Business Reform in Communist China: 1949-1978

Zhongji Wu
zwu@wellesley.edu

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Business Reform in Communist China: 1949-1978

Zhongji Wu

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To Yifu Wu
献给武义福
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INTRODUCTION

The radical socialist period of China (1949-1978) marked three decades of dramatic transformation of the country. China underwent rapid industrialization (the First Five Year Plan) and the Great Leap Forward, one of the biggest famines in human history, a striking reversal of industrialization (the Cultural Revolution), and the market reforms of 1978. Scholars of Chinese history and economy have treated China before and after 1978 as two distinct periods. The opening and reform of 1978 was usually presented as a distinctive break from the country’s socialist years. In contemporary discourse on China, it is hard to relate the fast-growing, now the world’s largest economy, to a socialist country that was marred by the craze of personality cult just fifty years ago. Nevertheless, this thesis examines the continuities of China’s business history from the country’s radical socialist years to its more recent market reforms. It uncovers the transformation of major business models that developed in the Chinese economy starting from the Great Leap Forward, as the country first underwent rapid industrialization, to the opening and reform in 1978, when the country entered into a new era of high-speed growth.

The Great Leap Forward (GLF) has usually been presented as a great catastrophe in the human history, resulting in the loss of millions of human lives in the famine following the movement. For example, the Chinese historian Yang Jisheng estimated the total death toll of the GLF to be 36 million, resulting from the mandatory agricultural collectivization
and the installment of communal kitchens in the countryside.\(^1\) Frank Dikotter has given a higher estimate, pointing that the total death toll may have been as high as 45 million.\(^2\) The famine is one of the most common images associated with the GLF. Another theme that was usually associated with the GLF was the obsession with iron and steel production, or the establishment of millions of “backyard steel furnaces” all over the country. It was reported that in the heyday of the GLF, more than 50 million people participated in the iron and steel campaign and another 50 million worked in supporting functions.\(^3\) Slogans during the steel mania centered on unrealistic goals in steel production, including the call to “overtake Britain in iron and steel and other major industrial products in fifteen years”.\(^4\) In addition to the people’s communes and the steel mania that were most commonly associated with the GLF, most scholars have agreed that the movement was a full-fledged, man-made disaster, whether in terms of agricultural production, industrial output, or the cost of human lives. James C. Scott identified the GLF as one of the “great human tragedies of the twentieth century, in terms of both lives lost and lives irretrievably disrupted”.\(^5\)

The GLF was, beyond doubt, a man-made catastrophe. However, most historians have overlooked important business decisions made by Chinese economic actors during the movement. The proliferation of “backyard steel furnaces” seemed to result from a purely irrational, and ideological commitment to industrialize the country at an unrealistic pace. These were small-scale and local production units that integrated the

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production of iron and steel. They were also rational response to a real challenge that the country was running into—that of broad front development. This is a classical challenge faced by many economies at the initial stage of industrialization. In the case of China, the challenge was particularly relevant because the economic actors attempted to industrialize the country at an unprecedented pace. Gerschenkron first used the term in his essay on economic backwardness in 1966, in which he wrote: "As likely as not the period of stagnation ... can be terminated and industrialization processes begun only if the industrialization movement can proceed, as it were, along a broad front, starting simultaneously along many lines of economic activities." He described the challenge on a macro scale—various industries of an economy had to move forward at the same pace for industrialization to unfold in a country. Chinese economic actors, on the other hand, were presented with the same challenge on a micro scale—individual factories, with incomplete supply chains in a underdeveloped economy, needed to produce finished goods so that the country could industrialize. The “backyard steel furnaces” were a subset of a more general business model that was prevalent in the Chinese economy at that time—that of complete factories. In order to produce steel with an unreliable or insufficient supply of pig iron in the economy, the “homemade” furnaces dealt with this bottleneck by making iron on their own. For a complete factory in any industry, presented with the challenge of gaps in supply chains, it sought to manufacture raw materials and intermediate goods for itself.

Complete factories were originally developed in the machine-building industry as makeshift solutions to the bottlenecks of machine tool making. However, soon the logic of making use of all equipment capacities led to the creation of multiple product lines and

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diversification. They were originally created as makeshift solutions to complete gaps in the supply chains of local factories. With the proliferation of this model, the necessity of internalizing diverse production capabilities within one, self-contained factory was turned into a virtue. Complete factories began using their internalized capabilities to produce a diverse range of parts and semi-finished materials for external use, supplying not only their own needs but those of other factories. Diversification turned out to be another solution to the challenge of broad front development—instead of calling for more specialized enterprises to fill in the gaps of incomplete supply chains, Chinese policy makers advocated for greater diversification and believed that the diversified enterprises would be able to address the challenge.

They soon realized that the complete and diversified enterprises could not serve China in the long run. With the proliferation of small, self-sufficient factories, the flaws of the previous business model began to emerge. One of the major flaw of complete factories was the redundancy of underutilized capacities. For example, if every machine-building factory in the economy were to have a forging and casting workshop, none of these workshops would be in use full-time during the day and it was a serious waste of labor and resources. As the Chinese economy industrialized and was required to create more sophisticated machinery, the flaws of the complete factory model soon outweighed its benefits. Therefore, starting from the early 1960s to mid-1960s, right before the onset of the Cultural Revolution, the model of complete factories and diversification was dismantled, and what was known as the Specialization and Coordination Movement started to unfold. This movement called for big and medium-sized complete factories to be broken down into smaller specialized enterprises. With higher level of specialization, enterprises were then able to mass produce and benefit from economies of scale. With expansion of production capacities, specialized factories could produce raw materials,
intermediate goods, machine parts, and components at a lower cost. In addition, as they started to specialize, they could exert more rigorous quality control and make high-quality products.

More specialized factories required a corresponding level of coordination in the economy. The more specialized an economy became, the more factories depended on each other for the manufacturing of finished products. The need for coordination was highlighted by Chinese economic critics and commentators as well during the Specialization and Coordination Movement. However, the case for coordination was not easily made in a socialist economy, where central planning was the dominant way to channel resources among enterprises. That is to say, in a planned economy like China, users and producers of a product could not communicate with each other directly. Therefore, the need for coordination turned out to be more complicated than what would take place in a market economy, in which users and producers could coordinate with each other through market mechanisms.

Starting from the end of mid-1960s, economic commentators and critics started to explore the possibility of getting around national planning and calling for greater enterprise-level coordination. They came to realize that one of the greatest impediments to the Specialization and Coordination Movement was the national plan, which was unable to accommodate the needs of individual factories. Therefore, they brought up the ideas of fairs and contracts. Sometimes referred to as “coordination conferences”, these fairs were events set up by local and provincial governments that brought together different factories, which were usually users and producers of specific products. In these government-led fairs, factories had the opportunity to communicate with each other to specify their individual needs. In addition, participants of the coordination conferences were encouraged to sign contracts on the spot. The idea of “contract” was one that was
repeatedly brought up by Chinese economic writers during the Specialization and Coordination Movement. Contracts facilitated and upheld enterprise-level coordination, which was previously not recognized by the national plan. With contractual coordination in place, factories were able to secure long-term suppliers or buyers of their products.

The movement, however, came to an abrupt end once the Cultural Revolution started. Dismissed as capitalist practices, the call for greater specialization and coordination was dismantled, and Chinese factories came back to the older model of complete factories. The principle of self-sufficiency was again touted, more as an ideological commitment under a socialist economy than an economic convenience or expediency. During the Cultural Revolution, many specialized factories were consolidated into complete factories, and the older model of complete factories was revived.

Following the fall of the Gang of Four and the end of Cultural Revolution, Chinese economic actors were presented with the same challenge that they faced decades ago during the Great Leap Forward. In response to the challenge of broad front development, writers revived the Specialization and Coordination Movement. Enterprises were encouraged to specialize, and greater enterprise-level coordination was promoted. In addition, writers came up with new terms, such as “horizontal economic relationships” and “horizontal economic integration”, to describe contractual coordination, but the same basic principles that emerged in 1960s were reintroduced. More importantly, with the opening and reform of 1978, the topic of market was no longer a taboo. Writers started to talk openly about the use of market in a socialist economy. In fact, the concept of contractual enterprise-level coordination led nicely into the discussion on market coordination. Chinese economic thinkers came to realize that market turned out to be the ideal set-up for specialized factories to coordinate with each other. The discussions about markets were, therefore, direct outgrowths of challenges that had already been explored
in 1960s, and even back to the complete factor model during the GLF, which had emerged as solutions to problems of broad front development. Market coordination was not a brand new solution that emerged out of nowhere. It was a continuation of a series of efforts, solutions, and reforms that Chinese economic actors had been grappling with since the start of the country's industrialization process.
CHAPTER 1

The Great Leap Forward (1958-1961) and the Complete Factory Model

During the Great Leap Forward, Chinese state planners and economic actors were presented with the challenge of industrializing the country at an unprecedented pace. Although the Soviet Union provided extensive aid to China to help establish 156 large-scale, modern enterprises during the First Five-Year Plan, these large enterprises alone could not bring about industrialization on a national scale. In light of the limited capacity of large, modern enterprises in China, the state planners came up with the slogan “Walking on Two Legs” and advocated for small-scale, local factories as an important force for industrialization. The slogan “Walking on Two Legs” indicated that “both relatively capital-intensive, large-scale, modern production units, and relatively labor-intensive, small-scale, and technologically backward ones were to develop simultaneously.”¹ Chinese state planners were aware of the long time span in building from scratch large, vertically integrated, modern enterprises in China. Therefore, small, local factories that could make ready use of local resources and labor became a desirable solution to the need for rapid industrialization. The slogan called for simultaneous development of both legs—the state would invest resources in the construction of large, modern enterprises that would serve

¹ Carl Riskin, China’s political economy : the quest for development since 1949 (New York : Oxford University Press, 1987), 117.
as the vanguard of the country’s industrialization; in the meantime, provincial and local governments would encourage existing local factories to industrialize as well.

A People’s Daily editorial in 1960 articulated the logic behind “Walking on Two Legs”:

On the one hand, we must develop a large-scale petroleum industry. These factories could make use of innovative technology, have high-yields, offer products of high-quality and great variety. However, to establish a modern, large-scale petroleum factory it requires a significant amount of steel, complicated equipment, large initial investment and a long time span. If we were to satisfy the needs for petroleum within a limited amount of time only through the development of large enterprises, relying only on the “foreign leg” of our economy, the speed and scope of development would be severely limited. Therefore, we must make full use of all available resources by establishing small, local petroleum factories. We must continue with the principle of combining both foreign and local methods and build factories on large, medium and small scales, in order to rapidly increase our petroleum production.²

The author of the editorial specifically addressed the petroleum industry, but the same logic could be applied to all industries during the Great Leap Forward as well. He highlighted the necessity of building small and medium petroleum factories due to the significant initial investment and long time span of building modern, large-scale petroleum enterprises. Therefore, the logic behind “Walking on Two Legs” was that small, local factories would develop simultaneously with large, modern enterprises so as to increase the pace and scope of industrialization.

However, as local factories sought to undertake their part of the industrialization mission, they ran into the problem of “broad front development”—a classical challenge faced by many economies at the initial stage of industrialization. Gerschenkron described the challenge of broad front development on a macro scale. The Chinese state planners were keenly aware of this challenge. For example, during the height of the First Five-Year

Plan in 1956, the economic writer Sun Yang used the example of No.1 Automobile Factory to illustrate how the challenge of broad front development unfolded in the Chinese economy at the level of the individual enterprise:

To make an automobile, it is insufficient to make the body and generator out of steel and make wheels out of rubber, because an automobile requires glass for windows, textile to make seat mats, paper to make washers, and spray paint to paint the body. In addition, we need specific factories to make an automobile's meters, springs and various accessories and components. The more modern a large automobile factory is, the more factories it needs to supply its production process. For example, the No.1 Automobile Factory we are currently building requires dozens of factories to coordinate with its production.3

Sun elaborated on the challenge of broad front development on a micro scale, how an individual enterprise would require various suppliers of raw materials or intermediate goods in the making of finished products such as automobiles. On the other hand, Gerschenkron pointed out that for a rapidly developing economy, various industries or sectors of the country's economy must develop simultaneously for industrialization to move forward. This chapter explores the ways in which small, indigenous factories initially tackled the challenge of broad front development, as well as the business models they turned to and the solutions they came up with. This is because the small factories constituted one of the “legs” advocated by Chinese planners, and can arguably be considered as the major undertakers of the country’s industrialization.

The challenge of broad front development unfolded in particular ways on the enterprise level. When local factories started to produce complicated and technologically advanced products, they did not have adequate supplies of semi-finished goods or machine tools due to the absence of specialized enterprises in the economy. In other words, individual enterprises needed to address gaps in their supply chains on their own. The initial solution came in the form of a particular business paradigm advocated by

3 Sun Yang, Woguo wunianjihua de gushi (Beijing: Zhongguo qingnian chubanshe, 1956), 28.
Chinese economic policy makers: the model of "small and complete" (xiao er quan) factories. These small factories started to integrate backwards and internalize supply chains on their own. Since they were unable to have adequate supplies of the desired goods through other specialized factories, local factories chose to become self-sufficient in meeting their own needs. Self-sufficiency also served as a response to another challenge that aggravated incomplete supply chains: poor transportation infrastructure. Due to high costs of transportation, factories tended to produce everything in-house to reduce these costs.

The emergence of complete, self-sufficient factories during the Great Leap Forward has been discussed by other historians as well. For example, Chu-Yuan Cheng highlighted the prevalence of self-sufficiency among many factories in the 1950s:

From the beginning of the First Five-Year Plan, almost all the new or expanded plants took self-sufficiency as their basic goal. They undertook not only the production of machinery but also all kinds of ancillary operations and services which in a more advanced economy would be contracted out to other plants. As a result, there were hundreds of what they called 'omnipotent' plants and thousands of small 'complete' plants.\(^5\)

Cheng noted that one of the major features of complete factories was the internalization of supply chains. For example, an automobile factory that followed the complete factory model would not only produce most of the components and machine parts in-house, but would also be in charge of providing repairing and other auxiliary services on its own. Cheng also pointed out that in a more advanced economy, where conditions for specialization were favorable, factories tended to outsource many of the in-house operations to other specialized enterprises. Riskin also observed the prevalence of complete factories in the Chinese economy during the GLF:

In factories, self-reliance gave rise to the “comprehensive” production unit that made for itself a large part of the materials and intermediate goods needed to turn out its main production line. Now it is possible for division of labour to be carried out in a large, integrated enterprise which is broken down into specialized production units. To some degree, larger Chinese enterprises functioned in this way, and it is unclear the degree to which efficiencies of specialization were sacrificed in such enterprises. However, ‘completeness’ often meant that enterprises maintained general machine shops that turned out the odd pieces of equipment needed for expansion or technical renovation. Such “completeness” was purchased at the expense of some inefficiency.\(^6\)

Riskin used the term “comprehensive production units”, which was equivalent to the model of complete factories—these local enterprises chose to integrate backwards by producing a large part of the materials or intermediate goods needed on their own. He noted that the benefits of specialization might be achieved in a large complete enterprise. However, a majority of the complete factories that emerged during the GLF were *xiao er quan* (small and complete) enterprises or production units that closely followed the principle of self-sufficiency.

Cheng and Riskin gave different reasons for the emergence of complete factories during the Great Leap Forward. Cheng, for example, believed that their emergence was a result of historical legacies from pre-1949 period: when the Chinese Communist Party took over plants left over from pre-1949 period, they were built by various foreign countries with no uniform standardization of parts or components. Therefore, most large plants chose to be self-sufficient due to the “uncertainties in the supply of parts and services from other plants.”\(^7\) Another historian, Carl Riskin, believed that complete factories were an administrative intervention that served to block the natural progression of specialization. He pointed out that conditions for specialization were not available as a country first started to industrialize: “It is arguable that, when countries were first setting

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\(^6\) Riskin, *China’s Political Economy*, 218.

\(^7\) Cheng, *The machine-building industry in Communist China*, 149.
up factories, neither demand nor supply conditions permitted extensive specialization among the factories, but that, as industry developed and factories spread throughout the country-side, greater division of labour among them became desirable. Whatever economic conditions in the abstract may have dictated, however, institutional and administrative considerations intervened." The intervention mentioned by Riskin came in the form of a particular business model advocated by Chinese economic policy-makers: the model of “small and complete” factories.

Riskin seems to imply that all other things being equal, Chinese industry would have specialized. Instead, administrative intervention produced small-scale complete factories. Implicitly, in his view, the small complete factory was not a solution, but a major administrative blunder, an intervention to prevented the "natural" course of development. This thesis, however, takes a different approach and argues that complete factories served as a solution to the challenge of broad front development. Moreover, Riskin believed that the central planning apparatus played a part in the advancement of the complete factory model. He argued that “Comprehensive enterprises, then, were not so much desirable in and of themselves, but rather were the only possible way to organize production with no market and only skeletal planning.” Under the central planning system, local enterprises were required to meet certain production targets, without the necessary technological know-how or intermediate goods provided. Therefore, self-sufficiency was the only alternative for them to meet the planning targets set from above. Both Cheng and Riskin had observed the rise of complete factories during the GLF, but neither of them had looked at the problems of broad front development in any significant way. Historical legacies from wartime periods or central planning might have contributed

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8 Riskin, *China's Political Economy*, 218
to the emergence of the complete factory model, but fundamentally, the model emerged from individual factories’ efforts to address the challenges of broad front development on the micro level.

