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COMPETITIVENESS STRUGGLE of SERVICE
OUTSOURCE: CHINA & INDIA
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I. Abstract

The preferred location for an outsourcing company (outsourcing service customer) should depend on a wide range of factors, of which those quality-related factors within a nation (e.g. Highly-skilled labour, high-level infrastructure, high-quality of firms, high level of existing technology level and large public spending on R&D) are always the focus of media and academy. The objective of this paper is to develop a framework for accessing the attractiveness of a country in outsourcing, which identifies various driving factors that may influence the country’s attractiveness. The research methodology this paper uses is quantitative research, rather than qualitative one that is commonly used by previous researches. Finally, we use this framework to assess and compare India and China's future attractiveness as a destination of services outsourcing, a topic that continues to be debated as service outsourcing industry is described by many Chinese as the key to transform China into World Corporate from World Factory.

In this report, there are four major findings. First, contrary to other literatures’ opinions, traditional driving factors which means those cost-related factors (e.g. Generally-skilled labour, basic infrastructure, large scale of firms, high level of openness of market and low tax rate) are relatively more important to the service outsourcing industry which is commonly regarded as “New emerging industry” by academy of both Chinese and Western world, than those quality-related factors. The reason is that those outsourcing service customers basically outsource the lower part of
a whole value chain only, rather than those high-end service processes due to difficulty in outsourcing and national security concern.

Second, neither China nor India could be said to have gained an upper hand in this struggle (except the appearance of new factors or new constraints) because both parties have different advantages in those cost-related areas.

Third, the large domestic market of China with potentially high purchasing power may not be good for the development of onshore outsourcing (outsourcing within territory) because the generally low-level service quality of China’s service providers may not catch up with the increasing service quality demand of Chinese customers.

Fourth, developing service outsourcing industry cannot help China to transform into World Corporate from World Factory since those low-end service process outsourced could seldom generate any knowledge spillover (overseas). Developing service outsourcing industry is an important and essential industry structure improvement, but it must not be the end we want.
I. Introduction

After 30-year export-manufacturing led reform, China accumulated a strong economic foundation in the expense of farmers’, workers’ livelihood. Now, the whole China is starting to switch from low value-added manufacturing-export to high value-added service-export (Outsourcing). This “Industry Structure Upgrading” (產業升級) is only the mean which helps to go to the final aim, technology transfer (knowledge spillover), thus facilitating the transformation from World Factory to World Corporate. In this transitional moment, China is inevitably having a competition with India, the first mover and also the existing biggest market-share holder in service outsourcing.

This report is to predict the competitiveness struggle between China and India in the service outsourcing industry through, by quantitative method, analyzing the relative importance of different driving factors (mainly the confrontation between hard power 硬實力 and soft power 軟實力) to the development of the industry.

This report focuses on the information technology service outsourcing. In Section III, the background of IT service outsourcing is given, about its composition, category, and current world market share. Section IV is the literature review, giving a detailed summary to all important findings by academy and media, both Chinese and Western, on the evaluation of the relative importance of different driving factors to the development of a nation’s IT service outsourcing industry. Section V

1 According to MicKinsey’s report in 2005, 83% of service outsourcing in the world is related to information technology (both IT service and IT-enabled service)
is about the research methodology including model specification, data (type and source) and the regression results. Section VI gives out the implication of the new devised competitive model which is specific to the service outsourcing industry. Then Section VII, the core of the project, provides the prediction about the competitiveness struggle between China and India in the service outsourcing industry in the future, based on the new competitiveness model. Afterwards, Section VIII reminds our readers those limitations in the research report and gives suggestion for future study in the same field. Finally, Section IX concludes the whole report for readers, giving out an outline of the whole framework and summary of those major ideas.

