International Journal of Economics and Finance
www.ccsenet.org/journal.html
Vol. 1, No. 2
August 2009

Producer Service and the Added Value of Manufacturing Industries, An Empirical Research Based on Various Industries of Different Countries

Xiaojing Zhang
School of Management, Dalian University of Technology
Dalian 116023, China
E-mail: llczxj@hotmail.com

Abstract

This article makes an analysis in the mechanism that how producer service promotes the added value of manufacturing industries. Producer service is regarded as an important source of scare factors for value creation in manufacturing. Therefore, the rapid development of producer service leads to cost cut and efficiency promotion in manufacturing industries. Added value rate is then chosen as the measurement to the influence of producer service on manufacturing. An empirical research is made based on data from China, the Czech Republic, France, Japan, South Korea, Norway, the United Kingdom and the United States. It shows that more producer service is used as an input, higher rate of added value can a manufacturing industry gain from it.

Keywords: Producer service, Manufacturing, Added value

1. Introduction

Producer service is defined as the intermediary services provided for the production of other products or services, including R&D service, finance and insurance, logistics, management and engineering consulting, legal service, accounting, communications and information services, exhibitions, marketing, engineering and product maintenance, training, and real estate, and so on.

It is regarded that the rapid development of producer service owes to service outsourcing, which means that firms or plants buy from external market the intermediary service they needed. It is also called vertical decomposition, which means the service sector in a firm is separated from it. In a few researches, the definition of producer service also includes those from internal sectors, but in this paper only the external services are considered. The most outstanding characteristic of producer services is the wider application of modern information technology and advanced management tools. In other words, it is the knowledge intensive or technology intensive services, so it has been called in many papers as Knowledge Intensive Business Services (KIBS).

With the development of producer service, great changes have occurred in world economy. After World War II, especially since the 1970s, the developed countries have experienced "service revolution" one after another, that is, the proportion of the services in national output and employment rising rapidly, and become a leading industry of the national economy instead of manufacturing. Some developing countries, India for example, also have experienced such a revolution. There are three reasons to explain this.

1) Changes in demand. Clark (1951) found that the proportion of the service industry in GDP will increase as per capita income increases, because income elasticity of demand of service industries is larger than 1.

2) Difference in productivity. Baumol(1967) pointed out that the growth rate of productivity in service industry is slower compared with manufacturing, thus the cost of services increased substantially, resulting in the proportion of the services sector in GDP increased dramatically.

3) Service outsourcing. Fixler and Siegel (1999) pointed out that the growth of the service industry is an important reason that the original in-house production of service activities are externalized and become an independent industrial sector.

These three explanations are all supported by empirical researches. However, recent studies have shown that, producer service as intermediate inputs is the main source of growth in service industries. For example, according to the data of financial, telecommunications, business services (FCB) industries of some OECD countries , Guerrieri and Meliciani (2005) pointed out that from the mid-1970s to the 1990s, the final demand of FCB industry grew only 1.0 percent annually, but an average annual growth rate in intermediary demand high up 5.12 percent.

The significance in the development of producer service is the positive impact of other industries of national economy, especially the manufacturing sector. UNCTAD believed that the service industry is associated with other economic activities, so it has far-reaching implications on the country's economic performance.

Riddle pointed out that business revolution is the prelude and pioneer to industry, and service innovation has become the support of the industrial revolution. For example, the emergence of professional research activities, improving the educational system, the mode of transport and the emergence of financial innovation provide a solid foundation for the industrial revolution. Therefore, Riddle proposed, the increase in share of services is not the result of economic growth, but the reason for economic growth. Here, UNCTAD and Riddle obviously refer to producer service.