The complete factory model was first extensively advocated and used in the machine-building industry. Examples from the machine-building industry presented the simplest and most basic form of complete factories. For the Chinese economy during the GLF, the machine-building industry constituted the backbone of the economy because every other industry relied on it for greater use of machinery, a major step toward industrialization. Chinese economic writers were keenly aware of the fact that the limited capacity of the machine-building industry constituted a major bottleneck in the economy. For example, according to a People's Daily editorial in 1958 on the significance of the machine-building industry during the country's industrialization process:

The machine-building industry is in a position such that it is not only responsible for supplying equipment to other industries, including heavy industry, agriculture, transportation, etc., it also needed to equip itself with proper machinery. During the Great Leap Forward, the steel industry asked it for metallurgical equipment, the power industry asked it for generator equipment, agriculture asked it for various types of farm equipment…. In addition to meeting all the demands, the machine-building industry must also empower itself by manufacturing a large number of machine tools required for production. It bore a heavy burden. Currently, a major bottleneck was that the capacity of the machine-building industry could not meet the demand.10

While the machine-building industry was responsible for producing machinery for many other industries, it also faced the challenge of broad front development within its own sector of production. In other words, many of the small, indigenous factories that were ordered to manufacture machinery for others lacked the essential machine tools or equipment to complete their production. In response, many factories in the machine-

building industry turned to the complete factory model and started producing machine tools in-house. The following example of Jingye Machinery Factory (Jingye jiqi chang) illustrated how a small, local factory integrated backwards in order to produce more complicated machinery set by the production targets. The Jingye Factory was instructed by the City Government of Shanghai to produce 7 tolling mills and 3 gearboxes to supply to the steel industry. However, the factory had no proper equipment, nor prior experience, in the manufacturing of rolling mills or gearboxes. In 1959, a worker from the Jingye factory published an article on the Machine Building Weekly and described how the factory integrated backwards to make machine tools:

> With no large-scale equipment and inadequate technological support, we faced many challenges. In order to meet the demand for rolling mills from our country, we choose to mobilize the masses and make use of simple equipment to prepare ourselves to complete the task of manufacturing rolling mills. By January of this year, we have made a total of 63 machine tools for the purpose of producing rolling mills.11

Faced with the challenge of producing rolling mills when it lacked the proper equipment to do so, the factory decided to manufacture the supplemental machine tools on its own. These machine tools included milling machines, boring mills, slotting machines, planers, and other pieces of equipment. Another quotation from a worker at Jingye Factory reflected the pursuit of self-sufficiency among local, indigenous factories in the machine-building industry: “We must use ‘homemade’ machine tools (tu ji chuang) to produce large equipment. Using small [machines] to achieve big things is one of the most important ways to address the current lack of large equipment.”12 Following the principle of self-sufficiency, local factories began to integrate upstream and internalize their own supply chains as a solution to various bottlenecks they encountered.

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12 Ibid.
Similarly, the Jinzhou Mining Machine Factory (Jingzhou kuangshan jiqi chang) in Liaoning also started to produce various machine tools and equipment in-house. Jinzhou Mining Machine Factory specialized in the manufacturing of machinery for the mining industry. In 1959, for example, it was instructed to to make heavy mining hoists, windlasses, washing appliances and other heavy, large-scale machinery for the mining industry. Under the new production targets, however, its original equipment was no longer adequate for the making of more complicated machinery. In response, the Jingzhou factory started to make the necessary equipment, including both single-purpose machine tools and multi-purpose auxiliary equipment, as a solution. It was featured in the Machine-Building Weekly in 1959:

On the one hand, they built some temporary, simplified and specialized equipment based on current production needs; on the other hand, they designed and manufactured a set of multi-purpose, complex, large-scale equipment using a combination of foreign and indigenous methods. These large equipment sets constituted part of the basic construction plan of the factory. Although this equipment was simple in structure and low in cost, it was extremely efficient.\(^\text{13}\)

In addition to the two factories above, another local factory in the machine-building industry produced single-purpose machine tools on its own as a solution to fill in gaps in supply chains. Similar to the Jingye Factory, the Qunli Machine Factory (Qunli jixie chang) in Harbin was presented with the challenge of manufacturing two complete sets of rolling mills. Qunli was a small, indigenous factory equipped with only 50 machine tools, one conveyer belt machine and one double-column planing machine. These equipment was not adequate to manufacture the essential components of a rolling mill, including the main machine body and herringbone gears. In the editorial article featuring Qunli in the

\(^{13}\)“Jingzhou kuangshan jixiechang zizhi dajichuang, wei jiajiaong dajian kaibu,” Jixie gongye zhoubao, February 14, 1959, 9.
*Machine Building Weekly,* the author described an internal debate within the factory on whether it was capable of producing the required rolling mills:

For a small factory like Qunli, is it able to manufacture complete sets of rolling mills? This depends on whether it is able to solve a series of very serious bottlenecks. For example, is it able to make the herringbone gears without a gear cutting machine tool? Is it able to make the rolling mill housing without a large-scale double column planing machine and a boring mill? Some people say: ‘Qunli is ill-equipped with the proper equipment for making rolling mills.’ Others say that in order to make rolling mills, one must either obtain large-scale equipment from the government or ask for outside help. However, neither option was available at that time.\(^\text{14}\)

In response, Qunli chose to go into the direction of a “complete” plant and make the necessary machine tools on its own. It manufactured an “homemade” version of a gear cutting machine tool with under five thousand yuan, while purchasing such a equipment based on an imported model would cost 260 thousand yuan. In addition, workers at Qunli made a set of machine tools to manufacture rolling mills. These internally-made machine tools took the place of a large-scale double column planing machine and boring mill in production that would otherwise have to be imported.

In addition to the machine-building factories that specialized in the manufacturing of machinery, various factories in other industries embarked on the production of machine tools and equipment as well. Following the principle of self-sufficiency and the model of complete factories, local factories started manufacturing the required equipment on their own. For example, in 1958, the *People’s Daily* featured Jilin Dye House (*Jilin ranliao chang*) that became fully self-sufficient in producing all the equipment it needed in production in-house.\(^\text{15}\) Prior to manufacturing its own equipment, noted the editorial, the repair workshop of the factory was only responsible for repairing and maintaining the

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\(^{14}\) "‘Qunli’ chang yingyong zuhe jichuang qiaozhi zhagangji,” *Jixie gongye zhoubao,* January 31, 1959, 2.

\(^{15}\) “Jilin ranliao chang zhebei quanbu ziji,” *Renmin ribao,* August 12, 1958.
equipment for the dye house. When it was in need of any large-scale or more complicated machinery, the dye house had to rely on procuring equipment from other machine-building factories. The factory’s reliance on other machine-building factories was considered an inconvenience. Therefore, the dye house transformed its repair workshop into a machine-tool-building workshop that was capable of manufacturing all of the equipment it needed in the production process:

Recently the workers at this factor decided to make full use of scrap steel and iron, as well as existing equipment, to build a total of 40 pieces of equipment this year. This would allow the factory to become self-sufficient in supplying itself with a 12-feet long machine tool, various types of pumps, boilers, potteries, and ventilators.16

The example of Jilin Dye House presented a slightly more complex form of complete factory, as it moved into the manufacturing of machine tools and various other products. Nevertheless, the basic principle of self-sufficiency remained the same—by making use of existing resources and equipment, complete factories sought to fill in the gaps in supply chains on their own.

Similarly, the construction firms in Beijing ran into shortage of machine tools and they came up with the solution of manufacturing the required machinery and equipment on their own. In order to do so, construction firms not only undertook the production of raw materials, but also the construction of various workshops for the manufacturing of necessary equipment. They transformed repair workshops within the factory into equipment-making workshops that were responsible for making indigenous machine tools. They also created “home-made” blast furnaces, “home-made” converters, cement plants, as well as made steel and iron to become fully self-sufficient in all the required construction

16 Ibid.
In order to make the required machinery, the construction firms integrated backward into the production of various forms of steel, concrete, as well as the construction of 13 workshops. The logic behind integration remained the same: there was inadequate supply of machinery and equipment in the Chinese economy, and factories that specialized in the production of machine tools were nonexistent. In response to incomplete supply chains, local, indigenous factories started to manufacture their own equipment using their existing capacity and resources by following the complete factory model.

The complete factory model emerged in almost every other industry that faced the challenge of broad front development. The model evolved and adjusted according to the needs of different industries. Under more evolved forms of complete factories, enterprises integrated backward not only to produce single-purpose machine tools, but also start to develop multiple product lines to meet the needs of various production stages and processes. Take the example of Guangzhou Light Bulb Factory (Guangzhou dengpao chang), which needed to build an additional three workshops to expand its production capacity. The construction firms in the city were unable to take construction orders for the light bulb factory due to the overwhelming

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demand for construction during the Great Leap Forward, nor was the light bulb factory able to secure orders from construction firms outside Guangzhou. In response to the inadequate construction capacity from outside factories, the light bulb factory undertook the construction of three workshops on its own in 1959:

The Design Academy of Guangzhou is too busy to provide designs for the light bulb factory, while other construction firms are unable to be in charge of the construction of the factory. In terms of ordering machinery from other enterprises, although [the light bulb factory] has travelled to Shanghai, Beijing, Chengdu, Tianjin and various other big cities to place orders, they are unable to have their needs [for machinery] met. Under this situation, the leaders of the light bulb factory realized that they can no longer rely on aid from the outside, but have to become self-sufficient... they decided to take charge of the design and construction of an additional three projects: one for metalworking, one for glass making, and one for storage.\(^{25}\)

In addition to the construction of two workshops and a storage facility, the light bulb factory was also in charge of manufacturing their own equipment and machine tools in the newly added workshops. For example, lacking a dry-bottom boiler, the factory manufactured one on its own. The complete factory model, which first emerged in the machine-building industry and involved the making of single-purpose machine tools, had expanded into other industries and involved the making of more complicated equipment, as well as the construction of workshops.

A more interesting case is the Harbin Bearing Factory (Harbin zhoucheng chang), which started to manufacture meters, instruments and grinding wheels for its own use. The bearing factory, expanding its production capacities and undertaking the making of multiple products, represented a more complex form of complete factory model:

Take the example of Harbin Bearing Factory, whose bearing production output increased multiple times in 1958. Previously, they relied heavily on the import of instruments and meters, as well as grinding wheels. When the import could not keep up with their demand in quantity and in

\(^{25}\)“Guangzhou dengpaochang yong tufa jiancheng liangge chejian, zili gengsheng, qinjian jianchang,” jixie gongye zhoubao, February 7, 1959, 11.
time, they decided to manufacture on their own. By 1959, they were completely self-sufficient in instruments and meters...\textsuperscript{26}

A factory that took the complete factory model even further was Chengdu Measuring and Cutting Device Factory (\textit{Chengdu liangju daoju chang}), which expanded into an even wider variety of products, including iron, steel, refractory materials, and eventually established a total of 14 satellite factories, all of which were created in response to a shortage of certain materials:

When they faced a shortage of steel in production, they would make iron, steel and rolled steel; when they did not have enough refractory materials for the production of iron and steel, they would make the materials on their own. In the end, the productive capacity of the factory increased three times more than the design capacity. Over one third of the high-quality steel and medium carbon steel required is now provided by the integrated enterprise on its own.\textsuperscript{27}

From the simple case of machine-building factories that manufactured single-purpose machine tools to the Chengdu Measuring and Cutting Device Factory that produced a multitude of raw materials and intermediate goods, the complete factory model had evolved from internalizing one step of the supply chain to internalizing various steps in the production process. Nevertheless, the rationale behind the complete factory remained the same—the various products and materials were produced for the factory's internal use. By the end of the Great Leap Forward, complete factories not only made equipment and machine parts for their own use, but for the use of other factories as well. Once they started to diversify, however, complete factories started to manufacture goods for the use of others. As we shall see in the next chapter, with extensive diversification, the complete factory model was transformed to serve a fundamentally different purpose.

\textsuperscript{26} Li Ximu, "Duozhong jingying shi gongye qiyeduokuai haosheng de fazhan shengchan zhilu," \textit{Renmin ribao}, October 8, 1960.
\textsuperscript{27} Benbao pinglun yuan, "Yige zhongyaode fangxiang," \textit{Renmin ribao}, April 22, 1960.
CHAPTER 2

The Emergence of the Diversified Complete Factory Model

The complete factory model emerged during the Great Leap Forward as makeshift solutions to incomplete supply chains. In the process of producing various required pieces of machinery to supply other industries, the machine-building factories described in the previous chapter started manufacturing machine-building equipment on their own. Although such practices started out as makeshift solutions, policy makers and analysts began to see these complete factories emerging during the Great Leap Forward as a broader model for Chinese industrialization. As the complete factories developed multiple product lines to fill in various gaps in their supply chains, they started to expand into the production of a greater variety of products. This led to a diversification of production capacities, and under the logic of making maximum use of existing equipment and resources, complete factories began to develop multiple product lines.\(^1\) Therefore, the complete factory model led to the emergence of diversified complete enterprises, and diversification became a prevalent model followed by factories in every industry. Although complete factories emerged as makeshift solutions to the challenge of broad front development, Chinese economic

actors made a virtue of this model and turned the diversified complete factory model into a more general model for industrialization in China.

Consider the case of the Harbin Bearing Factory introduced as an example of a complete factory. The factory started making meters and instruments for its own use, after the import of these products could not keep up with its demand. That is to say, it integrated backwards to fill in the gaps of its own supply chain, because it could not obtain meters and instruments from other sources. The effort at filling the gaps in production, however, soon turned into product lines in their own right. The bearing factory not only made meters and instruments for itself, but also started to supply these products for the use of other factories:

By 1959, they were completely self-sufficient in instruments and meters, and they were able to supply 61 other factories and export part of the output. They also solved the problem of an inadequate supply of grinding wheels and cut the production cost in half. Now, they are in the process of establishing workshops and work units for over seventy products, including iron and steel, construction materials, abrasive materials, high-frequency motor spindles, air-powered clamps, rubber tubes, etc.²

Therefore, what started out as a makeshift solution to an inadequate supply of instruments and meters created opportunities for diversification. Having become self-sufficient in manufacturing certain products that were originally for its own use, the bearing factory started to "export" what was not needed for in-house use in order to make maximum use of its equipment and facilities. In order to exploit the newly developed production capacities, diversification became a logical step undertaken by Chinese enterprises. The bearing factory illustrated a clear transition of the complete

² Li Ximu, “Duozhong jingying shi gongye qiye duokuaihaosheng de fazhan shengchan zhilu,” Renmin ribao, October 8, 1960.
factory model that started out as simple backward integration and later evolved into a more evolved model of diversification.

Both small-scale, local factories and larger, state enterprises started to diversify as well during the GLF. In addition to the Harbin Bearing Factory, the No.1 Automobile Factory (Di yi qiche zhizao chang) gave an example of how the complete factory model evolved into diversification on a broader scale. Similar to the previous two factories described above, the automobile factory faced similar challenges of incomplete supply chains:

In the production of automobiles, some materials are used in limited quantity. If we rely on the supply from outside factories, production costs will be high and timely supply cannot be guaranteed. However, if we produce the materials by ourselves with existing resources and facilities, we can not only ensure timely supply, but also cut production cost.4

The automobile factory turned to backward integration to fill in gaps of its supply chains. The article highlighted the fact that one of the primary reasons for backward integration was to make efficient use of the existing resources and equipment of the factory. Therefore, in response, the automobile factory started to develop more excess production capacities than many other factories that made simpler products:

Building on multipurpose utilization of resources, we have further diversified. Currently, we have established a group of small-scale, half-foreign and half-indigenous factories, such as a rolling mill, a chemical factory, a fiberboard plant, an iron powder factory, an asbestos factory, etc. With multipurpose utilization of raw materials and diversification, we can not only meet part of the needs from automobile production, but also supply many more product types to the market and facilitate state construction projects; we can also help improve automobile production and alleviate the burden for other factories. In the past, some machine parts required for our production, such as flywheel ring wheels or lock detachable rings were difficult to make and needed in small quantities. For other

factories that mass produce, making these machine tools are costly and low in return. In the future, we can slowly address the inadequate supply of these specific machine tools by making use of our own small steel factories.\(^5\)

In essence, every effort to fill supply chain gaps by the automobile factory created new capacity, which was then exploited to create new product lines. The author of the editorial noted that the automobile factory diversified for maximum utilization of existing resources. More importantly, the automobile factory served as another example of a complete factory that transitioned from making products for its internal use to external use of other factories. As multiple product lines started to emerge, the factory started to realize that by exploiting its expanded production capacities, it could fulfill broader demand as well. Through diversification, the automobile factory supplied other factories as well as filling in supply-chain gaps of its own.

Diversification was a strategy promoted widely, not limited to complete factories that had added new capabilities in an effort to fill gaps in the supply chain. Diversification was also driven by a wide range of efforts to make maximum use of existing resources and equipment, including wastes and by-products. Take the example of Guangzhou Papermaking Factory (\textit{Guangzhou zaozhi chang}), that expanded into the manufacturing of pig iron, clinker-free cement, as well as alcohol for the maximum utilization of its waste products and by-products\(^6\):

Originally, the Guangzhou Papermaking Factory daily dumped 20 to 40 tons of waste slag of pyrite that arose with the production of precipitated calcium carbonate for papermaking. Recently, they discovered that the waste slag of pyrite contained high levels of iron, so they decided to set up a “Iron Refining Research Group” and successfully refined pig iron out of the waste. If they choose to make use of the waste slag of pyrite, they will be able to produce 12 to 15 tons of pig iron on a daily basis. Before, the furnaces of the

\(^5\) Ibid.
papermaking company got rid of 70 to 80 tons of soot every day. Now, they mix the soot with lime and plaster to produce cement that are free of clinker and of good quality. Its production of cement can reach ten thousand tons a year. The factory produced 1080 cubic meters of sulfite waste liquor from the manufacturing of wood pulp for papermaking. It is currently in the process of building an alcohol factory to fully recycle the sulfite waste liquor as raw materials for making alcohol. It can produce approximately 3000 tons of alcohol per year.

The papermaking factory represented another variation of the same theme of making maximum use of existing capacities. As the factory started to think of ways to make use of its waste materials such as waste slag of pyrite, soot, sulfite waste liquor, it created new product lines based on the same principle of making use of excess capacities and resources. What was unique about the papermaking factory, however, was that diversification did not start out as a corollary of backward integration initially aimed at filling gaps in the supply chain, as the previous two examples described above. What they shared in common, though, was a strategy based on making maximum use of existing resources and equipment. This drive for greater efficiency fueled the broader application of the emerging diversified complete factory model.

This pattern had started out with efforts to exploit the opportunities created by backward integration aimed at resolving supply-chain problems, but the principle of diversification later found new uses. That is to say, diversification started to take on a life of its own and became another positive model that was touted among factories across all industries. Previous examples of diversification involved the machine-building industry, automobile industry, electricity industry, and the paper-making industry. In addition to the four industries discussed above, the diversified enterprise model expanded into many other industries, particularly the petrochemical industries.

7 Ibid.
and coal-based industries. Diversification was particularly conducive to these two industries because of the proliferation of waste materials and by-products in the making of chemical and other coal-based products. Diversified enterprises shared an important line of logic with complete factories—the optimum use of all existing capacities and resources. This was the primary reason why Harbin Bearing Factory started to produce instruments and meters as a separate, independent product line. The broadened principle of diversification as a virtue was not a fundamental departure from self-sufficiency. Diversified enterprises were still self-sufficient industrial complexes that produced a variety of end products.