II. Background Information

1. Composition of IT service outsourcing

Onshore outsourcing(在岸外包): Outsourcing service providers (vendors) are in the same country as its customers (outsourcing firms) and service is outsourcing within territory. This kind of outsourcing mainly carried out by those countries with large domestic market demand since outsourcing those service processes to companies which are near the target market, can save the transportation cost and trace the consumer preference instantly. Example: China, USA (張燕, 2008)

Offshore outsourcing(離岸外包): Outsourcing service providers (vendors) are in the different country from its customers (outsourcing firms) and service is outsourcing cross-territory. This kind of outsourcing is mainly carried out by those countries with a plenty of natural resource, giving the
customers a cost benefit. Example: India, Ireland, Philippines (張燕, 2008)

2. Category of IT service outsourcing

Three major parts, from low-end to high end (IDC, 2011):

(i) Information Technology Outsourcing (ITO): mainly about IT-supporting service, e.g. mass calculation, system testing. This is the first stage of IT service outsourcing.

(ii) Business Process Outsourcing (BPO): “One-Stop Service”, from backstage office, logistics, call centre to finance & accounting. This is one of the IT-enabled services (ITES).

(iii) Knowledge Process Outsourcing (KPO): the most value-added part, about the outsourcing of research and development stage and investment & finance analysis, those core and strategic functions of a company. This is the upper part of the IT-enabled services (ITES).

3. Current World Market Share

![Diagram 1](Calculated by IMF’s data, 2008)
The top outsourcing service provider is India, second Ireland and third U.K. China holds 3% of this big cake only now.

III. Literature Review

Although there have been many academic researches carried out in finding the competitiveness drivers of IT service outsource industry since 2007, for example, empirical study looking at offshore sourcing of business processes (Tanriverdi *et al.*, 2007), the global disaggregation of service occupations (Mithas and Whitaker, 2007) and the dynamic model of IT offshore service (Jason Dedrick, Erran Carmel, Kenneth L Kraemer, 2011), most of them are qualitative researches based on past theoretical competitiveness model targeting traditional industries, e.g. doing survey on world IT outsourcing companies (customers), therefore, there is a need to have a quantitative study and form a new competitiveness model specific to this emerging industry.

1. Measurement of Competitiveness in IT service outsourcing of Nations

The competitiveness in IT service outsourcing of a nation is measured by Trade Competitiveness Index (TCI). TCI implies that COMPETITIVENESS of an industry/sector of a country could be reflected by its EXPORT ABILITY in that sector (王澤利, 周升起, 2009; 陳佳貴, 2008)
TCI: \( \frac{\{\text{Export(i service)} - \text{Import(i service)}\}}{\{\text{Export(i service)} + \text{Import(i service)}\}} \)

where \(-1 \leq \text{TCI} \leq 1\)

- \(\text{TCI} > 0 \) & approaching 1, more and more competitive in that service
- \(\text{TCI} < 0 \) & approaching -1, lesser and lesser competitive in that service
- \(\text{TCI} = 1\), Only export, No import (in that service)
- \(\text{TCI} = -1\), No export, Only Import (in that service)

2. **Diamond Model**

Michael Porter’s (1990) diamond model is the most commonly used to compare the competitiveness of different nations in different industries in the past, so this paper basically follows Diamond model’s main ideas and is attempted to modify some factors in the following empirical estimation.

Porter’s diamond of competitive advantage model of nations consists of four main attributes that shape the national environment in which local and connected firms compete. In the following part, different world famous examples are used to illustrate these four factors (provenmodels.com, 2000).

2.1 **Factor conditions**

The nation’s relative position in vital industrial production factors such as skilled labour or infrastructure is important determinant of national competitiveness. Both the level of individual
factors and the overall composition of the resource mix must be considered. Factors can be country specific or industry specific. For example, China’s large pool of low-wage rural worker (peasant worker), more than almost any other nations -- has been vital to China’s success in export-manufacturing industries for the past 30 years.

