



Emergence of service-oriented manufacturing-experiences of world main manufacturing countries

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Article History

Received 08 March, 2016
Received in revised form 29 March, 2016
Accepted 04 April, 2016

Keywords:

**Manufacturing,
Service industry,
Industrial
development.**

Article Type:

Review

ABSTRACT

Debate about the priority of whether to develop service industry or manufacturing has been lasting for over 20 years. In recent years, there is a clear tendency that more emphasis has to be laid on service development. This paper reviewed the debates and analyzed the footprints of industrial development in the most advanced countries of the world. The results have demonstrated that in take-off period, almost every country chose manufacturing industry as the priority. Looking back to history, it is clear that the development of manufacturing industry is a key benchmark to decide a country's overall strength and its position in the world. At present, China puts manufacturing industry as the first priority in its economic development. Meanwhile, China must keep a sharp eye on the crises of manufacturing transfer and take the historical opportunity to speed up the development of service-oriented manufacturing.

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INTRODUCTION

Chinese manufacturing has been gradually losing its advantages and facing challenges from new emerging economies like India, Brazil and Vietnam; due to the continuous increases of labour cost and the appreciation of Chinese yuan (RMB). These countries seem to have more advantage and they have the tendency to replace the position of Chinese manufacturing. The over consumption of energy and resources makes China to consider the sustainability of development. In such cases, service industry has to be put to the agenda either in academic field or at government level.

One main stream opinion thinks that the development of traditional Chinese manufacturing is not promising in the future and Chinese economy and manufacturing must be transformed. Service industry should become a new engine for its economic growth. However this view has been doubted.

It must be admitted that, which industry to choose as the new engine for economic development, is a prudent

problem and should be considered seriously. Taking these issues into consideration, the report gives a retrospect to the debates on service or manufacturing from the perspective of academic research. The experiences of the industrial countries have been traced and analyzed. The reasons why industrial countries have been developing so fast and have established their overwhelming position in the world economy, have been dug out. Based on the historical analyses, the review proposes that speeding up the development of service-oriented manufacturing is an effective and efficient way for China to meet with the crises and maintain its sustainable development.

ROUNDS OF DEBATES ON SERVICE AND MANUFACTURING

Retrospect to the debates

Since 1978, debates about tertiary industry have been experiencing three main rounds which match the different

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Table 1. Statistical data about service development (a selected part).

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Core Journal containing “the Third Industry”	2	13	2	1	17	186	106	41	21	11	10	24	109	155
All Journal Paper captioned in “the Third Industry”	2	17	5	1	20	247	140	63	32	20	15	38	195	297
Core Journal containing “Service Industry”	11	9	10	9	12	24	15	19	13	7	11	10	16	20
All Journal Paper captioned in “Service Industry”	11	9	12	12	13	35	21	26	17	11	16	15	23	38
Core Journal in Total	13	22	12	10	29	210	121	60	34	18	21	34	125	175
All Journal in Total	13	26	17	13	33	282	161	89	49	31	31	53	218	335
Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Core Journal containing “the Third Industry”	81	60	104	26	22	23	28	32	34	44	34	45	34	27
All Journal Paper captioned in “the Third Industry”	309	250	177	104	114	98	111	115	135	143	102	116	105	103
Core Journal containing “Service Industry”	33	37	53	40	41	45	81	82	101	116	172	210	284	342
All Journal Paper captioned in “Service Industry”	138	140	166	156	171	192	250	270	429	419	466	625	816	1220
Core Journal in Total	114	97	157	66	63	68	109	114	135	160	206	255	318	369
All Journal in Total	447	390	343	260	285	290	361	385	564	562	568	741	921	1323

Source: China Journals Collection Yearbook.

stages of Chinese economic development.

In the course of the economic development in China, whenever Chinese economy meets setbacks, the service development will become a hot topic in academic and government's discussions.