2. The Effects of Producer Service on Manufacturing

Production of the impact of the services sector to the manufacturing sector is an extensive discussion on the existing problems. Traditional theory related to the service and manufacturing sector is the development of the turn. Economic development followed the evolution of industrial structure, secondary and tertiary industries step by step transfer of stairs. From the industrialized development stage, it has undergone several stages of the following: (1) the pre-industrial era. During this period, the primary industry accounted for a dominant position, the secondary industry has developed to a certain extent, the status of the tertiary industry minimal. (2) The early industrialization. During this period, the value of the primary industry in the proportion of the national economy gradually decreases, the declining status of the second industry to greater development of industries from light industry-oriented focus on gradually shift the basis of industry-dominating, the secondary industry dominates. Thirdly there is a certain industrial development, but the proportion in the national economy is still relatively small. (3) medium-term industrialization. During this period, the focus from basic industries to high processing industry in transition, the secondary industry remained No. 1, and the tertiary industry increased gradually. (4) Post-industrialization. During this period, the proportion of secondary industry continues to decline, and the rapid development of the tertiary industry, the fastest growth of the information industry, the proportion of the tertiary industry output in the three industries in the dominant position, and even has an absolute dominance. (5) Post-industrial period, at this stage, the main characteristics of knowledge-based industries.

Since the 1970s, the rapid development of the service industry caused people to rethink the relationship between services and manufacturing. As Rowthorn and Wells(1987) feels that the manufacturing sector is prerequisite for the development of services and infrastructure, the manufacturing sector added to services, many of the services sector's development must rely on the development of the manufacturing sector; manufacturing output of the service industry is an important sector demand. If there is no manufacturing, there would almost be no demand for such services. Pappas feels that the production of services to improve the productivity of the manufacturing sector is the prerequisite and basis for the production of under-developed services sector, can not form a strong competitiveness of the manufacturing sector, through deepening labor specialization or reduce the manufacturing sector into the middle of the cost of services such as channels, the expansion of the services sector will enable the manufacturing sector receipts, and constantly raise the level of professionalism, promote labor productivity increase is the driving force. Park feels that the services and manufacturing sector for the performance of interaction, interdependence and common development of the complementary relationship.

With the enhancement of economic development, the degree of services and manufacturing rely much on each other. On one hand, the production of services depends on the development of manufacturing sector. Most of the production of services is supporting production activities, a considerable proportion of their output is the production of the manufacturing sector in the middle demand, the development of the manufacturing industry, it lost the source of demand; On the other hand, from the benign development of the manufacturing sector is not Production of the strong support services, production services to improve manufacturing productivity and value-added products. Production of professional development, strengthening the production and operation of enterprises in vertical and horizontal linkages strengthened and deepened their mutual dependence and increase the financial, transportation, communications, advertising, consulting and maintenance, and other services. Therefore, the efficient production of services is in the manufacturing sector, raising labor productivity; enhance the competitiveness of products and the protection of the premise. In addition, Economic Geography studies show that the production of the service sector to manufacturing industries has an important impact on the layout. Marrewijk and Stibora(1997) and other studies show that the manufacturing sector of a country's international competitive advantage not only determined by factor endowments, but also determined by the level of development of the service industry.

At the micro level, many researches have found that manufacturer and producer service provider depend on each other in many aspects. Outsourcing Association of the United States has made a summary, see Table 1. In this analytical framework, the basic tactical advantage is the ability to reflect, is a core strategic advantage of the ability to reflect, and revolutionary advantage can be regarded as advantages of dynamic capabilities.

Insert Table 1 Here

3. An Empirical Research

3.1 Assumptions

Empirical research, related to the influence of manufacture resulted from product-service industry, currently

concentrated mainly in the manufacturing efficiency (output per capita), the international competitiveness of the manufacturing sector (exports), and other indicators like that (Kevin O'Connor, 1996). Here we choose the increasing data rate as a measure of indicators. That is because product-service industry and manufacturing industries are in the different countries and regions and what we care most is the occupying rate of each country which is so-called increasing data rate.