2.2 Demand conditions

The nature of home demand for an industry’s products and services requires considering both the quantity and quality of the demand. For example, Japan’s sophisticated and knowledgeable buyers of cameras helped to stimulate the Japanese camera industry to improve product quality and to launch new, innovative models.

2.3 Related and supporting industries

The presence or absence in the nation of internationally competitive supplier and related industries is a key factor. Until the mid-1980s for example, the technological leadership of U.S. in world semiconductor industry provided the basis for U.S.’s success in personal computers and several other technically advanced electronic products. Adoption of the automobile took off in U.S. after the construction of a national system of highways and gas stations.

2.4 Firm strategy, structure, and rivalry

This means the national conditions that determine how companies are created, organized and managed, as well as the nature and extent of domestic rivalry. For example, those super big business group in Japan, called, Keiretsu, with a large company size (to be precise, it should be the “group size”) and production size, enjoy a large (internal) economies of scale-----reduction in average cost.
Furthermore, domestic rivalry creates pressure to launch new products, to improve quality, to reduce costs and to invest in new, more advanced technologies. For example, after 1979 of China’s open door policy, the production market having been opened to private and foreign investors, the number of innovation and production increased a lot, especially the industries of television, washing machine and vehicles.

Porter stated two additional variables that indirectly influence the diamond:

2.5 Chance events

Disruptive developments outside the control of firms and governments allow in new players who exploit opportunities arising from a reshaped industry structure. For example, radical innovations, unexpected rise of oil price, revolutions, wars, etc.

2.6 Government

Government’s choice of policies can influence each of the four major determinants above. Successful government policies work in those industries where underlying determinants of national advantage are present and reinforced by government actions. Government can raise the odds of gaining competitive advantage but lacks the power to create advantages on its own.

These six mentioned attributes promote or impede the creation of competitive advantages of firms, clusters, and nations. All conditions need to be present and favourable for an industry/company within a nation to attain global supremacy.

But there is still another important point in the Diamond model. That is CLUSTER and the idea of clusters is a derivative of the diamond theory, and it refers to geographically concentrated
groups of interconnected firms and associated institutions in a similar field. They represent an efficient productive structure within which firms can operate (Brian Snowdon and George Stonehouse, 2006).

Clusters influence competitiveness in two ways.

In supply side, firms could get inputs (e.g. labour) easier, since those inputs are attracted by low searching cost of a well-paid job or a profitable investment project in clusters. Average cost of firms reduced.

In demand side, firms could sell their output easier, since many customers are attracted by low search cost of a wide variety of products in clusters. Average cost of firms is reduced.

Therefore, clusters help firms enjoy external economies of scale. Many countries have enjoyed such benefit already. For example, in China, there have been numerous industrial parks, contributing the success of the World Factory.
3. **Factors affecting decision on outsourcing location**

By different literature, we have concluded totally 13 driving factors that are mentioned to be important when outsourcing companies choosing the most appropriate location to outsource the IT processes, under the classification in Diamond model.

3.1 Factors of Production

3.1.1 Generally-trained labours

Generally-trained labours or Generally-skilled labours is commonly referred to those workers who have had trained in basic engineering in technical college or in job-training. China has a large pool of basically trained worker after the implement of 9-year compulsory education. Although many literatures ignored this factor when talking about IT service outsource, (張燕, 2008) mentioned its importance in the lower scope of the value chain of outsourcing, ITO. Therefore, generally- trained labours is put in the following regression and “labours who has tertiary educated” (e.g. technicians) is used to be the proxy.