From the articles relating to service industry released in core journals and all other journals demonstrated in Table 1, it can be observed that debates on the development of service industry has experienced three most important rounds in 1985, 1994 and 2005, respectively, which has demonstrated that for about every ten years, there would be a round of debates on service industry. The following will be the analyses on such phenomenon, based on the economic background of each round of debate.

The first round of debate around 1985-liberation of mind

From the reform and opening up in 1978 in China to 1984, the economic reform was mainly conducted in the countryside. The key problems solved in this period are the property ownership and the distribution mechanism. Since 1984, the reform has been spread from the country side to the cities, which marked the more wide and comprehensive reform and opening in China. During the course the adjustment of the reform policies, for the sake of improving the economic structure and enlarging the employment, service development has been put into the agenda. The State Council has proposed the development of tertiary industry in the national development

scheme. While investigating the economic development in Shan'dong Province, Yao'bangHu, the Party General Secretary pointed out that “in order to create a fresh and vigorous economic environment, it is a better way to develop tertiary industry.”¹

The second round of debate (1992-1995)-the outcome of the severe economic crises

The first round of debate about the development of the tertiary industry has wiped out the blocks in

¹ HAN Jie<on the development of tertiary industry for the increase of social economic effectiveness, Journal of business Research >, No. 7, 1985

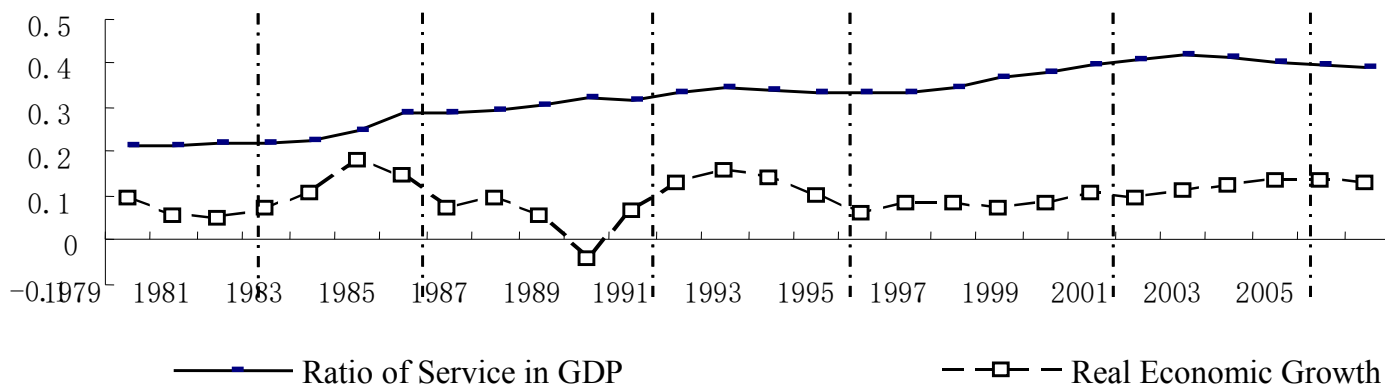


Figure 1. Ratios of service industry and real economic growth in China during 1979-2005. **Source:** China Statistics 2007.

theory and operation, which resulted in the increase ratio of tertiary industry in the total gross domestic product (GDP). However, in the early 1990s, due to the vicissitudes in the reform of political mechanism, there appeared some problems in the economic development. Specifically, the growth rate was slow and there were severe inflation. In 1992, Mr. Deng Xiao'ping paid a cruise to south of China. Deng's speech in south of China has pushed forward the steps for further reform and opening up in China. With the increase in the growth rate, the problem of imbalanced industry structure was even more serious. In June 1992, the Central Government and the State Council have announced the formal stipulation for speeding up the development of tertiary industry and advocated that the ratios of tertiary industry should surpass that of the first and second industry (the first industry was also called agriculture and the second industry was also called the heavy industry or manufacturing industry). The purpose for it was to raise the ratio of tertiary industry and accommodate more employment so as for China to keep abreast with the level of developing countries in GDP and total number of labor force². In December the same year, the State Council announced the conference for speeding up the development of tertiary industry and from January 2 to January 11, 1993, the State Planning Committee announced the forum for speeding up the development of tertiary industry. Following that, a new round of debate about the development of tertiary industry initiated again in the academic circle in China.