In industries that made use of coal as primary materials, the multitude of coal-related by-products created ample opportunities for diversification. For example, in an electric power plant that generated electricity from coal, it expanded into the production of kerosene, gasoline, phenol, fertilizer, petroleum coke, clay cement, and many other chemical products. These diversified products were not for its internal use, but for the agricultural use of its neighboring regions:

This electric power plant not only generates electricity, but also produces a great variety of products. Before coal is sent to the boiler, it would first go through carbonization and coal tar could be extracted through the evaporation process; the rest of the coal would then be sent to the boiler to generate electricity. After processing, the coal tar could be turned into kerosene, gasoline, phenol, fertilizer, petroleum coke, clay cement, etc. When various types of petroleum and chemical products are dry distilled, much of the gas that is produced in the process could be utilized.

Multiple by-products of coal were utilized and turned into finished products in different steps of the production process. While the factory remained primarily a generator of electricity, its products expanded into many other industries. To accommodate the

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8 “Yige zonghe liyong de shiyan dianchang, guojia jingwei shuilidianliju yige weixing,” Renmin ribao, November 18, 1958.
9 Ibid.
expansion of multiple product lines, the *People’s Daily* article indicated that the power plant had set up separate workshops for the manufacturing of certain products:

> The clinker that is left from the burning process of the boiler is not wasted either. It is mixed and ground with lime and plaster, and could be turned into slag cement. [The generator] has set up another improvised, alternatively cut workshop that could take in clay, lime and plaster. With the heat from gas or the smoke from the chimney of the boiler, they can then be burnt and ground, and later turned into clay cement; the lukewarm water that is discarded from the electric generator could also be used to irrigate the neighboring rice paddies. This could increase the production of the crops and take the place of a pumping station for irrigation.\(^{10}\)

Not only by products and waste materials from the processing of coal were utilized, heat and lukewarm water generated from the production process were put to use as well. As indicated by author of the editorial, almost all of the products that came from the diversification of the power plant were for the agricultural use of neighboring regions, for “export” rather than simply for in-house use. As covered in the *People’s Daily*, the diversified power plant was not only presented as an innovative one-off initiative, but also as a broader model to be followed by other factories. The status of diversified enterprises was elevated to the status of indigenous steel furnaces to be followed by all factories across the country:

> The ‘satellite’ of the cross-industry power plant has been successfully launched. It is a great feat for the power industry. We hope to launch more and more ‘satellites’ (especially the localization of power plants) after this ‘satellite’, and promote the establishment of indigenous power plants as we have promoted indigenous steel furnaces, and let them flourish everywhere.\(^{11}\)

In addition to coal-related industries, diversification was actively pursued by various factories in the petrochemical industry. Following the same logic of optimizing

\(^{10}\) Ibid.

\(^{11}\) Ibid.
the use of resources, various local factories that originally had limited variety of products started to be more aggressive in the utilization of by products as a way to achieve higher level of diversification. The Shanghai Oil Refinery (Shanghai lianyou chang) represented an example of diversified enterprises in the petrochemical industry.

It was featured in an editorial from the People’s Daily in 1960:

Take the example of Shanghai Oil Refinery: in the years between 1954 and 1958, it only made 17 types of petroleum products, including: gasoline, diesel fuel, kerosene, asphalt, etc. Much of the gas in the manufacturing process was either discharged in the air or burnt as fuels; starting from 1959, the factory adopted the strategy of diversification and came up with the slogan “eat all, extract all, plough deeply, make carefully”. New products that went into trial manufacture and production increased to 75 kinds, and this year they made an additional 92 new kinds of products. This allowed them to supply the much needed fuel oil and lubricant oil for many industries, as well as chemical raw materials for the chemical and medical industries.12

Within a year, the product types produced by the oil refinery more than quadrupled.

The multitude of by products from the oil refining process created many opportunities for diversification. In addition, the People’s Daily article noted that many of the diversified products produced by the factory were used to supply to factories of other industries, for “export” rather than for internal use.

The Dalian Gas Company (Dalian meiqi gongsi) was another factory in the petrochemical industry that diversified to make more efficient use of by-products. In 1960, it expanded its production of by-products from two types to thirteen:

The workers at the Dalian Gas Company modified some old equipment and added some new equipment in order to expand the factory’s capacity to recycle by-products. Before, they could only recycle two types; now, they can recycle thirteen product types, and create an additional 5.7 million yuan of income to the country. They built a set of coke tar processing equipment from two older workshops, and were able to manufacture more than ten product

12 “Shanghai gongchang qiye zonghe liyong ziyuan,” Renmin ribao, March 6, 1960.
types [from the modified equipment], including: anthracene, cosmoline, phenol, gasoline...\textsuperscript{13}

The diversified products that were made by the Dalian Gas Company were not only for local use but were transported to supply other major cities as well. The author of the editorial pointed out that: “One of the half-indigenous, half-foreign carbon soot workshops of the factory produced 593 tons of carbon soot last year. Its products were shipped to places such as Shanghai, Tianjin, Qingdao, etc.”\textsuperscript{14}

All of the factories described were clear-cut examples of diversification that arose from the logic of maximizing the use of existing production capacities. When the model of diversification began to be applied to the iron and steel industry, a new business rationale emerged. In addition to optimizing resource utilization, Chinese policy makers recognized that a bigger reason for diversification in the iron and steel industry was the need to reduce transportation costs. By integrating the production of crude iron, refined steel, and various steel-related products within an enterprise, an integrated iron and steel enterprise could eliminate transportation costs, and local demand for steel could be met more easily. Therefore, crude iron producers were encouraged to diversify and expand into steel rolling and the manufacturing of steel products as a way to lower transportation costs and address local needs for steel.

The demand for steel was an acute need that had be addressed during China’s rapid industrialization. Chinese economic policy makers recognized that local, indigenous, integrated iron and steel enterprises presented a solution to local needs. Therefore, they encouraged local raw iron producers to diversify into the production of steel. Once the needs for steel could be addressed locally by the \textit{xiao er quan} (small-scale and self-sufficient)
enterprises, the demand for steel on the national level could then be addressed. A publication of an iron and steel study group outlined the logic behind promoting diversification in the local iron and steel industry:

... [diversification] meets the demand for various products from the national economy and supports local industry and agriculture by providing a large number of products of great variety. At the initial development stage of 

xiaoyangqun (small-scale, local) enterprises, most of them only made a single product: they were iron refining factories that specialized in the production of raw iron. Making only one product was far from meeting the demand of fast growing local industries and agriculture...for a country that has a population of 500,000, it requires approximately 310,000 tons of pig iron and steel, most of which are needed in the form of machine tools, as well as a large amount of construction materials and fuel. This requires the integrated enterprises to produce more and better pig iron, as well as turn iron into steel, turn steel into machinery, and produce as many types of products as possible with existing resources, such as machine tools for agriculture, construction materials, chemicals, etc. The iron and steel enterprises must diversify into the direction of integrated enterprises—they must produce not only pig iron, but also steel and rolled steel; not only iron and steel, but also the production of machinery, chemical products, construction materials, etc. 15

The study group pointed out that the local iron producers must diversify to meet local needs for a variety of steel products. What was unique about the iron and steel integrated enterprises, however, was that diversification did not emerge originally to fill their supply chain gaps. By the time the steel and iron enterprises started diversifying, the complete factory model had already evolved into the model of diversification. Therefore, as the study group above indicated, diversification was adopted primarily as a solution to address the local needs for steel products.

Economic analysts argued that if local factories could meet local demand, the small, diversified, enterprises were superior to large, state enterprises located further from the countryside, where most of the demand for steel products came from:

Most of the steel products needed in agriculture are small in size... if the indigenous integrated steel and iron enterprises can satisfy the demand, what's wrong with that? Why do we have to roll tons of steel from big corporations in the city and ship them into the countryside?\(^\text{16}\)

One clear-cut example of how iron producers diversified into the production of steel products was the Shangcheng County Small Integrated Steel and Iron Enterprise (\textit{Shangchengxian xiaoxin gangtie lianhe qiye}). Starting out as an small-scale, local iron furnace that only produced raw iron in 1957, the factory was later transformed into an integrated enterprise that could produce iron, steel as well as a variety of steel-based products:

within half a month, [the Shangcheng County enterprise] turned from an \textit{xiaotuqun} (small-scale, local) furnace into a factory with seven workshops, including: a pulverizing workshop, two steel furnaces, a low-temperature steel-smelting furnace, a steel-hammering workshop, a rolling mill, and a power supply workshop. It is able to integrate the processes from handling raw materials to finished products. It can now produce raw iron, steel ingot, steel billet, round steel, square steel, flat steel, steel sheet, steel blade for spades, wire cable, nails, etc.\(^\text{17}\)

The author used the term \textit{xiaotuqun}, the literal translation of which was “small-scale, ‘homemade’, and from the masses”. This was a term that emerged specifically to describe the iron and steel integrated enterprises. The \textit{xiaotuqun} factory diversified primarily to meet the demand for instruments and machinery from the local agricultural sector. After diversification, the factory could then produce a variety of steel and steel products to meet local demand. In another example, the No.1 Iron and Steel Factory (\textit{Diyi gangtie chang}) reiterates the goal of supplying adequate machinery and equipment to the county the factory was located in:

\(^{16}\) “\textit{Jianli tuyang jiehe de xiaoxing gangtie lianhe qiye—zailun gangtie gongye ‘xiaotuqun’ de gonggu he tigao},” \textit{Renmin ribao}, December 7, 1959.

\(^{17}\) Henansheng yejin gongyeju, ed. \textit{Shangchengxian xiaoxing gangtie lianhe qiye zuzhi guanli jingyan} (Zhengzhou: Henan renmin chubanshe, February 1959), 1-2.
Currently, this factory has used a two-ton, half-foreign, half-indigenous, small rolling mill to produce thin steel plates, steel rod, round steel, flat steel and various other steel products; use a simplified wire drawing machine to make steel wire. After the integrated steel and iron enterprise is fully established, it will manufacture 10,000 tons of steel, 120,000 tons of raw iron, and 7,000 tons of rolled steel annually; in the meantime, it can make some production tools and machinery equipment. In the future, this factory will be the industrial center of the country. Along with other industries, they will form a relatively complete industrial system and allow the Shangcheng County to be self-sufficient in most of the required equipment.18

The No.1 Iron and Steel Factory not only diversified into the production of rolled steel, but also a variety of machinery and equipment. Compared to the previous factory that expanded into the making of various steel products, this factory achieved a higher level of diversification. Both steel and iron factories were located in the Shangcheng County, and the primary goal of all diversified enterprises was to make the county self-sufficient in “most of the required equipment”. In other words, factories diversified to produce iron and steel equipment for the external use of others. This represented the Chinese economic thinkers’ vision for integrated enterprises during the Great Leap Forward: the xiaotuqun iron and steel factories would achieve a high level of diversification and fully address the shortage of steel products on a local scale. With tens of thousands of these local integrated enterprises, the shortage of steel and steel products could then be addressed on a national scale.

In addition, Chinese economic writers noted that much of the raw iron production was small in scale and widely scattered. Therefore, the creation of integrated iron and steel enterprises was a way to consolidate the production of iron on the local scale and

18 Wuhan daxue jingjixi sannianji gongye diaochazu, “Cong shangchengxian daban gangtie kan xiaotuqun de weili jiqi fazhan—chaoying renmin gongshe diaocha baogao zhi’er,” in Wuhan daxue xuebao (renwen kexueban) 1 (1959), 55.
produce steel products that would be consumed locally. In an editorial published in the *People’s Daily* in 1958, for example, the author highlighted this point:

> These small-scale, foreign-and-indigenous-hybrid, iron and steel industrial bases can transform the previously specialized, scattered iron-making and steel-making centers into concentrated, completed enterprises. This would allow the factory to perform various tasks in-house without incurring any transportation costs, including turning minerals into iron, turning iron into steel, rolling steel, making machines, producing coke, and extracting various by-products from coal. These “small but complete” iron and steel industrial bases can be built in a relatively short amount of time. They can gradually form industrial centers in places with weak industrial base and have a huge impact on the surrounding rural areas.19

The author also highlighted the fact that the products of iron and steel enterprises were not constrained to the production of steel and other kinds of equipment and machinery. Following the logic of maximizing use of resources, they were encouraged to expand into the production of coke and various by-products as well. In addition, he reiterated the impact of indigenous iron and steel enterprises on their surrounding regions: as they started to diversify and supply steel as well as various types of equipment and machinery to factories in other industries, the integrated enterprises would serve as a driving force in the industrialization of surrounding areas.

The logic behind diversification was embedded in many of the examples of individual enterprises discussed above. One major reason given by Chinese economic thinkers was that diversification was conducive to the maximum utilization of resources. This was a shared logic among many enterprises described above. In the following article on the development of integrated enterprises in the Sichuan province, the author elaborated on how diversification could promote the optimum use of raw materials:

Maximum utilization of resources is an important measure of modern industries, as well as a major standard in evaluating the industrial level of a country. The more advanced industries are, the more efficiently one can use the resources; the higher the level of industrialization is, the more comprehensive the utilization of resources is. However, in order to achieve comprehensive utilization, one must break through the rigid boundaries of specialization and promote diversification. For a steel and iron factory, only after it diversifies and expands into the production of chemicals and construction materials can it make use of mineral waste and coal tar.

He highlighted that one major way to make maximum use of resources was through diversification. In addition to the utilization of raw materials, another major reason for diversification was to make use of existing equipment, machinery and various other production capacities:

... diversification could make full use of facilities, capital, technologies and other economic potential, making the best use of existing resources and increasing social wealth. First of all, once factories diversify, they transform from the manufacturing of one product to multiple products. This is equivalent to the establishment of new enterprises on a massive scale. In addition, diversified enterprises can extract useful materials from waste products. This is equivalent to 'turning stone into gold'... [diversification] greatly increases product types and enlarges social wealth.

The author argued that diversification would bring greater variety of products to the country at relatively low cost, since no new enterprises needed to be built. In other words, since existing factories could add new product lines, it would be much cheaper than building new enterprises to undertake the production of the added products.

In addition to elaborating on specific examples of diversified enterprises and the logic behind diversification, Chinese economic writers also discussed how the model of

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20 Gongye jingjixi 56 ji gangtie xiaoyangqun diaochazu, "Dagao duozhong jingying shi gaosu fazhan gongye shengchan shixian chijiu dayuejin de zhanlue fangzhen—Sichuan gangtie xiaoyangqun de zonghe jingying," 64.
21 Li Ximu, "Duozhong jingying shi gongye qiye duokuaihaosheng de fazhan shengchan zhilu," Renmin ribao, October 8, 1960.
diversification was promoted on the provincial level. The local enterprises described
above were not unique instances of diversification; they represented a much larger
trend of diversification pursued by factories all across the country. One of the provinces
that was featured in the People’s Daily was Heilongjiang:

In the past two years, many large enterprises in different regions
have moved in the direction of diversified, integrated enterprises. By
the end of June this year, more than 2100 of the 2900 enterprises in
Heilongjiang Province have diversified, and a total of 13,945
diversified production units of established. On average, every
enterprise built more than six diversified production units. Some
enterprises even built dozens of even more than a hundred smaller
factories, workshops, or departments.²²

The author indicated the prevalence of diversification among enterprises in Heilongjiang.
More than seventy percent of the enterprises had diversified, and had expanded into
multiple product lines. On the enterprise level, the extent of diversification was
astounding—some factories had diversified into the production of hundreds of finished
products. Furthermore, diversification was not only followed by larger enterprises; smaller
factories started to diversify as well: “Now, many smaller enterprises... in basic
construction, transportation, commerce, agriculture, etc. have begun to diversify.”²³ In
addition to the prevalence of diversification, diversified products made up of a bigger
percentage of the overall industrial output of the province: “In 1959, output from
diversification made up of only 5% of the overall industrial output of the province; in the
first half year of 1960, this number has gone up to roughly 10%.”²⁴ For individual factories,
diversified products also made up of more and more of a factory’s output. The editorial
gave an example of the Jiamusi Sugar Factory (Jiamusi youyi tangchang), which established
66 work units that specialized in the production of iron and steel, coke, machinery,

²² Ibid.
²³ Ibid.
²⁴ Ibid.
construction materials, phosphate fertilizers, nitric acid, etc. From January to June 1960, the output from the diversification work units made up 45.43% of the factory's total output.25 For a given factory, diversified products could make up as high as half of its total output.

By the end of the Great Leap Forward, complete factories had emerged from makeshift solutions to filling in gaps of incomplete supply chains to a more evolved business model followed by factories across all industries. The belief in economic benefits became an ideological commitment, along with other things, such as the virtues of walking on two legs, national self-sufficiency... In an editorial published on People’s Daily in 1958, the commentator argued that diversified enterprises were not makeshift solutions, but were intended as long-term solutions: “the xiaotuqun iron and steel integrated enterprises are not a matter of expediency; instead, they are a long-term strategy in our country’s industrialization process.”26 Diversification became an ideological commitment when advocated by Chairman Mao. In an editorial published in People’s Daily entitled “An Important Direction”, it encouraged all existing enterprises to develop into the direction of integration and diversification.27 The editorial opened its discussion with a quotation from Chairman Mao, which presented diversification as an important direction to be followed by all enterprises:

In September of 1958, while Chairman Mao was touring and conducting inspections in Hubei Province, he once said: “For large enterprises such as the Wuhan Iron and Steel Corporation (wugang), they can gradually develop into diversified and integrated enterprises. In addition to producing steel and iron-related products, they can also expand into the machine-building industry, chemical industry, construction industry, etc.” Now, a year later, the great vision of Chairman Mao has been realized. Factories such as the Wuhan Iron and Steel Corporation and the Baotou Iron and Steel Company not only produce iron and steel, but also cement, refractory materials, and machinery. Yesterday, in a piece of news published by

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25 Ibid.
our newspaper on Huainan City, we can see how a city that used to produce only coal is now transformed into a diversified industrial city with the coal industry at the center and various other industries, including the steel and iron, coke, machinery and chemicals. This is an important event. It marks an important direction. All the large enterprises must develop into the direction of diversified, integrated enterprises. \(^{28}\)

Just as diversification had evolved into a well-established business model and an ideological commitment, however, a new movement that emerged between 1960 and 1965 challenged the complete factory model and principle of diversification. As the Specialization and Coordination Movement unfolded in Chinese economy, factories were encouraged to develop in the opposite direction of diversification—to specialize and to spin off the diversified production capacities. With the promotion of specialization, enterprise-level coordination became a central topic of debate among Chinese economic thinkers.