3.1.2 Basic Infrastructure

Basic Infrastructure is also another one factor that seldom mentioned in the mainstream literature, since most of the people cannot figure out the direct relationship between the IT world and the supply of water, supply of energy or even the convenience of transportation. But here it is still put in the regression for evaluation, and “Quality of Road” as the proxy.
3.2 Domestic Market

It is the factor mentioned to be effective in helping to build up a competitive outsourcing industry, especially by the mainland academy. (胡國良, 2007; 鄭昱君,王豔霞, 2009; 闕澄宇, 柴淵哲, 2010; 崔巍, 2010)

On one hand, a capable (in term of size and purchasing power) domestic market of a nation is good for the development of service outsourcing industry in that nation, because outsourcing firms (customers of outsourcing service) could benefit from the reduction of delivery cost of final goods and services and an ongoing marketing research which help firms to design customized final products, if they outsource the service process to the places near their target customers. Therefore, a capable domestic market helps both onshore and offshore outsourcing development. That is the argument many China advocators carry when saying China will get success in IT service outsourcing and India will lose. (胡國良, 2007; 闕澄宇, 柴淵哲, 2010; 崔巍, 2010)

On the other hand, a capable domestic market of a nation may have negative impact on the development of service outsourcing industry in that nation, because even the domestic demand of outsourcing service is large enough, if the local vendors are not capable enough to provide the service up to the standard required by the domestic market, domestic market would outsource the service process overseas. In this way, it is not benefiting the outsourcing industry (service export) of that nation, but the import industry (service import). This point is mainly given by non China advocators who criticize China’s low quality production cannot stand with the domestic demand of

---

2 India has a large population with little purchasing power while China has a large population with potentially-high purchasing power
high quality consumption, so encouraging import indirectly. (Masten. S., 1984; Kailash Joshi and Srikanth Mudigonda, 2008)

The relative effect of these two forces is still not analyzed yet by academy in survey method, not to mention in quantitative method.

3.3 Supporting Industries

3.3.1 Highly- skilled IT workers

It is the so-called the most critical factors to IT service outsourcing. Nearly all literatures, both mainland and international, point out that the wage level of highly-skilled IT workers cover the major part of total expenditure of firms which outsource their service process, therefore, the size of the pool of highly- skilled IT workers, including HR manager or business analyst, determines the success of IT service outsourcing industry, especially BPO and KPO (Novak, S. and Eppinger, S.D., 2001; Kailash Joshi and Srikanth Mudigonda, 2008; 鄭昱君, 王豔霞, 2009). In the regression, “Number of scientists and engineers” is used be the proxy.

3.3.2 IT-related infrastructure

IT-related infrastructure is generally thought to be carrying more weight than basic infrastructure on building up an IT outsourcing industry (Dutta and Roy, 2005; Heeks, 2007). It could reflect the convenience of information flow within the territory and to where outside the territory, e.g. the infrastructure of telecommunication. In the regression, “Internet access” is used to be the proxy, which is a good indicator of technological readiness of the broader population
3.3.4 Capital Accumulation

Capital Accumulation is also another factor advanced by mainland literatures. The large amount of capital that China has accumulated in export-manufacturing sector could be turned into the investment in the IT service export sector (對外經濟貿易大學國際經濟研究院課題組, 2007; 崔巍, 2010). “International reserve balance” is used to be the proxy to Capital Accumulation since the net foreign lending is, in fact, the net export.³

3.3.5 Latest Technology

The latest technology level of a nation is said to be essential for any high-end industries, such as IT service outsourcing (Jason Dedrick, Erran Carmel, Kenneth L Kraemer, 2011). So “Technology Index” in Global Competitiveness Index is used to be the proxy in our regression.

3.4 Firm Strategy, Structure, and Rivalry

3.4.1 Scale of firms (IT service vendors)

It consists of two parts, internal and external one.

Internal scale of firms: It is the internal size of firms, generally in term of average labour size or production size in a nation. The larger internal scale firms have, the larger internal economies of scale the nation enjoys (Porter M.E., 1990; 鄭昱君,王豔霞, 2009). Those IT giants in U.S, e.g. Google, Apple and Microsoft, always have more than 20,000 workers.