After the second round of debate about the development of the tertiary industry, in the 1990s, the economic situation has been bettered from the indication of the following aspects: exportation was expanding, large number of FDIs flew into China and very generous cheap labor force. All these have helped the development

of manufacturing in China and the growth rate was increasing substantially. The ratios of tertiary industry in total GDP has been raised magnificently as can be seen from Figure 1.

The third round of debate (2002) which was the outcome of the globalization

Following the year 2000, economic development in China has embraced another new peak, but there are also some problems. The main problems can be summarized as: a) the investment scale on the fixed assets which made the economic growth have a heavy dependence on the investment; b) the surprisingly rapid growth in manufacturing has brought lots of ill-effects as severe pollution, high consumption of energy and resources and thus how to maintain sustainable development has become another problem; c) the ratios of tertiary industry in total GDP has been decreasing which resulted in the imbalanced economic structure; d) the increases of labor cost and the appreciation of RMB currency have resulted in the decrease of competitiveness in manufacturing; e) owing to the imbalanced industry structure, there appeared serious inflation problem. These problems have pushed academic scholars to think about the economic development mode based on the low labor cost.

This round of debate also contains different voices, which mainly indicated as follows: a) taking into account the development stage of Chinese manufacturing, one group of scholars stick to the view that China is still a developing country which is far away to say goodbye to the manufacturing. Such as, Gang FAN, a Chinese scholar warned that Chinese manufacturing is far beyond mentioning transformation³ and China should be alert to the blankness of manufacturing in its economic

²<History of Chinese Economics>, compiled by WU Li, Chinese Economics Publishing House, Beijing, 1999: p1098

³ FAN Gang <lack of manufacture may lead China to a hollow industry>, Leader's decision-making information, No. 3, 2003

Table 2. Retrospect to discussion about the development of service industry.

Rounds	The first discussion	The second discussion	The third discussion
Time	1985 Approx	1992-1996	After 2001
Scenario	Deepen the reform, better economic structure and solve unemployment	Severe economic pressure and inflation, high demand for employment	Insufficient domestic demand, inflation, high investment in fixed assets, increase of labor cost, appreciation of exchange rate, large consumption of energy and pollution; manufacturing industry needs transformation and global trend to develop service economy
Main theme	Basic theories on tertiary industry; statistical system and service development strategy	How to develop tertiary industry nationwide	Tackle manufacturing transformation, adapt to international trend, features of tertiary industry and the basic theories of service-embedded manufacturing
Features	Liberation of mind, government-oriented economy and pressures from unemployment	Government-oriented, wide range and multi-layers without a clear goal. For the first time appeared hi-tech services	More clear objective, discussions about service industry are more concrete (production-oriented service), wide range of topics the themes (relating to economics, elasticity of employment, geographic distribution and development strategy). Discussions are more objective and scientific
Problem solution	For the first time set up the theories for developing tertiary industry in China; for first time clarified statistical mechanism of service industry; service industry is seen as a key part in economy though service mainly refer to consumption area	Nationwide investigation into tertiary industry; tertiary industry development schemes for long-term strategy has been established all over China all kinds of industries	The theory development of tertiary industry has been founded based on the modern economics; various issues relating feature of tertiary industry have been discussed. Service has been seen as a branch of science
Milestones	In 1985, the State Council proposed the scheme plan for developing tertiary industry; Hu'yaobang reiterated the importance of tertiary industry and the first session of forum on tertiary industry was held	In 1992, The Central Government proposed to develop tertiary industry; in December, the State Council held conference on speeding up the development of tertiary industry; in January 1993, the State Planning Committee held forum for speeding up the development of tertiary industry and the first census on tertiary industry was held the same year	Production-based service has been clearly stated in The 11 th Five-Year Plan; in the work report of the 17 th commission of the central government, speeding up the development of tertiary industry has become a hot slogan
Outcomes	Ratio of tertiary industry in GDP increased.	Ratio of tertiary industry in GDP increased.	From 2001 till now, the ratio of tertiary industry is decreasing.