Theoretically speaking, product-service industry contribute much to the development of the manufacturing industries and it can increase the rate of manufacture which is called ”industry-related effect ”as follows, but there are two issues we should not neglect:

Fist, product-service industries mainly refers to the knowledge and technology intensive industries, and therefore the production got higher returns. However, the relatively pure manufacturing sector is capital and labor-intensive industries, and therefore we got low returns. Shi put forward the famous "smile curve” theory based on the computer industry, see Figure1. In the value chain, the proportion of manufacturing sector is lower than before, while the proportion of producer service industries is growing.

Second, from a statistical point of view, the manufacturing enterprises provide internal support services sector, including the value created in the manufacturing enterprise. If manufacturers outsource production services, the manufacturing sector will be as intermediate inputs and did not enter the manufacturing value added. As a result, manufacturing value added declined called "statistical effect." With the production of the service industry outsourcing more and more prevalent and with the value of the transfer and the role of statistical effect, the creation of the value of the manufacturing sector may also decline.

Therefore we have the following two assumptions:

H_1: More outsourcing of producer services leads to lower rate of value-added manufacturing, which means value transfer and statistical effects in excess of correlative effect among industries

H_2: The more Outsourcing of producer services, the higher the rate of manufacturing value-added, which means correlative effect among industries in excess of the transfer of value and statistical effects.

Insert Figure 1 Here

3.2 Model and Data

There are two standards in defining producer services In Empirical Research. One is defined by the type of industry, such as financial services, logistics, business services, research and development, and real estate, and so on. The advantage of this way is that data are easy to collect. But the problem is that some of these industries also provide personal and consumer services, just like personal financial services and residential real estate, making the data not accurate. The other definition follows strictly to producer services: Being the non-ultimate consumer services for intermediate inputs, this service should be a producer service whichever specific service it belongs to. Though being accurate, this approach depends on the input-output table when getting data. And, we must adopt value-type input-output tables instead of physical-type, dues to the difficulty in calculating services. For statistical techniques constraints, input-output tables generally lag behind the release of a number of years, and input-output tables are not made every year in many countries.

This article adopts the second approach, analyzing the impact that producer services have in manufacturing value creating on the basis of input-output tables. Input-output tables are from the Organization for Economic Cooperation and Development (OECD), the official statistics of its member states and important non-member countries or regions.

Establish the model of Empirical Analysis:

$$AO_{ik} = \alpha_{ik} + \beta SI_{ik} + u_{ik} \,. \tag{1}$$

AO_{ik} is added-value rate of i industry in country k (equals to the proportion of added-value in total industrial output); SI_{ik} is the country k 's intermediate inputs of manufacturing sector ,there is also the proportion of producer service in all intermediate inputs:

$$SI_{ik} = \frac{\sum_{j=1}^{m} I_{jik}}{\sum_{j=1}^{n} I_{jik}} \tag{2}$$

Which I_{jikt} is the intermediate input of j industry sector to i manufacturing sector in country k ,There are a total

of n as input of industry sectors, among them the services sector number is m; According to the OECD statistics framework, n=40 (Sectors No. 1 ~ 40),m=14 (Industry Sectors No. 27 ~ 40).

OECD statistics in selected manufacturing integrity of the system a total of eight countries, they are China, Czech Republic, France, Japan, South Korea, Norway, the United Kingdom and the United States. In the OECD reunification of the input-output tables, the manufacturing sector, a total of 22 (Industry Sectors No.3 ~ 24), which are: food and beverages tobacco industry, textile, wood products manufacturing, paper products and printing industrial, coal, coke, oil refining and nuclear fuel industries, chemical products (excluding drugs) industry, pharmaceutical manufacturing, rubber, plastics manufacturing, other non-metal manufacturing, iron and steel industry, non-ferrous metal manufacturing, metal component manufacturing, machinery equipment manufacturing, stationery manufacturing, electrical equipment manufacturing industry, radio and television communications equipment manufacturing, medical, precision and optical equipment manufacturing, automobile manufacturing, shipbuilding and ship-repairing industry, aerospace industry, railways and transport equipment manufacturing industry, manufacturing recovery. Therefore Total 22 × 8 = 176 sample points.