External scale of firms: It is the external size of firms, generally in term of the average number of firms within different geographic concentrations (“clusters” mentioned above) or

³ Since S-I=NX; if S>I, then NX>0; Net foreign lending = Net export
the number of geographic concentrations in a nation. The larger external scale firms have, the larger external economies of scale the nation enjoys (Diamond model). I have mentioned the case of industrial cluster in China; let see the example of scientific research cluster, the combination of academic organizations and business enterprises, in Silicon Valley (Paul Mackun, 2002). At the beginning, there were silicon chip innovators and manufacturers only in SV. After Stanford University had rented out part of its research park to Hewlett-Packard (HP), many other IT firms joined in the park and the agglomeration of IT business and IT academic institute formed in this scientific research cluster. Since that, SV became the center of high-tech businesses in U.S.

Because of the successful cases in U.S., Europe and the recommendation by Michael Porter, “Scale of firms” became one important driving factor for all kinds of industries in western academy. In the following regression, “average number of labour employed per IT firms” within nation is used to be the proxy.4

3.4.2 Quality of firms (IT service vendors)

It is another one of the most important areas the world high-end companies concern the most according to most of the literatures, both mainland and international (Dutta, A. and Roy, R., 2005; 鄭昱君, 王豔霞, 2009; Jason Dedrick, Erran Carmel, Kenneth L Kraemer, 2011). The quality of an outsourcing service supplier / vendor is reflected by both the number and the level of quality certification it gets. There are many quality certification standards in the world,

4 The reason of using “average number of labour employed per IT firms” to estimate both internal and external economies of scales is two-fold. First, there is no sufficient data, from attainable sources, about number of clusters of all 59 countries which is the target of the research. Second, there is a logic relationship that, if the average size of IT firms in a nation increase, more firms will be attract to open business in the nation in order to take the advantage of first hand market information (supply side), as if the case of Hong Kong ’s financial institutes.
but the most generally accepted is CMMI and ISO20000. In the regression, we use CMMI (Capacity Maturity Model Integration) which is an globally-recognized standard, carried out by Software Engineering Institute (SEI), since 2003, to appraise the maturity of a IT company’s business process and to provide a quality guideline. CMMI is presented from level 1(Initial), 2(Managed), 3(Defined), 4(Quantitatively managed), 5(Optimizing).

3.4.3 Openness of the outsourcing market

Openness of the outsourcing market refers to the extent of allowing foreign parties to carry out outsourcing service in the nations. This factor is said to be important because it could enhance the competition of the local outsourcing industry, thus the productivity under the theory of free trade in International Economics (Sundar Gayathri, 2008; 王澤利，周升起，2009).

The openness of the outsourcing market could be measured by Service Trade Openness Index (SO), and its formula suggested by IMF is as follows,

\[
SO = \frac{(\text{Total service export in (service i)} + \text{Total Service import in (service i)})}{\text{GDP}}
\]

The higher the SO index is, the more the service market is opened to foreign competitors.

---

5 The top outsourcing companies (customers) are in US and Europe, who always outsource higher-valued business process overseas due to their high-end business and require a higher capacity of their vendors on controlling the service provision process and a higher quality of service provided. Therefore, the generally-recognized level of CMMI is 3 at least, which is also the requirement in regression samples of this paper.

6 Definition of CMMI mentioned in Software Engineering Institute’s website, [http://sas.sei.cmu.edu/pars/pars.aspx](http://sas.sei.cmu.edu/pars/pars.aspx)
3.5 Government

3.5.1 Tax Rate

Taxation advantage is good for any industry in the “Baby period”, so IT outsourcing should not be an exception many academics thought. So we put corporate taxes in the regression for evaluation, which are often one of the top three expenses of an outsourcing operation after employee compensation costs and office occupancy costs according to KPMG. (Kailash Joshi and Srikanth Mudigonda, 2008; 郑昱君,王豔霞, 2009; 吕明元,關倩瑋,樊永岗, 2010)