\(^{28}\) Ibid.
CHAPTER 3

The Specialization and Coordination Movement (1961-1965)

Complete factories, which started out as makeshift solutions to supply-chain and transportation bottlenecks in the Chinese industrialization process, had become a much celebrated and positive model for Chinese enterprises by the end of the Great Leap Forward. Factories in various industries were encouraged to complete their own supply chains and produce everything in-house. With the development of multiple product lines, many decided to diversify and turn the complete factory model into a virtue. In the early 1960s, however, criticisms of complete factories started to surface, and by mid-1960s, the Specialization and Coordination Movement came into full swing. The complete factory model was dismantled, and Chinese economic thinkers started calling for factories to break down complete factories and transform them into smaller, specialized ones.

In late 1950s and early 1960s, when the complete factory model was still touted all over the country, some economic policy thinkers had already started to question the model and came up with alternative solutions to the bottlenecks faced by the Chinese economy. Increased specialization in production, they believed, was the pathway for all advanced economies. Specialization allowed for economies of scale, improvement of quality through experience and stricter quality control, and greater flexibility in the range of goods produced. For example, in 1960, when the GLF was still underway, supporters of specialization started to point out various benefits that came with higher level of
specialization. They believed that “once enterprises specialize, they can then make use of assembly lines and advanced technologies to increase productivity.”¹ The xiao er quan or xiaotuqun factories might provide a temporary solution to some of the challenges of broad front development confronting the Chinese economy, but they ought not to be regarded as long-term, permanent solutions. With the proliferation of complete factories, flaws of self-sufficiency started to emerge and became increasingly hard to overlook.

Criticisms of the complete factory model began to surface in increasing volume from early 1960s. These criticisms included: inflexibility in product lines, high costs of production, low product quality, low utilization of resources and production capacities, redundancy, and the inadequate supply of secondary machine parts and components. One of the major criticisms was the inflexibility of product lines and limited scope of product types. As complete factories grew in size and started to produce more complicated forms of machinery, it became increasingly hard to add new product types or modify existing products. In a complete factory, for example, a whole complete chain would be devoted to the production of one finished product. In order to modify the finished product, many interconnected steps of the production process needed to be changed. This caused great difficulty to many enterprises. As the Chinese economy underwent rapid industrialization, the addition of new product types was constant. Moreover, high production costs and low product quality became major challenges as well. A complete factory usually possessed several workshops that would were responsible for different stages of the production process. Nearly all of these workshops were underutilized, since the manufacturing of a finished product only required the use of a workshop at specified times of the production process. The maintenance of all workshops could be costly for a complete factory. In

¹ Li Ximu, “Duozhong jingying shi gongye qiye duokuai haosheng de fazhan shengchan zhilu, Renmin ribao, October 8, 1960.
addition, the factory was unable to devote equal attention to every step of the production process and, therefore, product quality could not be guaranteed. One of the major characteristics of modern industrial production was the ability to mass produce. With the proliferation of complete factories, productivity remained low and economies of scale could not be achieved. This posed a serious challenge to China’s industrialization process.

By the mid-1960s, the Specialization and Coordination Movement put an end to the prevalence of complete factories and a newer business model was touted. Factories were encouraged to specialize and to outsource the manufacturing of intermediate goods and components to others. The Specialization and Coordination Movement unfolded on both municipal and provincial levels, along with experiments undertaken by individual enterprises. Chinese economic critics and commentators described how the movement developed on provincial levels and gave anecdotes of how individual factories broke up complete factories, increased outsourcing, and started to specialize.

One factory that exemplified the dismantling of complete factories during the Specialization and Coordination Movement was the Shenyang No.1 Machine Tool Factory (Shenyang diyi jichuang chang). In October 1964, an article was published on the People’s Daily featuring how the machine tool factory underwent the transformation. Entitled “Shenyang No.1 Machine Tool Factory Found Ways to Increase Volume and Efficiency of Production—Discarding the Complete Factory Model and Adopting Specialization and Coordination”, the article first gave an overview of factory’s previous business model and offered a critique of self-sufficiency:

Shenyang No.1 Machine Tool Factory has been a complete factory since the completion of restructuring and start of production in 1956. In recent years, it continued going into the direction “self-reliance in all things”. Up to now, this factory can complete most of its

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2 “Shenyang diyi jichuang chang zhaodao duokuai haosheng fazhan shengchan daolu, tiaochu quanneng chang, shixing zhuanyehua xiezuo,” Renmin ribao, October 23, 1964.
production on its own and is able to manufacture almost all the machine parts of a machine tool except for a few components, including large machine part such as lathe beds, small parts such as neoprene washers and screws, as well as wooden cases and metal straps for packing—all of these are produced in-house. The consequence of going into the direction of an omnipotent factory, however, is that as the factory grows larger size, an addition of a new product requires adjustments in thousands of steps in the production process. Therefore, it is extremely hard to develop new product types; the utilization rate of raw materials is low; since the factory managers try to be in charge of everything, the multitude of production steps create many obstacles and makes management increasingly hard.³

The author of the editorial highlighted three major disadvantages of the complete factory model: inflexibility of production, inefficient use of raw materials, and challenge to management. The inflexibility of production was particularly relevant to the manufacturing of machine tools. As the factory expanded its production and started to make more complicated machine tools, it would have to create new complete product chains for new product types, or modify the current product chains extensively to accommodate the production of new goods. Both methods would be costly to undertake by the machine tool factory. As the writer above accurately point out, adding a new product would entail changes in “thousands of steps in the production process”, since the making of one machine tool probably involved hundreds of machine parts and components.

In addition, as the machine tool factory expanded its production, it became increasingly hard to implement quality control over thousands of its products. Therefore, some “secondary” components remained low in quality:

Many of the “secondary” machine parts that do not get enough attention in complete factories become “primary” machine parts once they are produced by specialized factories. Their technical problems are solved and quality improved rapidly. Take the example of a small component in machine tool production—mechanical springs. In the

³ Ibid.
past, springs were never the priority of Shenyang No.1 Machine Tool Factory. It had been making mechanical springs for its own use for the past ten years, yet the quality of the springs was never up to standard. In the earlier part of this year, it outsourced the production of all springs to Heping Spring Factory and quality immediately improved.⁴

One of the components that remained low in quality was mechanical springs. Although the machine tool factory had become self-sufficient in making its own springs for the past ten years, it was not able to specialize in spring production, increase the quality of springs or lower production costs. This was mainly due to the complete factory model it followed. Improved product quality and lower production costs only came with experience and economies of scale. Therefore, mechanical springs remained a bottleneck in the overall making of machine tools. The solution that factory managers came up with was to outsource spring production to Heping Spring Factory—one that was able to specialize in the manufacturing of mechanical springs. As the author of the editorial highlighted above, outsourcing turned out to be an effective solution and quality of springs immediately improved.

In addition to the outsourcing of spring production, the machine tool factory improved its level of specialization by outsourcing the production of various components to over twenty specialized factories. This practice allowed the machine tool factory to benefit more from an improved level of specialization:

Twenty specialized factories and cooperatives are currently supplying Shenyang No.1 Machine Tool Factory with many components at a cost lower than the main engine plant [had it undertaken the production on its own]. Since specialized factories and cooperatives can manufacture components on a large scale, they can make use of more advanced technologies and manufacturing techniques. Therefore, they can produce with higher efficiency, fewer raw materials, and lower cost.⁵

⁴ Ibid.
⁵ Ibid.
The machine tool factory outsourced much of the production of components to specialized factories. Production costs were lowered once the manufacturing of components was outsourced. This was because the specialized factories could achieve economies of scale through increasing level of specialization. In return, they were able to supply components at a lower cost than if they were produced in-house by the machine tool factory. In addition, with higher volume of production, specialized factories were able to make use of more advanced technologies that would otherwise be inapplicable to small production volumes: “The Shenyang No.1 Machine Tool Factory made fasteners using lathes while Shenyang Standard Component Factory was able to make use of cold forging techniques because of its production scale. This allows it to shorten production span with lower cost.” The machine tool factory was unable to use cold forging techniques, while the specialized factory that it outsourced the production of fasteners to was able to make use of the more advanced technology. This demonstrated that specialization could lower production costs through adopting production techniques that were economical when applied on a large scale. Overall, production costs for the machine tool factory were lowered after outsourcing, as the same journal article noted:

According to statistics from earlier this year, in manufacturing the same quantity of fasteners, Shenyang Standard Component Factory can save 8 tons of steel, 22,000 hours in production, as well as lower production cost by 55,000 yuan compared to Shenyang No.1 Machine Tool Factory. When the No.1 Factory used to produce wire terminal connectors for its own use, the production cost was 12 cents per unit, while the cost was only 5 cents for specialized factories; likewise for double-ended wrenches, the cost was 56 yuan per unit for No.1 Factory, while the number went down to 7 yuan for specialized factories.7

6 Ibid.
7 Ibid.
The reduction of production costs was dramatic—the cost of terminal connectors was cut down by half, and the cost of wrenches was cut down to 1/8 of their original cost, once specialization was improved. Through outsourcing, the machine tool factory was able to address the major challenges resulting from the complete factory model, by improving product quality and cutting production costs.

Another example that was highlighted by Chinese economic writers during the Specialization and Coordination Movement was the transformation of Qingshan Valve Factory (Qingshan famen chang). This was a small local factory whose main product was valves. Prior to the Specialization and Coordination Movement, the valve factory was exemplified a typical complete factory that internalized the complete chain of valve production:

Qingshan Valve Factory is a small factory with only a hundred or more workers, and it is in charge of manufacturing valves for the oil industry and the construction industry. In the past, this factory owned a casting workshop, a metal processing workshop and an assembly workshop. Workers believed that although the factory was small, it possessed all the necessary workshops. From feeding materials into the casting workshop to the completion of finished products, there was no need to step out of the factory. Therefore, such a factory could achieve "self-reliance in all things", and it was considered an expedient business model.  

The valve factory incorporated casting, metal processing, and assembly all in one place and was completely self-sufficient in the making of valves. However, it soon ran into a major roadblock with its casting workshop: “First of all, there is a shortage of personnel who are proficient in casting and other technologies; secondly, there is no testing equipment for casting. Therefore, the internal quality of castings cannot be managed.”

The casting process turned out to be a bottleneck in the production of valves. In the

8 “Qingshan famen chang gaibian 'wanshi buqiuren' zuofa chanping zhiliang tigao chengben xiajiang,” Renmin ribao, October 23, 1964.
9 Ibid.
complete factory, technologies for casting were insufficient, and it was unable to implement high quality control over the casting goods it produced for internal use. This was parallel to the challenge of manufacturing mechanical springs that the Shenyang No.1 Machine Tool Factory ran into in the previous example. To address the problem, the valve factory decided to outsource the casting process to a specialized casting factory—Wuhan Casting Factory. This factory would be in charge of all the casting tasks for the valve factory, and benefits that came with this practice was immediate:

Starting from October last year, Qingshan Valve Factory got rid of its casting workshop and outsourced the manufacturing of cast goods to Wuhan Casting Factory. The casting factory is responsible providing all the cast goods and the valve factory is now only in charge of the processing and assembly of valves... Currently, the inventory of the valve factory contains many smooth-surfaced, high-quality casting goods from the cast factory, and it usually has more than a month’s stock of semi-finished products. It no longer runs into the bottleneck of not having enough casting goods in production.10

The bottleneck of casting was addressed through outsourcing. The valve factory solved the problem of insufficient supply of casting goods. The author also highlighted additional benefits that came with increasing level of specialization—improved product quality and lowered production costs:

After they outsourced the manufacturing of casting goods to specialized casting factories, their product quality improved dramatically, and production costs were lowered by more than forty percent; in addition, the hours spent on producing every valve also reduced by twenty percent. Before, Qingshan Valve Factory hired over thirty workers to be in charge of casting; now, the specialized factory hired only twenty workers to fulfill Qingshan Factory’s needs.11

Here, he made similar arguments on the benefits of specialization as the previous author of the machine tool factory. Though specialization, the Wuhan Casting Factory became

10 Ibid.
11 Ibid.
more efficient in casting. It was also able to manufacture cast goods at a lower cost once it
gained enough experience in production and the economies of scale started to kick in.
Through outsourcing and specialization, the flaws of the complete factory model were
addressed.

The Specialization and Coordination Movement not only unfolded on the enterprise
level, but also on municipal and provincial levels as well. According to the mayor of
Tianjin, Yang Zhengmin, who published an editorial in *People’s Daily* in 1965, he described
how the movement took place on a broader scale:

> We have adjusted the production structure of some machine-building
factories, and have started to transform ‘big and complete’, ‘small and
complete’ enterprises into ‘small and specialized’, ‘medium and
specialized’ ones. This is a revolution in the production structure of
the machine-building industry. Although it is yet incomplete, it has
demonstrated its superiority in the newly structured small and
medium-sized specialized factories.\(^{12}\)

Yang noted that the movement entailed breaking up of big and medium-sized complete
factories into smaller, more specialized ones. On the enterprise level, the movement
involved discarding some workshops and the manufacturing of certain components by
outsourcing their production to more specialized factories. He indicated that what
happened to the Shenyang No.1 Machine Tool Factory and Qingshan Valve Factory were
not unique instances of transformation, but were representative of the Specialization and
Coordination Movement that was unfolding on a broader scale.

With the advance of the movement, benefits of specialization kicked in shortly. He
noted that on average, production increased and costs were lowered:

> According to the survey on thirty factories that recently became
independent from their parent factory, on average, their production
increased thirty to forty percent in comparison to when they were not

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\(^{12}\) Yang Zhengmin, “Zai ‘xiaoerzhuan’, ‘daerzhuan’ de jichushang zuzhi jixie gongye shengchan,”
independent. For example, the welding workshop of a machine tool factory used to be part of the process of manufacturing machine tools, and was to be in charge of only a part of the welding work. After the workshop became independent, it now took charge of all the welding from machine tool factories, as well as from forging press factories and from grinding machine tool factories. Its productivity increased by forty-five percent, and production costs were lowered by thirty-four percent.\(^\text{13}\)

Yang suggested that lowered production costs were not unique to the experience of the machine tool factory or the valve factory. On average, production costs of specialized factories were lowered. He specifically pointed out how expansion of production volume lowered costs for a welding workshop that spun off from a machine tool factory. Before, the workshop was only able to do welding work for the one machine tool factory it was affiliated to. After it became independent and could take orders from multiple factories, the welding work shop then could expand production, gain more experience from welding, and improve production. Economies of scale then kicked in, and it lowered its production costs dramatically.

Finally, Yang summarized some basic ideas on how a complete factory could be broken up into smaller, more specialized production units, and how specialized factories could coordinate with each other:

First, one can divide a factory into several smaller ones: we can divide a “big and complete”, or “small and complete” machine-building factory into several “small and specialized”, “medium and specialized” ones. In some cases, we can remove individual workshops and establish them as specialized factories; in other cases, we can turn the scattered production units into individual factories.

Secondly, we can outsource the production of certain products. While the main factory remains intact, we can outsource the manufacturing of certain machine parts to factories that are more efficient in the making of these components. This is a solution to the challenge that a factory is in charge of manufacturing too many product types, and the redundancy in production of factories that produce the same types of products. This can lead to specialization.

\(^\text{13}\)Ibid.
Thirdly, we can specialize the manufacturing of components. For some enterprises, although they do not produce many finished product types, they are in charge of making all of their components. For this type of enterprise, it should outsource the manufacturing of these components, coordinate with specialized production units and achieve specialization. Fourthly, many factories should remove their workshops for forging, casting, repair, electroplating, heat treatment, and establish specialized factories by consolidating separate workshops.\[^{14}\]

Yang proposed several possibilities on how a complete factory could be broken up, as well as how specialization could be improved on the enterprise level. The Shenyang No.1 Machine Tool Factory followed the third model described above—by outsourcing the production of certain components to more than 20 specialized factories, it was able to specialize in the making of machine tools. The Qingshan Valve Factory, on the other hand, seemed to belong to the fourth model. It removed its casting workshop, and outsourced the production of all casting goods to Wuhan Casting Factory. After outsourcing, the specialization of both factories could improve: while the valve factory was then able to specialize in the making of valves, the casting factory could more easily achieve economies of scale once it received more and more orders of casting goods. With expansion in production volume, the level of specialization would improve more rapidly.

All the examples of specialization presented above entailed outsourcing, cooperation, and coordination with other specialized factories. Indeed, Chinese economic writers came to realize that the full development of specialization could not be achieved without major attention to developing mechanisms of coordination. Coordination had been brought up a number of times in the precious discussion of this chapter in the context of specialization, but they presented challenges in their own right in a planned economy. Policy makers had to go through additional hurdles to bring about enterprise-
level coordination in China, where national planning was the dominant way of allocating resources. They came to realize that to reap the full benefits of specialization, they need to improve coordination first and foremost.

In fact, the more specialized factories became, the more they became dependent on each other in order to make the finished product, and the more they needed to coordinate with each other in production. As one economic writer Qiao Rongzhang noted, relationships between every enterprise in the economy grew more intertwined as they became more specialized:

Industrial coordination and industrial specialization are the prerequisites for each other and are beneficial to each other. Industrial specialization is to divide industrial production into independent, specialized production units based on different sectors they are in; on the other hand, industrial coordination is to integrate various specialized production units into a united and complete entity. Industrial specialization is the necessary condition for industrial coordination—without specialization or division of labor, there would be no industrial coordination; while industrial coordination is the premise for specialization. Without coordination, specialized production units will be unable to develop smoothly. Industrial coordination develops on the foundation of industrial specialization, while it also promotes specialization.15

Previous examples of the machine tool factory and the valve factory demonstrated how specialization was achieved on the enterprise level in China. With improvement in specialization, economies of scale would eventually kick in and benefits such as improved product quality and lower production costs would inevitably follow. The greater challenge was that of coordination. The complete factory model and diversification were ways to get around the problem without confronting it directly. They were, as the Chinese economic thinkers acknowledged, not sustainable or long-term solutions. Another economic commentator Dan Gu wrote in 1964:

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In order to bring about specialized production, one must secure the indispensable coordination relationships, such as the supply of raw materials, machine parts, provision of some manufacturing processes, molds, repair services, or backup components. This is because with increasing level of specialization, enterprises become more interconnected with each other; if such relationship terminates occasionally or is modified constantly, it would cause great distress to the production process, or even disrupt the entire production. Only if all the coordination relationships are secured can specialized production move forward smoothly... Once a coordination relationship is established [between two factories], they should try to make such relationship long-term and fix the timing and volume.\textsuperscript{16}

Dan reiterated the intertwined relationship between specialization and coordination. More importantly, he started to call attention to the significance of securing long-term coordination relationships between individual enterprises that should be modified easily or constantly. He highlighted how a terminated or modified coordination relationship could cause great distress to production, or even disrupt the entire coordination process. Although the ideas on enterprise-level coordination were not fully developed in the discussion above, Chinese economic thinkers had started to explore solutions to the challenge of systematic coordination on the enterprise level.

