc.).

The cooperative relationship between WuxiTongzhong, Isuzu, and Hino is balanced and well developed. Initially, WuxiTongzhong dispatched regular workers to Hino and Isuzu. Eventually, Isuzu created their dedicated resident team, made up of approximately ten highly talented individuals, by choosing from the dispatched workers. Hino also eventually adopted this method.
These dedicated teams at Isuzu and Hino are resident in Chongqing and Guangzhou, and they work as instructors for an automobile repair school that is funded by the companies when no work is available. For example, Isuzu and its dedicated team share onsite information with each other every day, and three or four team members go to Isuzu’s campus when work is available. When there is a high volume of work to be completed, the team members lead student groups from the automobile repair school and work together onsite.

Table 4 illustrates a typical day under the worker training plan (2019) for workers dispatched from WuxiTongzhong to Qingling and Hino. Although the plan is for temporary staff, it is both systematic and substantial. The following characteristics of the plan should be especially noted: (1) Japanese language training course, (2) intense training (half a year), (3) cultivation of group leaders.

The relationship between GHMC and Qingling is also of particular note. Despite being rivals in the market, Hino and Isuzu both teach each other their strengths in areas of competitive advantage when it comes to developing multiskilled workers.
For example, the engine of a heavy truck is one of its most important parts in terms of its overall performance. Its structure is complicated (just the number of oil pans and bolts alone for heavy trucks is more than twice that of general passenger vehicles), which requires advanced and accurate performance from the operators. In this regard, Hino has been leading Isuzu to some degree.

Conversely, Isuzu has been leading Hino in regard the docking process of chassis and cabs, all of which have an impact on the production efficiency of heavy trucks. This requires having operators on both sides of the line, and a hoist operator and line operators communicate with each other to maintain the integrity of dimensions, with failure to do so meaning that they would need to redo the steps.

Although their know-how is supposed to be confidential, they seem to have passed each other detailed knowledge through WuxiTongzhong. Despite their small scale in the Chinese commercial vehicle market, they have been able to maintain high productivity due to their successful training of multiskilled workers.

**Chinese rival makers and labor agency**

Rival Chinese makers also utilize labor agencies. However, unlike the two Japanese companies, they merely utilize the labor force of the labor agencies to absorb fluctuations in the market demand and do not seek multiskilled workers. This is because many Chinese companies desire profits through mass production quickly, in a short time frame, without challenging themselves. In other words, their goal is to mass produce and make profits in the shortest possible time with the lowest possible amount of investment. These companies sometimes file bankruptcy if they cannot become one of the manufacturers in the 10,000s-unit scale within five years, but they do not consider ways of increasing their profit rate as a thousand makers.

Furthermore, with the exception of certain heavy truck makers
(former nationally owned companies), they lack experience in utilizing multiskilled workers, are unable to implement low-scale production through them, and have no other option but to mass produce products to maintain profitability. However, even in these cases, they are forced to simplify the construction process and hire large volumes of onsite workers because of their inability to build an onsite multiskilled worker system, which thereby generates excessive labor costs.

**Conclusion**

The players in the Chinese commercial vehicle market have long competed in terms of production scale. However, the Japanese commercial automakers GHMC and Qingling have continued to be profitable despite producing smaller volumes than the Chinese market standard. This is because their Chinese production bases exhibit the same level of productivity capability as their Japanese bases, which makes up for the weaknesses of small-scale production. This is all supported in the background by the cultivation of multiskilled workers through specialized labor agencies. It can be said that this is a product of the strategic alliance between Japanese manufacturers in overseas markets. Heller (2002) has elucidated the structure of reaping mutual benefit through mutual learning in strategic alliances. However, this study focuses on different cases, wherein rival companies in a foreign market provide knowledge to common suppliers to gain mutual benefit.

Furthermore, in emerging market studies of major Japanese passenger automakers such as Honda and Toyota, it has been assumed that they have achieved a constant level of sales in each emerging market. However, this study has focused on two companies and verified that, despite producing low volume, they have been able to demonstrate their Japanese competitiveness in China, which is
derived from a high-mix low-volume production approach.

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