Source: Compiled by the authors.

development; b) the economic features of service industry calls for further discussion, such as the doubt on the capacity of labor force transfer originated from service.⁴

⁴ WEI Zuo'lei<Can services shoulder the heavy load of labor surplus in China>, Journal of Fiscal and Trade Economics, No. 11, 2006

Features and principles of the three rounds of debates

Table 2 has summarized and compared the three rounds of debates on the development of tertiary industry. We can find there are some principles:

1) Time span: it indicates clearly in Table 2 that there is a

ten year time span between one round of debate and the next one;

2) Driving forces for the emergence of the debate: the appearance of each round of debate has its own unique characteristics which are closely related to the economic and social settings of that time. The general principle is: whenever there appeared the problems relating to economic momentum (as in round 1 and 2) or structural problems (as in round 2 and 3), tertiary industry would be presented as a life-straw to solve the economic problems;

3) The government plays a key role in the rounds of debates: the first and second round of debates is almost all oriented by the government. In the third round of debate, because of the international background, the role government plays has weakened, but by the time when the third round of debate started, in the 10th five-year plan, government has placed development of tertiary industry into its plan, which is another indicator of government intervention in the debate;

4) The outcome that the ratios tertiary industry occupied in the total GDP is not so significant: from each round of debate about the development of tertiary industry and ratios that tertiary industry accommodates in the total GDP, we can find that even though the debate is heated, the final result does not match the degree of the debate. After the first and second round of debate, the ratios of tertiary industry in total GDP increased slightly, but after the third round of debate, the ratio of tertiary industry in total GDP not only did not increase but on the contrary decreased. To sum up, the three rounds of debates and the government scheme for developing tertiary industry do not reach the expected consequences. Reasons for causing such an embarrassed situation lie in two aspects: 1) from the perspective of economics, since China has large surplus of cheap labor force and has the opportunity to accommodate the international manufacturing transfer, Chinese manufacturing has developed very swiftly, which dwindled the role that tertiary industry plays in the economic development; 2) to speak from the perspective of policy assurance, though each debate about the development of tertiary industry is very hot, and government also plays a proactive role in it, there lacks concrete policies and favorable motivational mechanism to encourage the development of tertiary industry. Additionally, there are profound economic reasons. All these work as a joint force which hinders the development of tertiary industry.

The inspirations from the previous debates

Based on the aforementioned, we can get the following three conclusions and enlightenment.

The debates are normally in great complexity and lasting for a long time: Though in each debate, there

achieved consensus that tertiary industry plays an important role in the economic development, there are always doubts and questions as well as retrospect there due to the development stage and the complex situation that China faces. Discussion on this questions call for prudent analyses.

The option of industry structure is a natural course:

Though in each debate, tertiary industry has been bestowed with great expectation, but the fact has shown that in the last 20 years, all efforts in developing tertiary industry has never obtained a remarkable outcome. Due to the pressures from natural, social reason as well as keeping abreast with the global trend, Chinese manufacturing development has obtained great success superficially which has become an engine for the overall economic development. This has demonstrated that government behavior can result in some effect in regard to the overall national industry structure; but for the industry structure of a big country, the role that government plays is rather weak. The rational industry structure has to be determined by the national, social conditions and the development stage that a country is standing. According to the historical experience, countries with \$5000 per capita income will accommodate a substantial development in tertiary industry.