Coordination was crucial to specialization and outsourcing. However, as Dan suggested above, ways to achieve coordination were easier said than done. As the Specialization and Coordination Movement unfolded, Chinese writers started to propose solutions that could improve enterprise-level coordination, under a planned socialist economy.

According to Fan Muhan, an economist who wrote extensively on the problem of coordination at this time, the simplest form of coordination that could be formed between enterprises included users and producers of certain raw materials or intermediate goods in production:

\textsuperscript{16}Dan Gu, "Qing gongye de zhuanyehua," \textit{Dagongbao}, May 8, 1964.
One category is a vertical coordinating relationship—that is, when one factories is completing the production process, it always requires a variety of raw materials that are supplied from other factories; on the other hand, the final product of this enterprise is usually the raw material or semi-finished product for others.\textsuperscript{17}

In non-socialist economies, this kind of coordination was achieved through the market almost as a matter of course. The case of coordination was not as straightforward in a planned socialist economy. Fan gave follow-up examples to illustrate what he meant by vertical coordination:

Take the example of an iron factory, that requires the supply of iron ore, coke, and other necessary supplemental raw materials from other factories. In the meantime, its product of the smelting iron ore—pig iron—comprises the raw materials for other factories. Similarly, any product manufactured in machine-building factories requires the supply of metal and non-metal raw materials from other enterprises. The processed products, on the other hand, are usually intermediate products for other factories. Therefore, in the sequence of completing a production process, there exist extremely complicated vertical coordination relationships between enterprises.\textsuperscript{18}

The iron factory in the example above was a user of iron ore, coke, and various other raw materials. In the meantime, it was also a producer of pig iron that constituted raw materials for other factories. The relationship between the iron factory and other specialized suppliers demonstrated the simplest form of coordination described by the writer above. Similarly, the machine-building factories mentioned in the example undertook the same form of coordination as well. The only difference was the objects of coordination: they were intermediate goods in the making of machine tools.

In describing the same type of coordination, Chinese economic writers sometimes used different terminologies. This indicated that ideas on enterprise-level coordination

\textsuperscript{17} Fan Muhan, “Lun gongye shengchan zhuanyehua,” \textit{Jingji yanjiu} 10 (1963), 1.

\textsuperscript{18} Ibid.
were relatively new in the Chinese economy during the Specialization and Coordination Movement. At the time when these journal articles were published, there was not yet universally agreed terminologies in describing enterprise-level coordination. Ji Ming, another prominent economic commentator, described exactly the same type of coordination that was explored by the previous excerpt. However, he used a completely different expression:

Coordination broadly defined refers to the basic form of coordination based on specialization. It is the routine coordination between various production sections in an economy. In this type of coordination, the products supplied by a factory are demanded by a variety of factories. That is to say, the recipient of the products requires only a generic version of the product on a regular basis, without any specific design that is particular to the product. For example, a rivet factory produces rivets that can be used across all machine-building factories and can satisfy all demand with the same product. The coordination between the rivet factory and the machinery factories is called broad coordination. 19

Ji highlighted a different aspect of the coordination described above. Instead of emphasizing the intertwined relationship between users and producers in the production of a finished product, he pointed out that in the simplest form of coordination, the goods of exchange were generic goods that could be utilized in any factory in the economy. In other words, what both writers described were simple exchanges of goods in a planned socialist economy that could find its direct counterpart in a market economy.

In addition to coordination of raw materials and intermediate goods, Chinese economic writers also explored complex forms of coordination. Fan, for example, pointed out that coordination among enterprises should not be limited to the exchange of goods. The outsourcing of production processes and services to specialized factories constituted another form coordination as well:

19 Ji Ming, Shehui zhuyi gongye shengchan de zhuanyehua he xiezuo (Shanghai: Shanghai renmin chubanshe, 1959), 36-37.
The other type is horizontal coordination relationships, which means that as an enterprise completes the production of a product, it always requires the coordination (or input) of others, in terms of production techniques or the supply of semi-finished products or components. Take the example of a machine-building factory, whether it is in charge of assembling a finished piece of machinery, or it is in charge of supplying components to a assemble plant, it usually requires coordination from other factories in production tasks such as heat treatment, surface treatment, specialized welding, forging and casting, etc. When it is in charge of assembling components for a primary piece of machinery, it usually requires the supply of standardized items or sub-components from other factories.20

Fan gave the example of a machine-building factory that specialized in the assembly of a finished product. As it became more specialized, it started to outsource certain production techniques for other factories to be in charge of. The coordination relationship described above was no longer an exchange of raw materials or intermediate goods, but an exchange of service.

A yet more complicated form of coordination that came up in the debate was the coordination between users and producers of customized machine parts or components. This was a more advanced form of coordination, because the goods had to be customized by the producers according to the users’ needs. Therefore, as Ji Ming argued it was not a simple of goods between two specialized factories, but required a higher level of coordination:

Coordination narrowly defined differs from broad coordination in that it is a more secure and permanent type of relationship between various enterprises that are in the production of a single good. For example, in the production of Jiefang-brand vehicles, the long-term relationship between No.1 Automobile Factory and hundreds of its auxiliary plants can be called narrow coordination. These auxiliary plants provided specific components used by Jiefang vehicles.21

20 Ibid., 1-2.
21 Ibid., 57.
Ji highlighted how users and producers of customized machine parts coordinated with each other. He gave the example of No.1 Automobile Factory and all of the auxiliary plants that supplied it with specialized components. The goods produced by the auxiliary plants had to be based on the specific requests by the automobile factory, because it was the only user of the customized goods. The manufacturing of customized goods required extensive interaction between the users and producers, as Ji pointed out in the same journal article:

In this type of coordination, the products manufactured by the auxiliary plants were only used by the recipient. Therefore, they had to be produced based on the conditions and blueprints provided by the factory that placed the order. Take the example of the tire factory that provided tires to No.1 Automobile Factory. The tires it manufactured had to be based on the specifications and conditions determined by the automobile factory.22

Therefore, in order to ensure smooth production of automobiles, the coordination relationship between the automobile factory and its various auxiliary plants had to be secured in the long run.

From the coordination of generic goods, raw materials, and intermediate goods, to the coordination of production technologies, and finally, the coordination of customized goods, the production needs from enterprises became more specific. Therefore, coordination among factories had to improve so that producers could accommodate individual needs and requests from the users of their products. During the Specialization and Coordination Movement, Chinese economic thinkers came to realize that rapid industrialization of the country required mass production and economies of scale, which could only be achieved by improvement in the level of specialization. The previous model of complete factories and diversification was dismissed as a short-term, imperfect

22 Ibid.
solution to the challenge of broad front development. To address the challenge directly, Chinese economic thinkers recognized that enterprise-level coordination had to be improved. During the movement in 1960s, the debate demonstrated that ways to improve coordination among enterprises might not be as straightforward as it seemed in a socialist planned economy.
CHAPTER 4

Contracts and Coordination Conferences

Between 1960 and 1965, the most active years of the Specialization and Coordination Movement, Chinese economic analysts and commentators elaborated on the benefits of specialization and coordination and came to realize that enterprise-level coordination was crucial to bring about the various advantages of specialization, including the economies of scale, lower production costs, improved product quality, and greater product variety. Initiating and enforcing coordination among enterprises, however, was not as straightforward in a socialist economy as in a Western economy with developed markets. In the Chinese economy, where allocation of resources was done on the national level, direct coordination among enterprises was unusual, and market mechanisms for allocation were non-existent. Therefore, policy-makers needed to take initiatives to create venues and opportunities for enterprise-level coordination to occur. As discussions during the Specialization and Coordination Movement advanced, Chinese economic policy makers on the state and provincial level started promoting contractual relationships between individual enterprises. They encouraged enterprises and factories to coordinate among themselves; they organized coordination conferences for the users and producers of various industries to meet and specify their production needs; they also educated the public on the concept of contracts and underscored the legal binding power of contractual relationships. State
and provincial bureaus undertook a leading role in improving contractual coordination between individual enterprises, and started to prioritize such coordination over national planning. Moreover, various economic analysts and commentators called for the national plan to accommodate needs specified by individual enterprises and factories. They argued that enterprise-level supply and demand should constitute the foundation of national planning, not the other way around. By mid-1960s, the Chinese economy was moving toward the direction of market-like coordination on the enterprise level.

Toward the end of the Specialization and Coordination Movement, Chinese economic actors started to grapple with the challenge of creating a more concrete framework for enterprise-level coordination. In 1964, for example, two economic writers, Li Biqiang and Ren Yan, noted the complexity of this major undertaking: “Each enterprise is an individual unit in charge of its own production activities, but it is also influenced and constrained by other enterprises in terms of the supply of raw materials, semi-finished products, and machine parts. Therefore, coordination among enterprises is much more complicated than coordination within an enterprise.”¹ In a complete factory, coordination was achieved internally—different divisions of the factory coordinated with each other to produce a finished product. However, in order to take full advantage of the benefits of specialization, enterprises required coordination with each other to achieve satisfactory outcomes. The authors of the article identified the complexity of such coordination and pointed out that enterprise-level coordination, though desirable, required the creation of a framework and infrastructure to make such coordination available to individual enterprises.

¹ Li Biqiang, Ren Yan, “Lun gongye shengchan zhuanyehua, jishu jinbu he jingji xiaoguo,” Jingji yanjiu 2 (1964).
Additionally, many economic analysts and commentators recognized that national planning was a major roadblock to coordination between enterprises. With the central planning apparatus in place, individual enterprises had no means to coordinate with each other. Economic actors and policy-makers not only needed to create a framework to initiate enterprise-level coordination from scratch, but also needed to come up with ways to solidify and execute coordination among enterprises outside the national plan. In other words, they had to determine how state and local governments could acknowledge and enforce coordination between individual enterprises and accommodate individual needs from specific factories in a planned economy.

Fan Muhan, the specialist on coordination, elaborated on how the challenge of coordination unfolded in a planned economy. Fan underscored the difficulty of meeting individual needs of enterprises through allocation of resources on the national level. A planned economy was unable to accommodate or incorporate specific production needs, because enterprise-level coordination relationships could not be honored under an overarching national plan. Fan gave the example of a boiler in a generator that required the supply of a specific type of coal. Despite of a formal contract between the boiler and a specific coal mine, the needs of the generator could not be met due to the presence of the national plan:

Take the example of a boiler in a generator, which is designed based on the use of a specific type of coal. If it can make use of such coal, it would consume the least amount of coal, utilize energy most efficiently, lower production costs, and improve its major indices every year. During the construction of the generator, the Design Contract (Renwu jihua shu) already specified the coal mine that would supply the generator with the coal, and the coordination between them was established. The challenge, however, is to acknowledge and honor the coordination relationships. Usually, the allocation of coal means to concentrate all the coal produced in the country as overall coal resources for the year, and then proceed to allocation based on
bureaus and regions to individual enterprises. However, this can only ensure the quantity specified by the boiler, but cannot guarantee the specific type required by it.³

Fan pointed out that even though two factories might have specified a coordination relationship through the Design Contract, the national plan remained a major roadblock to the implementation of the contractual relationship. In other words, though factories had the opportunity to meet each other and sign contracts among themselves, there was no established mechanisms in place that could accommodate supply and demand on the level of individual enterprises. In a developed market economy, users and producers could depend on market mechanism to channel resources to the most efficient use and respond to individual needs. However, in a strictly planned economy, no planning apparatus, however sophisticated, could accommodate all contracts between millions of enterprises and factories all across the country. The example of the boiler demonstrated that despite of the fact that the enterprise-level contractual coordination was already in place between the boiler and the coal mine at the time when the boiler was built, the central planning apparatus was unable to accommodate the needs specified by the boiler for a certain type of coal. As a result, the boiler was unable to operate at its maximum capacity, nor could it make the most efficient use of its raw materials.

The Chinese economic actors were not only keenly aware of the challenges of enterprise-level coordination, but also came up with ways to address it. Toward mid-1960s, they started to promote the use of contracts and encourage enterprises to enter contractual coordination with each other. They also created venues and opportunities for individual factories to meet and sign contracts and, most importantly, prioritized

contractual coordination over national planning. In many of the journal articles 
published between 1960 and 1965, Chinese economic critics and commentators called 
for the national plan to accommodate contractual coordination.

Discussion on contracts was prevalent in economic literature in China in the 
1960s. Economic analysts wrote about the desirability of contracts, explained to the 
public the use of contracts as an important tool to carry out enterprise-level 
coordination, and underscored the legal binding power of contracts. Two major types 
of contracts were in use at that time. The first type was called “Design Contract”, which 
was referred to by the economic writer Fan in his discussion on the flaws of national 
planning—the “Design Contract” represented a series of contracts binding an 
enterprise at the time when it was built, or when an existing enterprise underwent 
major reform or expansion. The Design Contracts would outline all the factories that 
were in such coordination relationship with the plant, including “the suppliers of 
major raw materials, fuel, electric power, the subcontractors of certain production 
tasks, as well as the factories that supply major semi-finished products, components 
and auxiliary parts”.4 They served as series of contracts that would enforce all the 
contractual relationships an enterprise would enter into. Chinese economic writers 
not only called for the greater use of Design Contracts, but also argued that they ought 
to be incorporated into national planning to ensure that the contracts would be 
enforced.

Design Contracts, similar to contracts between individual enterprises, had legal 
binding power. Any contractual coordination specified in the Design Contracts had 
bindingly power and should not be modified constantly. The economist Fan elaborated 
on the binding power of Design Contracts in 1963:

4 Ibid., 2.
Therefore, once the Design Contracts are ratified, a coordination relationship in industrial production is formed, and it has legal binding power. The industrial coordination that is formed this way will be realized through state planning, and it demonstrates the superiority of a planned economy as well as the rationality behind coordination; in the production process, such relationship is relatively the most stable form of relationship. Enterprises and various administrative bureaus must adhere to it. It cannot be modified without approval from the original ratifying authority, and this reflects the stability of the coordination relationships.\textsuperscript{5}

Another type of contract advocated by analysts addressing the issue of coordination was contracts signed between individual enterprises, which were promoted as a major tool for enforcing newly established coordination between users and producers in the economy. Two writers, Liu Jiannana and Zhang Chunkai, used the analogy of “big contract” and “small contract” to illustrate the difference between these two types of coordination.\textsuperscript{6} Liu and Zhang sought to introduce their idea of direct contracts between individual enterprises by comparing them to allocation through national planning. They referred to allocation and coordination through national planning in terms of “big contracts” while characterizing their ideas about coordination at the enterprise level as “small contracts.” “Small contracts” referred to direct contractual coordination established between individual enterprises. Liu and Zhang introduced national planning under the framework of contracts as a way to reconcile market-like relationships (contractual coordination) with socialist planning ideologies. In juxtaposing the “small contracts” and “big contracts”, they emphasized that “big contracts” were coordination through national planning, not enterprise-level coordination:

For example, the state allocated 2000 tons of thin sheet metal to Shanghai Light Industry Bureau. In the past, it is usually the

\textsuperscript{5} Ibid., 3.

Metallurgical Bureau and the Light Industry Bureau that made the contracts directly between themselves, and one contract would be 2000 tons. People call such contracts 'big contracts'. In this type of contract, users and producers rarely see each other.”

One major disadvantage identified by the writers was that “big contracts” could not satisfy individual requirements from users. For example, the steel supplied may not be the right type, or the required quality requested by the users. Under this situation, small contracts were promoted in Shanghai starting from 1962. Liu and Zhang elaborated on how “small contracts” could improve coordination between users and producers in the steel industry in Shanghai:

For example, if the state allocated 2000 tons of thin sheet metal to Shanghai Light Industry Bureau, and these metal is supplied by Shanghai Metallurgical Bureau, then these two bureaus would convene a group of producers and users, and create opportunities for them to discuss their specifications on the technologies and types of the product, and encourage them to sign contracts among themselves. The users of the product no longer need to go to the light industry bureau for the metal, but can directly go to the producers for supply.

In essence, the small contracts that the authors elaborated on above represented coordination among factories initiated on their own without state intervention. While the government bureau might create venues and opportunities for users and producers of certain products to meet, they were encouraged to initiate coordination among themselves to achieve efficiency and accuracy in coordination. Contracts, therefore, served as an indispensable tool in promoting specialization and coordination.

Various economic commentators also elaborated on the details of signing contracts—they explained to the readers what terms should be specified in a contract,

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7 Ibid., 196.
8 Ibid., 197.
how often a contract was usually signed, and also underscored the legal binding power of contracts. An editorial published in People’s Daily in 1961, for example, fleshed out the use and significance of contracts:

All coordination relationships must be fixed by the signing of contracts on both sides. The contracts that are signed based on mutual consent must specify the type, size, quality, quantity, price and delivery deadline of the desired product. In addition, they must also specify the responsibilities on both sides. These contracts have legal binding power and must be strictly enforced. No one side can cancel the contract on its own. If one side does not abide by the contract, it must face the consequence of making compensations to the other. Contracts should specify the obligations of coordination and clarify on responsibilities on both sides to ensure the legal status of the contract.9

The binding power of contracts was emphasized in China in the 1960s because there was yet no legal infrastructure in place that ensured the implementation of enterprise-level coordination. Therefore, contracts served as an important framework that legitimized the coordination between enterprises in the economy.

In a journal article on the use of contracts published in Economic Research, the economic writer Qiao Rongzhang presented similar arguments on the use of contracts and emphasized their legal binding power:

In our country, the coordination relationships in industrial production are usually fixed by contracts signed by the two sides of the coordination relationship. Contracts are an important way to organize and manage coordination in production. In contracts, one must specify the type, quantity, quality size, price, delivery date, delivery location, method of payment, as well as various rights and obligations from both sides. Contracts have legal binding power. Both sides should adhere to it strictly, and no one side can modify or nullify the contract on its own. The authorization, modification or nullification of a contract must be based on mutual consent. In order to enforce economic discipline in a socialist economy and ensure industrial production, it is necessary to carry out some guidelines to guarantee the execution of contracts.10

Qiao reiterated the binding power of contracts, and pointed out that timely execution and implementation of contracts were essential to the smooth running of the economy.