This model is similar to the popular panel data model. The regression output is represented as both fixed effects model (Table 2) and random effects model (Table 3).

Insert Table 2, Table 3 Here

Therefore, even if effected by the value transfer and the statistical system, the Producer Services was separated from the manufacturing sector. That means the manufacturing sector is not simply to production services, and then transferred directly to the value of downstream manufacturers or ultimate consumers; production services companies and manufacturing enterprises cooperation, and promote the upgrading of the manufacturing sector, thereby creating greater value.

4. Policy Implications

China is a large manufacturing power in the world, but most of Chinese manufacturing enterprises are in the position of being governed in the world Value Chain. There are two different opinions over the years: Some people think that we should stick to developing the manufacturing industry in order to contribute to Industrial upgrading and Transmission. While others think that we should give service industry priority to increase the proportion of the service industry.

However, Producer Services have their particularity. For example, it asks for more strategic elements (such as human capital and entrepreneurship), and it gives more attention to the protection of Intellectual Property, so the development of the service industry still has a long way to go.

This paper indicate that, for most areas in China , in order to realize the upgrading of the manufacturing industry, on one hand Chinese enterprises should focus on making sure the leading position of manufacturing industry, on the other hand, building up their core competency in R&D and marketing through cooperation with upper and down session.

Therefore, for most areas of China, the industrial policy is not focusing on the development of local service industry by leaps and bounds, but on the promotion between local manufacturing industry and advanced foreign Producer Services enterprises so as to accelerate the pace for the upgrading of manufacturing industry. With this in mind, the improvement of manufacturing industry brings a great demand for Producer Services, which is bound to contribute to the development of local producer services in the long run.

References

Baumol W. (1967). Microeconomics of Unbalanced Growth: the Anatomy of Urban Crisis. American Economic Review,57:415–426.

Clark C. (1951). The Conditions of Economic Progress. London k: MacMillan & Co. Ltd.

Daniels P.W. (1995). Producer Services Research in the United Kingdom, The Professional Geographer Vol. 47 Issue 1 Page 82.

Fixler D., Siegel D. (1999). Outsourcing and productivity growth in services. Structural Change and Economic Dynamics,10:177–194.

Glen H. S. (1998). Changes in producer services location, Sydney: globalisation, technology and labour Asia Pacific Viewpoint, Vol. 39, No. 2, pp237–255.

Goe W. R. (1991). The Growth of Producer Services Industries: Sorting Through the Externalization Debate, Growth and Change Vol. 22 Issue 4 Page 118.

Guerrieri P., Meliciani V. (2005). Technology and International Competitiveness: The Interdependence between Manufacturing and Producer Services. Structural Change and Economic Dynamics,16: 489-502.

Harrington J.W. (1995) Empirical Research on Producer Service Growth and Regional Development: International

Comparisons, The Professional Geographer Vol. 47 Issue 1 Page 66.

James W. H, Campbell H.S. (1997). The Suburbanization of Producer Service Employment Growth and Change Vol. 28 Issue 3 Page 335.

Kevin O'Connor. (1996). Industrial Design as a Producer Service: A Framework for analysis in regional science, Papers in Regional Science Vol. 75 Issue 3 Page 237.

Marrewijk C., Stibora J. (1997). Producer Services, Comparative Advantage, and International Trade Patterns. Journal of International Economics, 42:195-220.

Neal Z.P. (2008). The duality of world cities and firms: comparing networks, hierarchies, and inequalities in the global economy, Global Networks, Volume 8, Issue 1, Page 94-115.

Pappas N., Sheehan P..(1998). The New Manufacturing: Linkages Between Production and Service Activities. in P.Sheehan and G.Tegart. Working for the Future. Melbourne: Victoria University Press:127-155.

Park S.H., Chan K.S. (1989). A Cross-Country Input Output Analysis of Intersectoral Relationships between Manufacturing and Services and their Employment Implications, 1989(2):199-212.