The effectiveness of government efforts: From the current data, it is obvious that government efforts may not go along with the expected results. But we should admit that government efforts have laid a solid foundation for the development of tertiary industry in aspects as follows: the establishment of statistical system, service census, the sponsorship for service research and the public propagation for advocating new ideas, etc. However, as regards the economic policy support, like favorable policies in taxation, financing, the effectiveness of government efforts and academic orientation are not sufficient enough. The option of service and manufacturing VS the shift of overall strength of a country.

Table 3 is a crisp demonstration of the option in service and manufacturing as well as the correlation with the rise and fall of a country's overall strength. To be specific, after the great geographic discovery in the 15th century, there appeared three rounds of shifts of super nations in world civilization. They are: a) the great geographic discovery made the rise of Spain; b) the rise of the UK with the emergence of the first industrial revolution; c) the rise of the USA due to the second industrial revolution and the termination of two world wars. After the world wars, the competition among countries in overall strength is mainly derived from the adoption of high technology.

Table 3. Transformation of manufacturing to service: A worldview.

15 th century, Global trade services in Spain ↓	Early 20 th century, Global trade and service in the UK ↓	Middle of 20 th century, global trade and services ↓	In 1980s, financial service and real estate developed fast in Japan ↓	Early 21 st century, advanced countries service penetrated in various kinds of industries
17, 19 th century, the emergence of UK in manufacturing	Middle of 20 th century, innovation on manufacturing mode in USA	1970s and 1980s, Japan and Western Europe were strong in manufacturing and advanced manufacturing mode	In 1980s and 1990s, USA launched advanced manufacturing plan, hi-tech manufacturing and enhanced services in manufacturing	Early 21 st century, What about service development in China?

Table 4. Typical strong manufacturing countries in history.

Country	UK	USA	Japan
Booming period	End of 19 th century	Middle of 20 th century	1970s and 1980s
Ratio of manufacturing in booming period (%)	25	62	15
Features in booming period	Overwhelmingly dominant	Overwhelmingly dominant	Overwhelmingly dominant industrial process has overwhelming dominance

Source: British Data comes from <the Rise of Advanced Countries> by Paul Kennedy Translated by Bao'cun Wang et al. Qiu'shi Publishing House, 1988: p181; American Data comes from <Economic History of Europe and the USA> by Yan'de XIA, Shanghai San Lian Publishing House, 1991: p718; Japanese Data comes from World Bank Database (www.worldbank.org).

EXPERIENCES AND REVELATIONS FROM THE ADVANCED COUNTRIES

Based on the above analyses, we can get the following revelations and inspiration:

- **Manufacturing development determines a country's overall strength:** From the shift of super powers in the world, it is obvious that a country's manufacturing strength determines its preliminary strength and its international position. When manufacturing is strong, the overall national strength is powerful, vice versa. Taking the USA for example, though American manufacturing only took up 16% of its total GDP, it occupied 70%⁵ of the American exportation. Therefore, though the ratio of tertiary industry takes up a large portion of its total GDP, USA never let free its monitoring and controlling on its key manufacturing industries.
- **Whenever manufacturing develops to a certain stage, there are dangers for dispersion and transformation:** No matter in the UK, USA or Japan,

when the manufacturing development reached its peak, the profit derived from manufacturing would decrease, the profits derived from trade and service would relatively increase, which would cause the capital investment shift from manufacturing field to service sector and thus resulted in the decrease of the overall national strength. In the severe international competition, it would lose its international position. After 20 years of speedy development in manufacturing, China now also meets with its bottleneck and crises for further development in manufacturing due to internal and external pressures. Therefore, special attention should be paid to the shift of manufacturing, upgrading of industries and the evaluation on the option of tertiary industry as the new development strategy.