3.5.2 Research & Development

The spending on research and development by the government has been under the spotlight of media and academy for a long time due to a common consent on the positive correlation between R&D and the development of high-end Industry (any type of IT business are always be related to high end, including IT service outsourcing, in both Chinese and International academy) (Hirschheim, R., Loebbecke, C., Newman, M. and Valor, J., 2007; 郑昱君，陶大元, 2009)

3.5.3 Protection of property right

The importance of intellectual property right (IPR) protection can vary across outsourcing efforts. It may not be important for small, one-off web design projects, but becomes increasingly important as one moves into proprietary software & web development, e.g. BPO and KPO. (Sargent, J.F. and Meares, C.A., 2006; Sundar Gayathri, 2008;
IV. Research Methodology

1. Model Specification

Following two models which are more all-rounded in analyzing and comparing the future attractiveness of India and China for IT service outsourcing (鄭昱君, 王豔霞, 2009\(^7\) and Kailash Joshi Srikanth Mudigonda, 2008\(^8\)), a new model modified as follows:

\[
C_{01i} = \beta_0 + \beta_1(L) + \beta_2(Infb) + \beta_3(M) + \beta_4(HL) + \beta_5(Infi) + \beta_6(IR) + \beta_7(LT) + \beta_8(S) + \beta_9(Q) + \beta_{10}(O) + \beta_{11}(T) + \beta_{12}(RD) + \beta_{13}(PR) + \varepsilon_i 
\]

\[i = 1, 2, \ldots, 59 \text{ (different countries)}\]

And the dependent variables, explanatory variables and corresponding hypotheses are as follows:

---

\(^7\) (鄭昱君, 王豔霞, 2009) uses Analytic Hierarchy Process (AHP) to access the relative attractiveness of India and China in IT service outsourcing through calculating the scores each country get in the four aspects assumed: human resource, management quality, scale of firms and government policy

\(^8\) (Kailash Joshi and Srikanth Mudigonda, 2008) assumes that 4 areas needs to be considered in the assessment of the relative attractiveness of India and China in IT service outsourcing: cost advantage (mainly about human cost and tax rate), inhibiting factors (mainly about political stability and protection of property right), business environment (infrastructure and government policy)
Table 1: Dependent, independent variables, proxy, data source and hypotheses

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Symbol</th>
<th>Measurement / Proxy</th>
<th>Data Source</th>
<th>Hypothesis (+/-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitiveness on IT service outsourcing industry</td>
<td>C01</td>
<td>Trade Competitiveness Index (TCI)</td>
<td>International Monetary Fund, 2006</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Symbol</th>
<th>Measurement / Proxy</th>
<th>Data Source</th>
<th>Hypothesis (+/-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Generally-trained labour</td>
<td>L</td>
<td>Number of students in tertiary education per 100,000 inhabitants (total of male and female)</td>
<td>United Nations Educational, Scientific and Cultural Organization (UNESCO), 2008</td>
<td>+</td>
</tr>
<tr>
<td>2. Basic Infrastructure</td>
<td>INF b</td>
<td>Quality of Road Index (Lowest, 1-7, Best)</td>
<td>The Global Competitiveness Report, 2009 (World Economic Forum)</td>
<td>+</td>
</tr>
<tr>
<td>3. Domestic market</td>
<td>M</td>
<td>Sum of gross domestic product plus value of imports of goods and services, minus value of exports of goods and services</td>
<td>The Global Competitiveness Report, 2009 (World Economic Forum)</td>
<td>Uncertain</td>
</tr>
<tr>
<td>4. Highly-skilled IT worker</td>
<td>HL</td>
<td>Number of scientists and engineers</td>
<td>The Global Competitiveness Report, 2009 (World Economic Forum)</td>
<td>+</td>
</tr>
<tr>
<td>5. IT-related infrastructure</td>
<td>INF i</td>
<td>Internet users per 100 habitants</td>
<td>International Telecommunications Union, 2009</td>
<td>+</td>
</tr>
<tr>
<td>8. Scale of firms (IT service vendors)</td>
<td>S</td>
<td>The average number of staff employed per IT outsourcing firm within nation</td>
<td>International Monetary Fund, 2006</td>
<td>+</td>
</tr>
<tr>
<td>9. Quality of firms (IT service vendors)</td>
<td>Q</td>
<td>Total Number of firms passing test of CMMI Level 3-5</td>
<td>SEI Appraise Program 2008</td>
<td>+</td>
</tr>
<tr>
<td>10. Openness of the outsourcing market</td>
<td>O</td>
<td>Service Trade Openness Index (SO), formula suggested by IMF</td>
<td>International Monetary Fund, 2006</td>
<td>+</td>
</tr>
<tr>
<td>11. Tax Rate</td>
<td>T</td>
<td>Corporate Tax Rates (%)</td>
<td>KPMG, 2009</td>
<td>-</td>
</tr>
<tr>
<td>13. Protection of property right</td>
<td>PR</td>
<td>Intellectual property right protection index (Lowest, 1-7, Best)</td>
<td>Global Piracy Study, 2008 (Business Software Alliance &amp; IDC)</td>
<td>+</td>
</tr>
</tbody>
</table>
2. Data Type