The use of contracts was necessary yet not sufficient to bring about enterprise-level coordination on a national scale. Despite of the desirability of contracts, there was no framework in place for Chinese factories and enterprises to communicate and be informed of the supply and demand of each other. The solution that Chinese economic writers and actors came up with was to create such opportunities. In the 1960s, they created fairs on the regional level and took the lead in helping enterprises coordinate with each other.

Examples of such fairs that were organized to improve enterprise-level coordination emerged in the early 1960s. In an article published in *People's Daily* in 1962, for example, the author described how the No.1 Machinery Bureau (*Diyi jixie gongye bu*) undertook the task of organizing fairs for factories to come together and coordinate among each other to channel individual supply and demand.\(^\text{11}\) Participants of the fair included over 100 assembly plants, including the No.1 Automobile Factory, the Wuhan Heavy Machine Tool Factory, the Shenyang Water Pump Factory, the Shanghai Machine Tool Factory, and over 300 auxiliary plants that supplied components and machine parts. This was a national fair that encouraged the major assembly plants to initiate and enhance coordination relationships with specialized production units that manufactured machine components in demand. In order to underscore the necessity of enterprise-level coordination, the author of the editorial contrasted how coordination was achieved before factories could coordinate directly

with each other. Under the framework of national planning, an assembly plant would come up with a list of required components and reported it to the machine-building bureau. In turn, various bureaus would coordinate the request among themselves and distribute the demand across specialized component factories. However, he observed that the framework of coordination under national planning was problematic for the machine-building industry, which relied extensively on the coordination of hundreds of thousands of components. He reiterated the flaws of national planning that had been discussed by several authors above, including the inadequacy of the national plan in accommodating the needs of individual enterprises: “since the user and producer were unable to meet each other, and there were usually various sizes of one single product, it was common that many components produced were not what the assembled machine required.” He also noted that the absence of enterprise-level coordination created increasing challenges for Chinese industry, as the pace of industrialization hastened and the need for coordination intensified:

After several years of rapid development, the size and technological level of the machine-building industry have greatly improved; for example, most of the machinery equipment now must be produced on our own; the specialization and division of function among factories became more sophisticated; especially for some large and complicated pieces of machinery, the requirement for components became increasingly stringent and the demand for product type and size became more complicated than before. Therefore, the older way of organizing machine sets can no longer accommodate current production needs.12

It was under the pressure of need for enterprise-level coordination that No.1 Machinery Bureau started taking the lead in promoting coordination among enterprises. From October 1961, the bureau organized fairs that sought to initiate enterprise-level coordination between assembly plants and their corresponding

12 Ibid.
auxiliary plants that manufactured machine parts. The actual term they used was "conference" rather than "fair," but the purpose of these meetings was quite clear: a venue specifically designed for factories to meet and sign contracts, serving a market-like function. The author of the editorial described such conferences in detail:

They [the No.1 Machinery Bureau] chose a total of around 100 assembly plants that had heavy workloads, and asked them to come up with the machine parts and specialized factories requiring coordination arrangements, the quantity required for the year 1962, as well as the size and quality for the machine parts. After an initial discussion by the corresponding bureaus, they would hold conferences for assembly and auxiliary plants. They would create opportunities for the enterprises to coordinate with each other directly, sign agreements regarding the supply of components and contracts for the supply of raw materials.13

The No.1 Machinery Bureau organized such fairs to target assembly and auxiliary plants in the machine-building industry and encourage them to sign contracts with each other directly on the spot, during the coordination conferences. The conference, therefore, was equivalent to a government-sponsored fair.

In 1964, two years after the article above was published in People's Daily, another author published an article on the use of fairs in promoting contractual coordination.14 In this article, the economic writer Weng Zhan focused on the need for enterprise-level coordination in Jiangsu Province. Weng also described a large-scale "conference" for enterprises that was, in essence, a provincial-level fair that allowed factories on the supply and demand side to meet and coordinate with each other:

In the Provincial Industrial Production Working Conference organized by the Provincial Party Committee... enterprises on the supply and demand side were able to meet each other directly and come up with production requirements for each other. The conference organized hundreds of enterprises on both the demand

13 Ibid.
and supply side, which signed over 2000 coordination agreements and contracts with each other.\textsuperscript{15}

In addition to fairs held on the provincial level, they were held on the city level as well. Various cities in Jiangsu province organized fairs within the city to promote coordination among local enterprises. Weng gave the example of cities like Changzhou and Suzhou to illustrate how fairs were used as an important tool to enhance enterprise-level coordination. Participants on the supply side not only exhibited their products at the fair, but were also encouraged to coordinate with factories on the demand side directly and sign contracts on the spot. He wrote:

Starting from June 1964, the city of Changzhou responded to the call from local enterprises that sought coordination arrangements by arranging users and suppliers to meet and coordinate with each other directly at the fair, where products [of the suppliers] were exhibited. Within less than twenty days, more than 1000 contracts and agreements were achieved, and many problems that had evaded resolution for a long time were resolved. Similarly, in Suzhou, the city also organized specialized conferences in which manufactured products were exhibited. Between September and November, these conferences helped satisfy the needs of local enterprises for coordination, and establish hundreds of new contractual coordination relationships. Using the method of “exhibiting manufactured goods and organizing contractual coordination on the spot” (shiwu zhanlan, xianchang zuzhi dingdian), we were able to improve the previous situation in which enterprises rarely communicated with each other, did not trust each other, and blindly sought to develop in the direction of “big and complete”.\textsuperscript{16}

The most intriguing part of Weng’s account was that of the exhibition of manufactured goods. He pointed out that in both Changzhou and Suzhou, enterprises on the supply side would exhibit their products at the coordination conferences. Therefore, users and suppliers were not only able to meet each other, but with the exhibition of manufactured goods, users were also able to determine if the products being offered

\textsuperscript{15} Ibid., 1.
\textsuperscript{16} Ibid.
at the fair met their needs. They could also compare same type of products from different producers. The emergence of fairs where objects of exchange were exhibited indicated a clear trend toward market-like coordination.

The coordination conferences described above were not one-off events. In 1964, for example, a collection of reports was published on the topic of enterprise-level coordination and coordination conferences. In the collection, eight provinces published reports on their experiences in organizing conferences to promote coordination.\(^{17}\) In Northeast China, the first coordination conference took place from June 28 to July 5 in 1963, in which 429 enterprises on the demand side signed 1237 agreements and contracts with 295 enterprises on the supplier side.\(^{18}\) In Heilongjiang Province, a similar conference was held in the city of Jiamusi, in which 266 enterprises from the user side and 190 enterprises on the supply side signed a total of 4289 agreements regarding the coordination of raw materials, and over 300 contracts.\(^{19}\) In Jilin Province, a coordination conference was held for a second time in June 1963, in which 201 users and 138 producers signed a total of 531 agreements and contracts.\(^{20}\) In addition, the No.1 Machinery Bureau also held a coordination conference in Beijing between assembly plants and specialized factories that supplied components and machine parts. During the conference, 134 assembly plants signed a total of 2590 coordination agreements with 309 specialized factories.

By the end of the Specialization and Coordination Movement, contracts and fairs had been identified as important ways to improve enterprise-level coordination. The emphasis on coordination between enterprises, however, directly conflicted with the

\(^{17}\) Guojia jiguan nianji weiyuanhui qiye guanliju, ed. Guding xiezuo dingdian gongying, zuzhi gongye qiye guding xiezuo dingdian gongying gongzuo jingyan huibian (Beijing: Zhongguo gongye chubanshe, July 1964).

\(^{18}\) Ibid., 8.

\(^{19}\) Ibid. 23.

\(^{20}\) Ibid., 52-53.
ideological commitment to national planning in a socialist economy. Therefore, in addition to coming up with ways to enhance enterprise-level coordination under the framework of national planning, advocates of this form of coordination were presented the additional challenge of reconciling such coordination with the central planning apparatus. In the 1960s, it was yet not possible to openly offer critiques on the national plan; economic writers, however, found alternative ways to offer arguments that prioritized enterprise-level coordination over central planning. They argued that the foundation of the national plan ought to be contractual relationships between enterprises. They also argued that top-down planning must accommodate needs from individual enterprises.

In an editorial published in *People’s Daily* in 1963 on strengthening contractual coordination, the author prioritized coordination and made the argument that enterprise-level coordination must form the foundation of national planning:

> Due to the complexity of the national economy, national planning can only give a rough estimate of the type of products, quality and quantity of production. It is impossible for the national plan to enumerate and include all the products and projects. Therefore, the establishment of contractual coordination turns out to be an important addition to national planning. Specifying contractual coordination is the most meticulous part of organizing the national economy, and it is the fundamental way to improve planning and management in production, as well as to ensure stability in production. If we can build up and enhance contractual coordination step by step according to our plan and turn the national economy into an integrated entity through tens of thousands of long-term contracts or contracts, then the figures we draft in the national plan will be more concrete, and various industrial sectors in the economy would be able to develop to the fullest.

The author reiterated the argument that coordination on a national level would never be sufficiently exhaustive to encompass all the individual coordination relationships in

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the economy. Therefore, the Chinese economy would have to rely on enterprise-level coordination to “improve planning and management in production, as well as to ensure stability in production”. As an alternative to openly criticizing of the planning apparatus, the author of the editorial argued that the foundation of national economy would be contractual coordination, instead of top-down national planning. He envisioned an integrated economy interconnected through “tens of thousands of long-term contracts”.

In another editorial on the priority of enterprise-level coordination published in the People’s Daily, the author argued that national planning must accommodate the needs of contractual coordination relationships.\(^2\) That is to say, enterprise-level coordination would be included in the national plan to ensure timely execution of contracts and agreements between enterprises. In order to address the challenge that some enterprises still prioritized planning targets over the fulfillment of contractual coordination, the writer elaborated on the importance of coordination among enterprises:

\> Some comrades separated contractual coordination from planning targets and did not take the fulfillment of contracts seriously. Some enterprises only chose to complete coordination tasks with large production volumes and few working hours, or came up with various excuses to evade coordination tasks. All of such behavior was wrong. All contractual coordination, once specified, must be completed. All contractual coordination that was included in national and local plan would be part of the plan; that is to say, these coordination relationships constituted the actual implementation of the plan. Even though some coordination projects were not included in the plan or were not specified, they still needed to be taken seriously. This is because national and local production plans can only give rough estimates of the product type, quality, production volume required from individual enterprises; however, contractual coordination would give concrete numbers to these requirements, and specify what enterprise would produce which products, their production quantity, the required quality and sizes, as well as delivery deadlines,

etc. Therefore, whether an enterprise can fulfill production targets could not be separated from its fulfillment of contractual coordination. Only when enterprises could complete all coordination tasks can we say they completed national planning targets.23

The author reiterated the argument that national planning could not encompass all contractual relationships on the enterprise level. Therefore, the enforcement of contracts and agreements among enterprises was the fundamental way of allocating resources. Although national planning was envisioned as the dominant way of managing coordination in a socialist economy, the author argued that enterprise-level coordination was the building block of national planning. That is to say, the actual coordination among individual production units was achieved through contracts, instead of national plans. Suggesting that national planning would serve to ensure the fulfillment of contracts among enterprises, he appeared to make the argument that national planning served more as a way to legitimate and ensure the fulfillment of contracts than a way to coordinate raw materials and resources among enterprises.

Fan Muhan, the expert on coordination, made a stronger case for the priority of contractual coordination over planning. Recall that Fan gave an example of a boiler in an electric generator was given to illustrate the challenge of meeting individual needs through national planning in Chinese economy. In the same article published in *Economic Research* in 1965, Fan gave another example of a machine tool factory whose needs for specialized electric generators cannot be met by national planning. He wrote:

Take the example of a machine tool factory specializing in metal cutting. For every machine tool it manufactured, it required specific electric generators and electric control equipment produced by other specialized factories. Such coordination relationships were already specified in its Special Contracts. If one can enforce and implement this coordination, then the machine tool factory would be guaranteed good-quality electric generators and electric control equipment.

23 Ibid.
However, the customary way of coordinating cannot ensure this type of contractual relationships, because in national planning, all the electric generators produced were allocated as resources of the year to individual enterprises by department and then by region. This can only guarantee the quantity of electric generators required by the machine tool factory, but cannot ensure the type and quality it needed, which can cause fluctuations in its production and the quality of machine tools produced.\(^\text{24}\)

Fan reiterated the challenge of reconciling national planning and contractual coordination. Even though contractual relationships might have been established through the specification of contracts, they could not be honored through national planning. Therefore, Fan argued that the national plan must acknowledge and execute contractual coordination between enterprises:

\[\ldots\text{accommodating coordination relationships in production into national planning is a dominant factor; without this aspect, any enterprise can only acknowledge special coordination relationships but cannot actually fulfill them. This is because the products manufactured by nationally owned enterprises must be allocated through national planning; these enterprise have no right to allocate their own products.}\] \(^\text{25}\)

He reiterated the point that national planning must serve to fulfill contractual relationships and accommodate coordination needs from individual enterprises. Implicitly, Fan also advocated for greater enterprise autonomy. Under the national plan, enterprise-level coordination could not be achieved not only because factories had difficult communicating with each other, but also because they had no autonomy to do so.

Fan further argued that national allocation of resources must be based on existing contractual relationships between enterprises. That is to say, national planning could not be isolated from individual needs from enterprises:


\(^\text{25}\) Ibid.
Therefore, in order to enhance and solidify coordination in production, [we] must study and improve the current methods of allocating resources based on plan. We must allocate products in the society based on existing coordination relationships between enterprises, instead of allocating resources in isolation from the pre-existing coordination relationships.... That is to say, the first layer of national planning should be based on contractual coordination between enterprises and be allocated through enterprises, while the second layer of planning can be fulfilled through the allocation of resources from management bureaus. Therefore, [we] can truly solidify and implement industrial coordination relationships between enterprises.²⁶

Fan explicitly stated that enterprises should take the initiative to allocate resources as part of national planning. While individual production units would take the lead in coordinating among themselves based on their production needs, government bureaus and agencies would be responsible for allocating resources after enterprise-level supply and demand had been coordinated based on their initiatives. Although Fan did not argue for the replacement of national planning by contractual coordination, he was clearly in favor of coordination based on first and foremost individual needs of enterprises.

By the end of the Specialization and Coordination Movement in the mid-1960s, Chinese economic actors had experimented with ways to improve enterprise-level coordination through the use of contracts and the organization of coordination conferences (fairs). They had also come up with arguments to reconcile the emphasis on contractual coordination with the ideological commitment to national planning in a socialist economy. The emergence and development of enterprise-level coordination indicated that the Chinese economy was moving in market-like directions in the mid-1960s, more than a decade earlier than the market reform of 1978.

²⁶Ibid., 6.
The Specialization and Coordination Movement came to an abrupt end with the onset of Cultural Revolution, which was “a movement that profoundly affected nearly every aspect of life for hundreds of millions of Chinese citizens, tore apart the Chinese Communist Party, fundamentally altered the organization of the economy, and propelled the People's Republic of China (PRC) into deeper international isolation.”27 As this new radical reform movement unfolded, specialization and coordination came under attack and were dismissed as capitalist practices. Previous models of complete factories and diversification were revived, and the principle of self-sufficiency was again touted as positive guideline to follow. In short, just as Chinese economic actors started to experiment with contractual coordination and the use of fairs in promoting enterprise-level coordination, the Specialization and Coordination Movement was terminated, and older models were resuscitated. The complete factory model and principle of self-sufficiency were again advocated as effective solutions to the challenge of broad front development. During the Cultural Revolution, discussions on specialization, economies of scale, or enterprise-level coordination almost disappeared. The discourse that emerged during the Cultural Revolution was almost indistinguishable from what was being promoted during the Great Leap Forward.

One of the most important slogans during the GLF was “walking on two legs”, and small-scale, local factories were presented as a crucial force in promoting the country’s industrialization. Similarly, during the Cultural Revolution, an almost identical slogan was revived—“Upholding Big, Medium and Small Enterprises”. Following the same logic, Chinese economic writers again advocated small factories as the backbone of China’s industrialization. One of the writers during the Cultural Revolution cited the following

quotation from Chairman Mao on the ideological commitment to reviving smaller enterprises:

Our great Chairman Mao once pointed out: “We must gradually establish a group of large-scale, modern enterprises as the foundation [of our country]. Without such a foundation, our country would not be turned into a modernized, powerful nation within decades. However, most enterprises should not follow this development strategy. Instead, we should establish more medium and small enterprises, as well as make full use of the industrial legacies that are left from earlier periods. We should be thrifty and try to achieve more with less money.”

The promotion of small factories was based on both practical and ideological grounds during both periods. More importantly, during the Cultural Revolution, the xiaotuquan (small-scale, local) factories were encouraged to become self-sufficient in all areas. In Chapter 1 and Chapter 2, different examples of complete and diversified factories during the GLF were introduced. One can almost find all of their counterparts during the Cultural Revolution. Complete factories started out as makeshift solutions to incomplete supply chains in the machine-building industry. Originally, machine-building factories started by making single-purpose machine tools when they could not obtain the required machine tools from other specialized factories. During the Cultural Revolution, the Red Star Gauge Factory (Hongxing liangju chang) was a small factory that made many of its own machine tools and supplemental machinery during the production process. The Red Star Factory started out as a production unit that supplied grinding stones to other factories. As it was transformed into a gauge factory, it required more workshops, as well as a variety of machine tools for the manufacturing of specialized gauges. The factory not only built more workshops on its own, but also undertook the making of machine tools by itself. For

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29 Shanghai shi chuban geming zu, “Xiaochang zhiqida, shitou zao mochuang,” in Xiaochang zouzai dalu shang (Shanghai: Shanghai shi chuban geming zu, 1970), 63.
example, lacking a grinding machine, workers from the Red Star Factory decided to make one on their own:

In the manufacturing process, without technological support, they [the workers] would study on their own; without blue prints, they would borrow them from their brother factories; without the necessary raw materials, they would purchase from second-hand goods stores. When they could not understand the blueprints, they would visit other factories to study their grinding machines. If they forgot, they would go and visit multiple times in a day. In order to make the grinding machine from stones as quickly as possible, they eat and sleep in the factory, day and night.... after three and four months of hard work, the “homemade” grinding machine (tumochuang) is put together.\textsuperscript{30}

The description of the Red Star Factory seemed to be more ideologically driven than how complete factories were portrayed during the GLF. Nevertheless, the logic behind the Red Star Factory and machine-building factories during GLF was almost identical: factories from both periods integrated backwards to complete their supply chains on their own. The principle of self-sufficiency was revived during the Cultural Revolution, and the Red Star Factory was promoted as a positive model to be followed by other small, local factories.