As stated above, decision on which industry to be put as priority for development should not only consider the economic effectiveness but also consider the historical positioning and the overall strategy. China presently is on the increasing of its national strength which has been brought by its manufacturing. At the moment, China's manufacturing only takes up 8% of the total in the world. Such shabby and shy share is far more from that of the advanced countries in the world history being renowned

⁵Calculated as per the Chinese Year Book 2004, Chinese Statistics, Beijing, 2004

Table 5. Manufacturing ratios of major manufacturing countries in world total (2005).

Country (region)	USA	Japan	China	Germany	Europe
Manufacturing ratios in world total (%)	22.50	10.80	8.50	6.50	21.10

Source: World Bank Database (www.worldbank.org).

Table 6. Countries with average income \$3000 Per Capita VS. China's Service Ratio.

Country	Per capita GDP	Service ratio (%)	Country	Per capita GDP	Service ratio (%)
Brazil	2953	56.80	Mauritius	3738	62.47
Turkey	2119	60.60	Venezuela	3760	44.58
Argentina	2894	68.50	Malaysia	3915	42.39
Bosiwana	3031	50.80	Lithonia	3969	57.97
Jamaica	3062	62.81	China (2002)	1135	41.00
Uruguay	3645	67.21	China (2006)	2017	39.17

Note: figures are calculated based on World Bank Database (2002), China's Data from (China Statistic Year Book 2007).

as the world factory (Table 4). China is also far beyond the title of manufacturing super power (Table 5). Under such occasion, whether China has already come to the point for its transformation or whether it should implement service as the main economic mode really calls for careful consideration and prudent meditation.

There is a popular viewpoint: from the horizontal comparison worldwide, countries with per capita income of \$2000-3000, the ratio of tertiary industry takes up 50% of the total GDP, but China only takes up 30% of its total GDP, which has a great gap⁶ as against that from the normal practice in the world. Quite a number of scholars have approved this viewpoint. This simple fact only indicates that the ratio of tertiary industry in China is low in its total GDP, but if we investigate the countries compared (Table 6), taking Turkey, Argentina, Botswana, Jamaica, Latvia, Uruguay, Venezuela, Malaysia and Lithonia for example, which of these countries can be called influential countries in the world as regards the income? We can say the rise of a super power should follow its own unique way, it is useless and does not make sense to have simple comparison and contrast. There is no way to be totally imitated in the world.

Under such circumstances, academic circles have proposed a new concept--- service-oriented manufacturing based on the experiences of the world economic development and the reality of Chinese situation. This new concept in theory is trying to describe the relationship between service and manufacturing.⁷

⁶ Refer to <the comparison between per capita income of Chinese and those whose are around USD 3000>, Journal of Chinese overall state and national strength, No. 2, 2004

⁷Lin'yan SUN, Gang LI,et.al<New manufacturing model of the 21st century-service manufacturing>, Journal of Chinese mechanical engineering, No. 19, 2007

The historical experiences testified that the country which develops its manufacturing well will become powerful in the world. Taking into account of the overall national strength, China should still persist on developing its manufacturing, esp. develop service-oriented manufacturing as a new production mode so as to achieve the balance between the overall national strength and rational economic structure.

CONCLUSION AND FUTURE RESEARCH

This paper has reviewed the three rounds of debate about service and manufacturing in China. Through analyses on the three rounds of debates, we think the discussion of industry development is to be put into a comprehensive scenario which includes the internal, external, natural, social conditions as well as the development stage, government behaviors and supplementary policies and institutions; the paper has reviewed the rise and fall of the once advanced countries and the correlation between a country's rise and fall as well as its choice of industry for priority development have been pointed out; the emergence of service-oriented manufacturing and the integration of service and manufacturing have been investigated. Future researches in this field should consider from the following two aspects:1) Empirical studies and quantitative researches should be embraced to provide a dynamic prediction and monitor to the development of Chinese manufacturing; the evaluation on the development of service and manufacturing should also be dynamic and rational; 2) theoretical interpretations and economic analyses should be warmly welcome for the explanation of service-oriented manufacturing strategy, as well as the upgrading

of Chinese manufacturing and its path analyses.