Cross-section data: The performance of 59 countries in Trade Competitiveness Index (IT service trade only) in 2006 and 13 areas (driving factors mentioned above) which are possibly related to the development of IT service outsourcing industry in 2006, 2008, 2009 or 2010.10

(Appendix 1)

3. Regression Result

a) Individual regressions

In order to access every individual factor’s influence on (C01), independent variables are separated to run their own individual regressions first. After these, all factors will be put together to run an overall regression as what is shown in table 3 (page 31). The results of individual regressions are as follows:

\[
C01 = 3568.1^* + 438.38^{**} L
\]

s.e. \[ (2285.1) \quad (158.23) \]
N= 59, Adj. R\(^2\) = 0.5686, SEE=0.4472

\[
C01 = 6.4352 + 2.0045^* INF_b
\]

s.e. \[ (2.2468) \quad (0.7746) \]
N= 59, Adj. R\(^2\) = 0.3856, SEE=0.6140

---

9 These 59 countries are chosen by the consideration of their activeness in world IT service outsourcing market and the availability & accuracy of their national data provided.

10 Since there is no any single year of which all driving factors’ data are available in 59 countries.
\[ C01 = 3.5689^* - 1.2633^* M \]
\[ \text{s.e. } (1.8956) \quad (0.3689) \]
N= 59, Adj. \( R^2 \)= 0.4486, SEE=0.5672

\[ C01 = 1.0013 + 4.1206 \text{ HL} \]
\[ \text{s.e. } (0.9988) \quad (3.5233) \]
N= 59, Adj. \( R^2 \)= 0.0012, SEE=0.9881

\[ C01 = 48.213^* + 12.562 \text{ INFi} \]
\[ \text{s.e. } (22.568) \quad (9.8622) \]
N= 59, Adj. \( R^2 \)= 0.0227, SEE=0.9706

\[ C01 = 15680^{**} + 55663 \text{ IR} \]
\[ \text{s.e. } (7803.2) \quad (19825) \]
N= 59, Adj. \( R^2 \)= 0.0586, SEE=0.9453

\[ C01 = 6.6501 + 1.0502^* \text{ LT} \]
\[ \text{s.e. } (1.8956) \quad (0.5279) \]
N= 59, Adj. \( R^2 \)= 0.5521, SEE=0.4573

\[ C01 = 1.0003^* + 0.0031^{***} S \]
\[ \text{s.e. } (0.4384) \quad (0.0002) \]
N= 59, Adj. \( R^2 \)= 0.7216, SEE=0.2755
C01 = 0.8966* + 0.8344 Q
s.e.    (0.1154)     (0.3721)
N= 59, Adj. R² = 0.0006, SEE = 0.9983