In addition to manufacturing single-purpose machine tools, factories during the Cultural Revolution made complicated machinery in-house as well. Jiangxi Jinggangshan Automobile Factory (Jiangxi jinggangshan qiche chang) was a small factory that produced a majority of the machine tools it required on its own. The automobile factory started out as an “automobile repair factory with only six hundred workers and 88 machine tools and pieces of equipment”. During the Cultural Revolution, as an act of revolutionary commitment, the factory set up a production target of manufacturing five hundred

\textsuperscript{30}Ibid., 61.
automobiles per year. In the process, they ran into serious bottlenecks of insufficient machine tools. In response, the factory started to make their own machine tools so that a variety of machine parts and components of automobiles could be produced in-house:

On the one hand, they made use of existing equipment to manufacture automobiles; on the other hand, they produced a series of specialized equipment for automobile production on their own to equip themselves. They manufactured automobiles as well as machine tools simultaneously, so as to accelerate the pace to equip themselves and expand production. [For example,] one workshop had only two air forging hammers, which were far from meeting their production needs. Workers continued with the manufacturing process, while producing machine tools on their own, including: rock drills, hydraulic riveters, radial drilling machines, crane trolleys, hoisting machines, as well as a series of jigs and fixture. All of these formed an assembly line and the factory was able to outperform the original production goal.

The automobile factory integrated backwards extensively, and made almost all of the auxiliary machine tools it needed in production. Starting from 1968, it produced a total of 97 specialized machine tools, which made up more than 45% of its existing equipment.

The Jinggangshan Automobile Factory was a smaller factory compared to the No.1 Automobile Factory described in Chapter 1. Nevertheless, both automobile factories followed the model of complete factories and pursued self-sufficiency as their primary goal in managing production.

The Cultural Revolution put an end to the Specialization and Coordination Movement that came into full swing by the mid-1960s. The Cultural Revolution was, therefore, not only an ideological struggle with the Chinese Communist Party, but also had deep implications for the country’s economy. By mid-1960s, fairs and contracts emerged as possible solutions to the problems of coordination that Chinese economic actors had

32 Ibid., 106-107.
33 Ibid., 107.
been dealt with since the start of GLF. The Cultural Revolution, however, disrupted a series of full-blown efforts to promote enterprise-level contractual coordination. Not surprisingly, as the Cultural Revolution came to an end and the Gang of Four was deposed, the debate on specialization and coordination was revived and resumed in late 1970s and 1980s. Chinese economic thinkers continued to tackle with the problems of specialization and coordination, and the market reform in 1978 was an outgrowth of these efforts that started toward the end of the GLF and later were rehabilitated after the Cultural Revolution.
CHAPTER 5
"Market Reforms": 1978 to the Present

The Cultural Revolution revised the shifts generated by the Specialization and Coordination Movement and restored the primacy of the complete factory model. The end of the Cultural Revolution led yet to another change of course that revived the Specialization and Coordination Movement with new vigor. Discussions on the topic of specialization and coordination resumed and taken to the next level by Chinese economic critics and commentators. The complete factory model and national planning faced renewed criticism in a much more systematic and open way. The market reform that unfolded in late-1970s was, in essence, an outgrowth of the discussions on coordination that emerged as early as late 1950s and early 1960s.

In the late 1970s, the presentation of the materials was more systematic and structured than the discourse that emerged during the Specialization and Coordination Movement. Entire books were published on the topic of specialization and coordination, and Chinese economic thinkers treated the topic as major principles that constituted the core of their later arguments. The contents of the discussions remained similar to what emerged in 1960s, including benefits and types of specialization and coordination, possible business organizations that can improve coordination, and the use of contracts to
solidify coordination. Chinese scholars also studied how a high level of coordination was achieved in advanced capitalist economies.¹

As early as 1979, Chinese economic writers launched into a critique of the complete factory model from the Cultural Revolution era and drew renewed attention to the virtues of specialization coupled with a system of coordination. They recognized that the prevalence of complete factories remained a major problem to the Chinese economy:

The socialist economy is built on the foundation of socialized mass production. There is a broad range of relationships of specialization and coordination between enterprises, regions and departments. With the advance of science and technology, the specialization and coordination of production would develop as well. However, due to ... the way we treat mass production in the same way as we manage small production, many of our enterprises no longer develop into the direction of specialization and coordination, but rather in the direction of self-sufficiency in all aspects. Therefore, most of the enterprises in our country are “small and complete” or “big and complete”...²

With the advancement of production technologies and increase in production volume, Chinese economic writers pointed out that complete factories became increasingly incompatible with the need for modern mass production. The economist Qiao Rongzhang, for example, offered the following critique on the complete factory model in 1978:

Organizing specialized production is an inevitable trend of the development of modern industries. The structure of modern products is very complicated, the level of precision required by components is high, and the demand from society for these products is increasing. These modern industrial products are produced in large volume, they are complicated in structure, and they require a high level of precision. If they are almost or all produced by complete factories, the

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¹Xiao Liang and Rong Wenzuo, Shengchan zhuanyehua he xiezuo (Beijing: Qinggongye chubanshe, 1979).
production cycle would be very long, and much of the specialized production equipment cannot be fully utilized. This is not economically efficient. Specialization can overcome these drawbacks. The history of industrialization in various countries demonstrated that the model of complete factory was already outdated, while specialization and coordination were a good way to organize modern industrial production.³

Another economic writer, Wang Zhike, made an almost identical argument on the critique of complete factories:

“Small and complete”, “Big and complete”, the pursuit of self-sufficiency in all areas, self-serving or self-circulation all run counter to the needs of socialized mass production. They are the model and mindset of a primitive barter economy.⁴

The concept of modern mass production was emphasized by both Qiao and Wang. In their discussions, they referred to the term as high-volume mass production that could not be achieved by xiao er quan or xiaotuqun (small-scale and complete) factories. With the advancement of production technologies and industrialization, mass production became an increasingly urgent need that received much more attention. In early 1960s, Chinese economic analysts had already viewed specialization and enterprise-level coordination as superior strategies for improved product quality, lower production costs, and greater product variety. In post-1978 years, writers reiterated the same arguments but saw the changes as being all the more urgent because of the need for the country to move fully into mass production. Both Qiao and Wang highlighted that with the increase in production volume, the need for specialization and coordination was greater than ever.

Basic arguments on the topic of specialization were reiterated in the reform era. Chinese economic writers promoted the establishment of independent, specialized

enterprises in opposition to complete factories, and argued that the level of specialization of the former was higher:

In terms of the level of specialization in production, there are two scenarios in the specialization of products. The first is a complete factory that completes all manufacturing and production of components on its own; the other is a non-complete factory that completes major manufacturing of essential machine parts on its own, while other components are supplied by its coordinating factories. The level of specialization is low for the former, while high for the latter. When we promote the specialization of products, we should prioritize specialized enterprises that either produce major components or are in charge of assembling.5

The authors of the book, Han Youlan and Liu Furong, offered a similar critique of complete factories. They also acknowledged that complete factories could achieve a certain level of specialization in-house, but highlighted the fact that the specialization of an enterprise was different from specialization within a complete factory. They elaborated on this distinction:

Specialization of enterprises is different from specialization within a factory. Specialization within a factory is a result of the division of labor. With the development of industrial technologies, factories establish more specialized workshops, production stages and working stations based on the division of product (machine parts, components) or production techniques. This is called specialization within a factory. Its emergence indicates a deepening of the division of labor as well as an improvement in production technologies. The higher the level of specialization is within a factory, the more efficient it is in production. However, this is different from the specialization of enterprises. This is the specialization within an enterprise does not increase the number of enterprises or factories; the products from specialized workshops, production stages or groups only constitute semi-finished products within the enterprise, and they are not circulated in the society as commodities. On the other hand, the development of specialized industrial enterprises can not only increase the number of factories and enterprises, but also have more commodities circulated in the society and improve overall level of specialization of the society.6

5 Han Youlan and Liu Furong, Gongye shengchan de zhuanye hua xiezuo yu gongye gongsi (Tianjin: Tianjin renmin chubanshe, 1980), 5-6.
6 Ibid., 3-4.
Although the distinction between specialization of an enterprise and specialization within an enterprise was not made as sharply in the 1960s, the arguments made on specialization were almost identical in the Specialization and Coordination Movement and in post-1978 years. In the 1960s, what Chinese economic writers defined as specialization was what Han and Liu called “specialization of an enterprise”.

After 1978, economic analysts reiterated the argument that outside the complete factory model, which provided for limited specialization and internal coordination, the kind of specialization they advocated could not be achieved without special mechanisms of coordination. Specialized enterprises of the kind they favored could not exist in isolation and needed an extensive network of enterprises that would allow communication and coordination among them. This perspective, highlighted in the 1960s, was reiterated in the same terms by Wu Zhaohong and Lu Wangcai in 1980:

As we have discussed before, modern mass production is a highly socialized form of production, and it is an integrated entity. Each section and enterprise belongs to a production stage or is part of it, interconnected with each other. Without integration, no enterprise or factory can exist on its own. Therefore, in promoting modern mass production, it requires not only specialized division in labor, but also requires improved connection and coordination between enterprises. On the one hand, it goes into the direction of specialization, and on the other, the direction of coordination. These two aspects are interdependent and improve each other. Coordination is the prerequisite of specialization: without the connection in production among enterprises, regions and departments, there would be no realization of specialization; specialization is the foundation of coordination, and without the division of labor, there would be no possibility of coordination. Coordination improves specialization, and the better organized coordination is, the more it can accelerate the improvement in specialization; on the other hand, the higher the level of specialization and the division of labor are, the more production units are dependent of each other, and the more they require coordination.7

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7 Wu and Lu, *Gongye zhuanyehua xiezuo yu xiandaihua*, 33-34.
The authors, Wu and Lu, again highlighted the concept of modern mass production and argued that the Chinese economy had reached a new level of development where the old complete factory was inadequate, and new forms of coordination were needed.

Similar to their predecessors of the 1960s, economists and policy makers understood that coordination centered on relationships among individual enterprises, which were users and suppliers of the products in exchange:

As long as there is division of labor in the society, there must be coordination. The higher the level of division of labor, the more intimate the relationship between different sections and enterprises, and the more coordination is needed. The division of labor and coordination are prerequisites to each other, and they are conducive to each other as well. We know that industrial enterprises are the producers of materials in the society, as well as consumers. For example, a textile factory provides a variety of textile products to the society to meet the demand from people; on the other hand, it needs many factories to supply textile machinery or equipment, raw materials such as cotton, fuel, as well as other supplemental materials. In this way, the textile factory is integrated with other factories as an organic whole.8

Economic commentators Wang Guangzheng and Xue Zhaoying, argued that every enterprise in the economy was both a user and producer of goods. The basic point had been made by writers in the 1960s, who had advocated for enterprise-level coordination through the use of contracts and fairs. In post-1978 years, writers made use of the same classification of enterprise-level coordination that had been developed in 1960s. Recall the concepts of coordination broadly and narrowly defined, which were first brought up by Ji Ming in 1959.9 Wang and Xue referred to this classification in their writing on coordination in 1983:

[T]he industrial production coordination we are discussing here is not coordination in a broad sense, but coordination in a narrow sense. Such coordination is limited to only one form of production

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8 Wang and Xue, Woguo gongye shengchan zhuanyehua yu xiezuo, 4.
9 Ji Ming, Shehui zhuyi gongye shengchan de zhuanyehua yu xiezuo (Shanghai: Shanghai renmin chubanshe, 1959).
relationship, which is the relationship between enterprises that produce the same type of product. It does not include coordination within an enterprise, nor does it include coordination between national economic bureaus such as the industrial bureau and the agricultural bureau. In terms of the content of coordination, it does not include the coordination of raw materials, technology or labor; nor does it include the coordination of the supply and demand of commodities. For example, raw materials, fuel, standardized machine parts and semi-finished products are usually produced by factories based on social demand and their own capacities, and then allocated to the domain of consumption through allocation bureau or business venues, in order to meet the demand of many machine-building factories of various departments. This coordination belongs to the supply and demand of commodities, and is considered broad coordination. However, narrow coordination refers to a specific type of supply, which is the supply of designated semi-finished products or machinery components. The salient feature of such coordination is that the producer would complete the production tasks based on specific technical requirements and blueprints from the user, and supply the products directly to the user on a regular basis.10

The revisiting of the classification that Ji came up with demonstrates continuities of the discussions that emerged during the reform era with the Specialization and Coordination Movement. Significantly, Chinese economic writers in post-1978 reforms emphasized a variant of “broad” coordination, and argued that enterprise-level coordination was no longer confined to the exchange of components, machine parts, or raw materials, which had been the primary objects of coordination in 1960s:

[S]ocialized mass production, especially modern socialized production, with the advancement of technologies, development in specialization, expansion of production volume, improvement in the continuity of production processes... it requires us to build relationships between enterprises and production units that are closely connected with each other in terms of technology or production in various forms. In this way, they can make the most efficient use of all the production elements and conditions that are indispensable to modern production, but are scattered in different regions, such as: labor, equipment, space, resources, technology, information... transportation, communication, etc. Therefore, as long as [we are in the realm of] socialized mass production, specialized

10 Wang and Xue, Woguo gongye shengchan zhuanyehua yu xiezuo, 5.
coordination and economic integration would inevitably exist and develop.\textsuperscript{11}

The realm of coordination had been broadened to the exchange of technologies, labor, equipment, and information among enterprises. This was a new development in enterprise-level coordination that had not been previously discussed in 1960s.

Although the need for enterprise-level coordination became ever more urgent with the aim of achieving modern mass production, a growing number of commentators voiced the view that the national planning apparatus remained a major roadblock to the development of coordination. While writers of the Specialization and Coordination Movement hinted at the drawbacks of national planning, their criticism was implicit and subdued. They had suggested that national panning could not accommodate specific needs of individual enterprises. They also implied that contractual coordination ought to supersede the national plan in allocating goods and resources. No open criticism of the planning apparatus, however, emerged in the 1960s. After the Cultural Revolution, Chinese economic writers became more explicit in their criticism, although the main thrust of the arguments remained very similar to those of their predecessors.

The economic writer Jiang Xuemo noted in an article published in 1979, for example, that the national plan was inadequate in meeting enterprise-level production needs:

Needs of a society come in a great variety, and they change corresponding to the changes in production technologies, economic conditions and other social conditions. There are many types of products in a society, while the production of one single product involves many enterprises simultaneously. It is, therefore, impossible to encompass the production, supply and distribution of millions of enterprises in a comprehensive state plan and do a good job in coordinating.\textsuperscript{12}

\textsuperscript{11} Wang, "Fazhan hengxiang jingji lianxi chuyi," 9.
Jiang argued that with the advancement of specialization and the increasing need for coordination, national planning became increasingly insufficient in coordinating the needs between users and producers. Another group of economic writers presented a similar critique on national plan in 1980:

In order to manage a complicated national economy as an integrated entity in a rigorous way, only relying on the plan is not adequate. This is because: (1) a plan cannot encompass thousands of economic activities that change constantly; even for the parts that are included in the plan, it is not able to specify in a comprehensive and detailed way (2) a plan cannot relate various economic activities to the profits of enterprises (3) a plan does not have the enforceability as that of a contract. This is because the plan cannot guarantee the implementation of coordination.13

These were reasons that had been discussed by writers in the 1960s, and were later reiterated when national planning came under increasing scrutiny and attack in post-1978 years. In addition to criticizing the inadequacy of national planning in meeting the needs of individual enterprises, critics pointed out that another major drawback of the planning apparatus was that it deprived individual factories of autonomy. Economic critics in the 1960s had hinted at the possibility that enterprise-level contractual coordination should be prioritized over the national plan, but criticism of the overarching power of the national plan became much sharper after 1978. Chinese economic writers noted that the lack of enterprise autonomy remained a serious problem for the Chinese economy. The economist Jiang Xuemo, for example, elaborated on the lack of autonomy among enterprises in 1979:

On the relationship between the state and enterprises, the state is in tight charge of too many things. Enterprises lack the autonomy they should have in terms of planning, production, resources, labor, finance, etc. Therefore, they cannot adjust [their production] based on

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the needs of national construction, people's lives, or changes in national and international [needs].

The national plan was not only inadequate in meeting the production needs of individual enterprises, it also deprived factories of autonomy in forming enterprise-level coordination among themselves. It constituted a major impediment to improving the level of specialization and coordination. Another Chinese economic writer, Yu Hanqin, offered a sharper criticism of national planning and argued that individual enterprises ought to be the principals in forming coordination relationships:

The major roles played by local governments are not to organize the coordination of various projects; instead, their main responsibilities are to come up with a series of policies and create a conducive environment for economic integration and coordination, while the coordinating projects are implemented by enterprises themselves. Enterprises are directly responsible for economic integration and coordination. They undertake commodity production independently and are in charge of their own profits. Therefore, economic integration and coordination must be based on the principle of consensus, equality and reciprocity. On the other hand, local governments would be in charge of large-scale infrastructure projects in transportation and energy that are usually not undertaken by individual enterprises.

Writers in the 1960s had hinted at the possibility that enterprise-level contractual coordination ought to supersede the national plan. In 1986, the author Yu Hanqin argued more forthrightly that the role played by local governments in forming enterprise-level coordination must remain subsidiary to individual enterprises who were the ultimately responsible for the coordination with each other.

In response to the perceived roadblock created by national planning, economic writers in the 1960s came up with the idea of contracts and fairs as a way to improve enterprise-level coordination. In post-1978 years, fairs were revived to facilitate

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14 Jiang, "Lun jihua tiaojie yu shichang tiaojie de jiehe," 55.
enterprise-level coordination at the provincial level and the use of contracts was encouraged between factories. At the same time, Chinese economic thinkers came up with more radical ways of promoting enterprise-level coordination.