Main knowledge contributions of this paper

- This paper has reviewed the three rounds of debate about service and manufacturing in China. The background information, the features and influences of the debates have been revealed. Through analyses on the three rounds of debates, we think the discussion of industry development is to be put into a comprehensive scenario which includes the internal, external, natural, social conditions as well as the development stage, government behaviors and supplementary policies and institutions;
- The paper has reviewed the rise and fall of the once advanced countries and the correlation between a country's rise and fall as well as its choice of industry for priority development has been pointed out. Option of service development may evade the attention to the manufacturing development which may result in the decrease of overall national strength and the international position. Therefore, to speak from the overall national development strategy, it is still better for China to develop its manufacturing so as to enhance its national strength;
- The emergence of service-oriented manufacturing and the integration of service and manufacturing have been investigated. Based on the analyses, we have found that implementation of the service-oriented manufacturing may be the right strategy for China to choose if China wants to solve its problems existed in its manufacturing development. It is not only effective to solve the current problems, but also considers the national strategy as a whole. In conclusion, China should adopt the service-oriented manufacturing strategy as soon as possible with its utmost efforts.

Future researches

Future researches in this field should consider from the following two aspects:

- From the perspective of the debate between service and manufacturing: comprehensive analyses are required to investigate the inherent features of service and manufacturing and at which the stages that Chinese economy is. Empirical studies and quantitative researches should be embraced to provide a dynamic prediction and monitor to the development of Chinese manufacturing; the evaluation on the development of service and manufacturing should also be dynamic and rational.
- From the perspective of service-oriented manufacturing: theoretical interpretations and economic

analyses should be warmly welcome for the explanation of service-oriented manufacturing strategy, as well as the upgrading of Chinese manufacturing and its path analyses.

Which industry a country should choose to develop, profitability and effectiveness can never be the only criterion to judge. The historical evidences have demonstrated that manufacturing determines a country's rise and fall as well as its overall national strength. If a country is strong in manufacturing, the country itself will be strong; vice versa. From the experiences of the developed countries, we can say that from the shares that manufacturing accommodates in China's total GDP, it is far from being labeled as the world factory; it is also far behind the time to throw away the development of manufacturing and develop pure service industry. Either from the share that manufacturing takes up or from the quantum that it holds, China still has a long way to go to become a big manufacturing country. In the next scores of years, it is a shame for China to become a second-class super nation in the world. It should have the ambition to become the first-class super country in the world. From this point, we can say that manufacturing in China should not be lessened but should be enhanced. The development of Chinese manufacturing should be strengthened but not be weakened. Recently, most of the Chinese government leaders paid frequent visits to the manufacturing enterprises to investigate the problems which is a signal that weakening of Chinese manufacturing may result in serious consequences⁸.

To speak from the fact, the crises that China faces today are not the fault that China has chosen manufacturing as its priority for development. The problem lies in that China's manufacturing calls for technological reform, industry upgrading and innovation.

The world economy has entered a new epoch-service economy. In such a fad and fashion wave, China should keep abreast with this trend and implement service-oriented manufacturing as its national strategy. Through the integration of service and manufacturing, service will be enhanced along the whole value chain and existent problem in manufacturing development in China will be solved, such as energy consumption, pollution, profitability, innovation, etc. so that China will accomplish a great leap forward in its manufacturing development as well as its whole economic development.

ACKNOWLEDGMENT

The authors of this article extend their sincere thanks to the sponsorship provided by Projects GJY-2015-YB-17

⁸ Four leaders from the Central Government visited 5 provinces along the coastal area in five days aroused the wide attention of the public www.people.com.cn

and 2016SY04 of Xi'an University of Science and Technology.

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