Pierre-Yves Léo, Philippe J. (1991). Multisited Versus Compact Producer Service Firms: Insights from the French Case, Growth and Change Vol. 22 Issue 4 Page 142.

Riddle D. (1986). Service-Led Growth-the Role of the Service Secto. New York: Praeger.

Rowthorn R., Wells J.R. (1987). De-industrialization and Foreign Trade. Cambridge: CUP.

Swick R. (2004). Measuring services in the producer price index. Statistical Journal of the United Nations ECE 21299–308 299 IOS Press.

Walsh J., Deery S. (2006). Refashioning Organizational Boundaries :Outsourcing Customer Service Work, Journal of Management Studies, Volume 43, Issue 3, Page 557-582.

Wernerheim C. M., Christopher A. (1999). Sharpe Producer services and the 'mixed-market' problem: some empirical evidence, Area Vol. 31 Issue 2 Page 123.

Table 1. Advantages of service outsourcing

Tactical advantage	Strategic advantage	Changing advantage
Reduce and control operating costs	Improve business concerns	Bring to customers faster, newer solutions
Reduction of non-core business investments	Access to world-class advanced technology	The increasingly shorter product life cycle to respond
Cash injection	Promote reorganization	Re-established with suppliers and partners relations
Lack of access to internal resources	Risk-sharing	Ahead of rivals
Overcome difficulties in control and management functions	Release resources for other purposes	To lower the risk of entering a new market

Table 2. Regression of Fixed Effects Model

Variable	Coefficient	t-Statistic
SI?	0.564941	7.938917
Fixed Effects		
CHN--C	0.211894	
CZE--C	0.128524	
FRA--C	0.169262	
JPN--C	0.222284	
KOR--C	0.193042	
NOR--C	0.133580	
UK--C	0.185649	
USA--C	0.247275	
R-squared	0.503482	
Adjusted R-squared	0.479697	

Table 3. Regression of Random Effects Model

Variable	Coefficient	t-Statistic
C	0.187095	8.105900
SI?	0.562275	8.228406
Random Effects		
CHN--C	0.022701	
CZE--C	-0.052432	
FRA--C	-0.015454	
JPN--C	0.032443	
KOR--C	0.005848	
NOR--C	-0.047556	
UK--C	-0.000561	
USA--C	0.055011	
R-squared	0.485586	
Adjusted R-squared	0.482629	

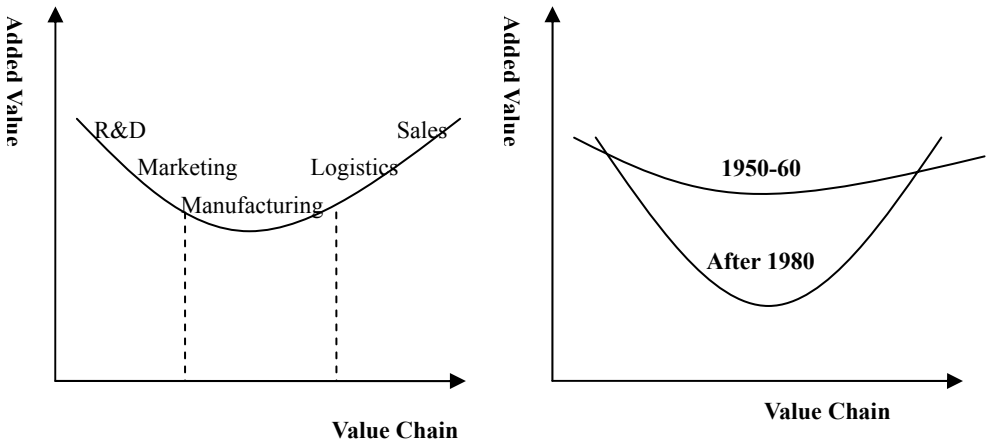

Figure 1. Smiling Curve