The organization of fairs continued in 1980s. For example, in 1984, a large-scale coordination conference was held among five provinces and cites, including: Sichuan, Yunnan, Guizhou, Guangxi, and Chongqing. From April 1984 to April 1985, more than 1500 coordination contracts were signed among the participating enterprises.16. Another economic writer, Li Wanjun, wrote in 1983 that fairs (“coordination conferences”) were conducive to building contractual relationships between enterprises, and advocated for government agencies “organize regional economic and technological coordination conferences on a regular basis. Participants would be responsible government departments as well as regional and enterprise-level leaders. They would analyze the advantages and disadvantages of coordination, set principles [and guidelines], negotiate about coordination projects, sign contracts of coordination, so as to improve economic coordination between regions.”17 Li highlighted the significance of coordination conferences as a way to improve inter-regional coordination, a point that had not been emphasized by writers in the 1960s. The breakaway from regional compartmentalization in enterprise-level coordination was, in essence, a direct counter-argument against national planning. Fairs created venues for enterprises to overcome the territorial boundaries imposed by the national plan and communicate with each other directly.

The importance of contracts received renewed emphasis in the post-1978 era. Economic analysts saw direct continuity between the improvement in enterprise-level

16 Ibid. 517-518.
coordination and the need for enforcement of contracts. Four economic writers, Sun Cheng, Jian Guanglun, Li Yinqing and Qiu Ping, fleshed out the relationship between coordination and the use of contracts in 1980:

As division of labor in a society... developed to a certain extent, the emergence of economic contracts followed. Before the appearance of division of labor in a society, there was no need for management [of these relationships] and therefore no need for economic contracts. It was only when the division of labor emerged and later developed into specialized coordination that the inter-connectedness and inter-dependence between sections and enterprises became increasingly important. In order to ensure that production can move on smoothly, the two sides that enter into economic relationships with each other regularly should specify each other’s responsibilities and make sure that they can fulfill the conditions required by the other in a timely manner. Thus appears the necessity of signing economic contracts ...

Sun, Jian, Li and Qiu highlighted the binding power of contracts, a point that had been brought up by writers in the 1960s. They also pointed out that the use of contracts became ever more necessary, as the division of labor in a society improved and enterprise-level coordination became more prevalent.

Fairs and contracts in themselves were not new interventions. In the post-1978 years, Chinese economic writers, however, brought up two new economic terms, “horizontal economic coordination” and “horizontal economic integration” as extensions of the concepts of enterprise-level contractual coordination that emerged during the Specialization and Coordination Movement in the 1960s. Although both terms had earlier precedents, they also took on new meanings and significance in the post-1978 discussions.

In defining the term “horizontal economic relationships”, Chinese economic writers in the 1970s and 1980s invoked arguments that had been previously discussed extensively, including specialization, division of labor, and coordination. In

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the economic journal *Caijin wenti yanjiu* in 1986, the economist Li Hongshan, offered a definition of horizontal economic relationships that was in essence an outgrowth of enterprise-level coordination that had been formerly defined:

Horizontal economic relationships are external coordination relationships that are built on division of labor within a society; they are how enterprises complement each other in terms of production factors. Under the condition of socialized mass production, the division of labor within a society can be divided into the division of labor within an enterprise and outside an enterprise. Internal division of labor within an enterprise refers to the division among different production types, production processes or workshops. Internal coordination relationships are built on the internal division of labor within an enterprise. The external division of labor is the division of society among different enterprises. They are an extension of the internal division of labor. Under socialized mass production, enterprises are dependent upon each other. The product of an enterprise may be the material or the subject of labor for the other. No one can exist without the other. In real life, each producer may not have adequate labor, materials or finance, and it is likely that they may experience shortage in certain production factors, while other producers have excess. If these enterprises can enhance horizontal relationships or integration with each other and complement each other, then productivity could be greatly improved.  

The author Li offered a definition of horizontal economic relationships that was almost indistinguishable from how enterprise-level contractual coordination had been described during the Specialization and Coordination Movement. In other words, enterprise-level coordination could be understood as the simplest form of coordination between enterprises; horizontal economic relationships, on the other hand, represented a direct outgrowth of this concept, but incorporated new meanings as well. Li, for example, highlighted the fact that horizontal economic relationships served as an effective way to break down hierarchical and bureaucratic boundaries imposed by national planning:

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Horizontal economic relationships are economic activities or transactions initiated by enterprises themselves that go beyond certain hierarchical and bureaucratic relationships. First of all, economic horizontal relationships are production relationships. They reflect commodity exchange relationships between producers of commodities. Secondly, such commodity exchange relationships take place among enterprises and go beyond certain hierarchical and bureaucratic relationships.\(^{20}\)

Writers in the 1960s had implicitly argued for enterprise-level coordination to take the place of central planning, but in the 1980s, they started to openly call for horizontal economic relationships to take the place of national planning in the allocation of resources. In other words, they believed that horizontal economic relationships would eventually supersede the national plan and became the dominant method of coordination among enterprises. Li also highlighted that the principals responsible for coordination should be users and producers of commodities or goods, instead of government bureaucracies.

Another writer in the 1980s reiterated the point that economic relationships between enterprises ought to transcend geographic boundaries. Wang Zhike, who wrote on the same topic in 1986, argued that enterprise-level coordination could take place between any factory in the economy, regardless of geographic boundaries, as long as profits could be made from the transaction:

In order to expand production and make more economic profits, the producers and users of commodities would inevitably build relationships with each other in terms of supply and demand, financing, technology, equipment, raw materials, labor, etc. Their relationships are horizontal, and are not bound by counties, provinces, or even nations. Generally speaking, wherever there are more economic profits to be made, they would build relationships there. It is even more true within our country.\(^{21}\)

\(^{20}\)Ibid. 21.
\(^{21}\)Wang, "Fazhan hengxiang jingji lianxi chuyi," 10.
Wang broadened the realm of horizontal economic relationships to the exchange of goods, products, technology and financing. He also highlighted that coordination between enterprises ought not to be constrained by their locations, as long as profits could be made. Although Chinese economic critics went to great lengths to elaborate on the concept of horizontal economic relationships, the core message behind the concept was straightforward: enterprises ought to have the freedom and autonomy to make business decisions and coordinate with each other, regardless of geographical or bureaucratic boundaries. One reason why writers had to offer extensive and sometimes lengthy explanations of the term was because they were trying to work through Marxist social science at the same time they were trying to get across economic concepts that would otherwise be straightforward in a capitalist context. In the context of a market economy, for example, horizontal economic relationships could simply be understood as relationships between individual buyers and sellers that constituted the supply and demand of the economy. In a socialist economy, however, it was more challenging for writers to articulate and justify enterprise-level coordination under national planning.

In addition to “horizontal economic relationships”, another term that emerged in the 1980s was “horizontal economic integration”. Chinese economic writers sometimes used these two terms interchangeably, although there were nuances in the use of these two expressions as well. Economists defined horizontal economic integration as a particular category of horizontal economic relationships, in which enterprises entered into more stable, longer-term contractual coordination with each other. Authors Chen Jiagui and Huang Sujian offered a definition of horizontal economic integration in 1987:
Horizontal economic relationships encompass a wide range of economic activities. It not only included economic integration, but also the usual relationship between users and producers. It included all types of horizontal coordination relationships: general contracts, agreements, and various forms of horizontal relationships in the realm of economics, technology, information that are not enforced by contracts or agreements. What differentiates the economic relationships described above from the other is their tightness and their stability. Economic integration is a type of economic relationships that has a high level of tightness and stability.22

Recall the concept of “narrow coordination” that was first defined by Ji Ming in 1959 and later revisited by economic writers in post-1978 years. Narrow coordination, for example, would be an instance of horizontal economic integration because the coordination relationship between an automobile factory and the specialized factories that supplied it with customized machine parts or components should not be easily modified. The coordination between them was still undertaken by individual enterprises, but it was longer-term and more specific to the participating factories.

Writers also emphasized that horizontal economic integration ought to be more effective in breaking bureaucratic and geographic boundaries. The economic writer Li Hongshan, for example, pointed out in 1986 that economic integration went beyond regional administrative jurisdictions:

Horizontal economic integration is the organized, contractual, long-term and stable form of horizontal economic relationships. Economic integration refers to economic activities that go beyond certain regional administrative jurisdictions. They refer to such activities between enterprises or production units that are in different regions, departments, and ownership structure—they voluntarily negotiate contracts with each other and come together in order to connect with each other in terms of production, circulation and various production processes.23

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22 Chen Jiagui, Huang Sujian, ed. Qiye hengxiang lianhe zixun shouce, (Beijing: Jingji kexue chubanshe, 1987), 55-56.
23 Li, “Hengxiang jingji lianhe de jiben gainian he zhuyao xingshi,” 22.
Another economic writer, Li Douhuan, argued that through economic integration, individual enterprises could overcome the boundaries imposed by national planning more easily:

Horizontal economic integration is economic integration among enterprises that is built on the foundation of equality, voluntariness, and mutual benefits. It is related to traditional economic coordination, although the two terms are not exactly the same. Economic coordination originates from socialized mass production. It is promoted with advancement of production technologies, deepening of the division of labor within a society, and improvement of the level of specialization... Horizontal economic integration is a type of economic coordination under certain specific conditions, and it is a new type of economic coordination that emerged in the post-1979 economic structural reform. Under socialist conditions, it is a breakaway from coordination that was compartmentalized within regions. It breaks through regional boundaries and promotes coordination among enterprises under the governance of different regional administrative jurisdictions. In the meantime, it also refers to a wide range of economic integration between different departments, enterprises of different ownership structures, and different industries.  

The main point to take away from the Chinese economic writers' discussions on horizontal economic relationships and integration were that they were outgrowths of the concept of enterprise-level coordination that had been discussed and put into practice through fairs and contracts in the 1960s. In the post-1978 discourse, critics had become more explicit in their argument that enterprises ought to have greater autonomy in entering into coordination relationships with each other. In other words, users and suppliers in the economy ought to have the freedom and autonomy to go beyond geographical or bureaucratic boundaries and exchange goods, technologies, labor, or information with each other.

In practice, horizontal economic relationships and integration were similar to the outsourcing of production to independent, specialized factories that had emerged.

during the Specialization and Coordination Movement in the 1960s. In 1986, for example, a bicycle assembly plant outsourced the production of various components to other smaller, specialized factories: “while the head company was mainly in charge of major manufacturing processes and the production of essential components, the production of more than 60% of machine parts was outsourced to over 100 factories.”25 The relationship between the main assembly plant and other individual factories was an instance of horizontal economic integration.

Another example of horizontal economic integration was the Dongfeng Automobile Joint Operation Company (Dongfeng qiche gongye lianying gongsi). It was an integrated entity of the No.2 Automobile Manufacturing Factory and various specialized factories, many of which used to be automobile factories that were in charge of producing entire vehicles. In order to increase efficiency and expand production, they were restructured to specialize in the production of machine parts.26 The relatively long-term, stable contractual coordination between the No.2 Automobile Manufacturing Factories and its suppliers of components and machine parts would be considered as an instance of horizontal economic integration.

Chinese economic commentators sought to explain the concepts of horizontal economic relationships and integration at great length. It is evident, however, that they were discussing patterns that would otherwise be described in the West under the rubric of market coordination. Economic writers found themselves at pains to accommodate the discussion on market coordination in the socialist context, and came up with terms such as enterprise-level coordination, horizontal economic relationships and horizontal economic integration. In a market economy, these

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economic terms would represent any form of exchange between buyers and sellers. In the Chinese economy, writers not only needed to fit the discussions of market relationships under the context of Marxist social sciences, but also needed to grapple with the challenge of national planning. They called for greater enterprise autonomy, argued against rigid central planning and highlighted the need for horizontal economic relationships and integration. These arguments were, in essence, what would be described as market reforms in the West. Indeed, with the lifting of taboos in the 1970s and the advancement of Opening and Reform in 1978, some writers started to discuss the concept of market openly. For example, in 1980, the economic writer Wang Dezhong related market coordination to horizontal economic relationships:

As we all know, the original meaning of market is a place for the exchange of things. Later, it was extended to the exchange or circulation of commodities in the economic sense ... in the capital society, capitalist commodity production took the place of simple commodity production, and production of commodity developed to the highest level. Almost everything was in the form of commodities and the market was everywhere. Therefore, the market emerged and developed with the division of labor in the society and the exchange of commodities. Just as Lenin has pointed out: "Wherever there is division of labor and exchange of commodities, there is a market."

Wang argued that the emergence of markets was a natural outgrowth of improvement in the division of labor in the society. With higher level of specialization and coordination, market coordination seemed to be the next logical step to take in coordinating the supply and demand in the economy.

Outside observers have looked at the market reform in 1978 as part of a deeper ideological, political and economic sea change of the "post-Mao" era in which markets became the new line. However, this chapter has demonstrated that the very close approach to market coordination represented by the horizontal economic relationship

argument stemmed from the same set of problems that Chinese enterprises had encountered since the Great Leap Forward. Chinese economic thinkers and actors had been presented with the challenge of coordinating broad-front development, and they had come up with solutions including the complete factory model, principle of diversification, enterprise-level coordination (contracts and fairs), as well as horizontal economic relationships and integration. Therefore, the market reform in 1978 can be seen as direct outgrowths of problem-solving efforts on the enterprise level that could be traced to early 1950s, when the industrialization process just started to unfold in Communist China.
CONCLUSION

The subjects of this study are individual enterprises and how economic decision-making unfolded on the micro level. Communist China had witnessed three decades of turbulence from the establishment of the republic in 1949 to 1978. Dramatic changes were unfolding politically, ideologically, economically, and in every aspect of people’s lives. Given such upheaval, it is easy to overlook the smallest, yet most fundamental, business decision-making units in the Chinese economy—individual factories. This thesis focuses on solutions and business models that individual enterprises came up with in order to tackle a series of problems associated with the challenge of broad front development, confronting the industrialization process from the start. It has explored, in particular, the ways in which enterprises responded to uneven growth and sectoral imbalances characteristic of the broad-front challenge, most commonly manifested at the micro-level as incomplete supply chains. It has traced the development of complete and diversified enterprises during the Great Leap Forward, the rise of Specialization and Coordination Movement in the 1960s, the reversal from enterprise-level contractual coordination back to complete factories during the Cultural Revolution, and lastly, the revival of specialization and coordination after the fall of the Gang of Four and its culmination to full-blown market reforms in post-1978 years. It has offered the conclusion that the emergence of market coordination after 1978 stemmed from a series of concrete steps in problem-solving on the enterprise level, since the beginning of the
Great Leap Forward. These observations could not have been possible without focusing on individual factories as the main subject of study.

This thesis has zeroed in on the decision-making process on the micro level. For this reason, it has been able to identify important continuities in the business history of Communist China that might otherwise have been overlooked. The introduction of markets and market coordination into an ideologically-framed economy, to outside observers, would seem to represent a dramatic change. The market reform of China that started to unfold in 1978 was preceded by the Cultural Revolution, a period in which capitalism was under violent attack under the rule of the Gang of Four. Therefore, the year 1978 was perceived as a watershed in Chinese history that marked the miraculous economic growth as well as full-blown, nation-wide market reform. If national planning and Marxist social sciences were ideological commitments of Communist China prior to 1978, market coordination became the new orthodoxy after the Opening and Reform.

Observations on the enterprise level, however, would not support the line of argument described above. The findings of this study contradict the analysis on the macro level. Market coordination, expressed in terms of “horizontal economic relationships” or “horizontal economic integration”, was a direct outgrowth of enterprise-level contractual coordination that emerged during the Specialization and Coordination Movement in the 1960s. Efforts to grapple with the challenges of specialization and coordination began as early as the Great Leap Forward, when individual factories turned to the complete factory model or the diversified complete factory paradigm to fill in incomplete supply chains on their own. It was only through close-up examination of changes on the enterprise level from journalistic discourse that conclusions drawn above were possible.

In addition to shedding light on the market reform in 1978, this study offers new perspectives on the Great Leap Forward in the 1950s and the Cultural Revolution in the
1960s. The GLF had been traditionally viewed as a series of irrational and purely ideological driven campaigns to industrialize the country at an unrealistic pace. This thesis, however, demonstrates that in addition to massive collectivization and the establishment of people’s communes all over the country, important business decisions were being made on the enterprise level. Chinese economic actors recognized the need for coordination, but in light of poor transportation infrastructure and incomplete supply chains, producing all the required materials and intermediate goods in-house seemed to be the logical solution. In other words, backyard furnaces might seem irrational in today’s context, but during the GLF, they could be understood as pioneers in the model of integrated iron and steel enterprises that combined the process of iron refining, steel making, steel rolling and the production of a variety of steel products. They not only met local demand for steel, but also tackled the problem of coordination internally within the enterprise. Therefore, as early as in the 1950s, efforts to tackle problems of business development were made, and they had profound implications for the Chinese economy in later years.

This thesis also highlights the degree to which the Cultural Revolution represents a setback to China’s economic development. Historians had noted the economic stagnation of China during the Cultural Revolution and that the movement had not only important political implications, but economic ramifications as well. This study confirms the appraisal of the Cultural Revolution as a disruption and setback to China’s overall "modernization” and emphasizes that the positive trajectories emerging after the Great Leap Forward were reversed due to the disruption. Recall that the Cultural Revolution disrupted and dismantled the Specialization and Coordination Movement, during which enterprise-level contractual coordination was promoted as the new business model in lieu of complete of complete factories and diversification. Discussions on enterprise-level
coordination also led to the organization of fairs ("coordination conferences") and the use of contracts. Chinese economy had been on the threshold of market coordination in the 1960s. Had the Cultural Revolution not taken place, market reform could have unfolded in China a decade earlier than 1978.

By 1980s, Chinese economic writers not only discussed extensively the topic of market coordination, they also started to explore the ramifications of "administrative coordination" in developed capitalist economies of the kind described by Alfred D. Chandler.¹ They recognized that market coordination was not perfect, and that the emergence of trusts, monopolies, syndicates, and konzern- or zaibatsu-style multi-unit enterprises characteristic of "managerial capitalism"² could be more efficient ways of improving enterprise-level coordination. In other words, the rise of what might be regarded as planning in Western capitalist economies, implicit in the idea of "administrative coordination," was of particular interest to Chinese economists as well. The convergence of capitalist and socialist coordination in this emerging line of thinking offers possibilities for further research.

¹ Discussions on administrative coordination can be found in Alfred D. Chandler, The Visible Hand: The Managerial Revolution in American Business (Cambridge: The Belknap Press of Harvard University Press, 1977), pp. 7-8, 11. Chandler also provided a comparison between administrative coordination and market coordination (pp. 208, 453, 383), as well as the emergence of administrative coordination in the machinery-making industries (pp. 309-312).
² Chandler discussed the phenomenon of managerial capitalism in The Visible Hand on pp. 491-493, 497-498.
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