C01 = 0.0273 + 0.0001** O
s.e.    (0.0023)     (0.0000)
N= 59, Adj. R² = 0.6986, SEE = 0.3072

C01 = 16.294 – 33.561* T
s.e.    (8.5569)     (12.559)
N= 59, Adj. R² = 0.4986, SEE = 0.5192

C01 = 0.0019** + 0.0312 RD
s.e.    (0.0001)     (0.0043)
N= 59, Adj. R² = 0.0125, SEE = 0.9837

C01 = 1.1023* + 2.0023* PR
s.e.    (0.4382)     (0.0346)
N= 59, Adj. R² = 0.5286, SEE = 0.4886

All the above regression results conform to the hypotheses made before. Moreover, we can see that there is a negative relationship between “Domestic Market” (M) and the Competitiveness of IT service outsourcing (C01) empirically, which is uncertain in academy before. One possible explanation is as follows:
In diagram 3, we can see that the top leading market (demand) for outsourcing service is U.S., the second Japan; while in diagram 1, the top outsourcing service provider is India, second Ireland and third U.K. This shows that a country with large domestic market may probably acts as the importer of IT service (outsourcing service customer), rather than the exporter. (outsourcing service vendor).

Then we can go back to the uncertainty on the relative strength between the positive effect (to save delivery cost, outsourcing firms generally prefer to outsource service process to nation with large domestic market) and negative effect (nation with large domestic market always import service more than export, especially when the local service sector is weak) of domestic market of a nation on the development of outsourcing industry of that nation. From the individual regression between (C01) and (M), we know that the negative effect of

---
11 Germany, France, Russia are at the top of Europe, but not more than 5% each.
domestic market is over its positive effect. A large domestic market does not help the development of IT service outsourcing industry.

A book called “The world is flat” (Thomas Friedman, 2005) is that Globalization provides a reasonable explanation on the reducing importance of location factor. Since the improvement in transportation and communication has reduced the delivery cost significantly, outsourcing company shifted their core focus from delivery cost to other areas of cost competitiveness of the outsourcing service vending nations, e.g. resource endowment, when choosing outsourcing location.

b) The first overall regression:

\[
C01 = \beta_0 + \beta_1(L) + \beta_2(Infb) + \beta_3(M) + \beta_4(HL) + \beta_5(Inf) + \beta_6(IR) + \beta_7(LT) + \beta_8(S) + \beta_9(Q) + \beta_{10}(O) + \beta_{11}(T) + \beta_{12}(RD) + \beta_{13}(PR) + \epsilon_1 \tag{1}
\]

As shown in table 3, there is only one variable significant at 10% level and 4 variables are resulted in wrong signs, i.e., “Latest Technology” (LT), “Capital Accumulation” (IR), “Quality of firms” (Q) and “Research & Development” (RD); that means the regression formula need to be reconstructed or re-specified.

c) The second overall regression:

\[
C01 = \beta_0 + \beta_1 \log(L) + \beta_2(Infb) + \beta_3(M) + \beta_4(HL) + \beta_5(Inf) + \beta_6 \log(IR) + \beta_7(LT) + 
\beta_8 \log(S) + \beta_9(Q) + \beta_{10}(O) + \beta_{11}(T) + \beta_{12}(RD) + \beta_{13}(PR) + \epsilon_2 \tag{2}
\]
Due to lack of significant coefficients in the 1st regression, three variables, “General skilled labour” (L), “Capital Accumulation” (IR), “Scale of firms” (S) are taken logarithm, in order to capture their non-linear feature in the linear regression estimation.

In table 3, the 2nd regression shows that there are one more significant variable, “Scale of firms” (S), and totally 2 variables are significant (both at 1% level). Besides, Adj. R² increases
to 0.7339 and SEE drops to 0.2373 from 0.4032. However, there are still 4 variables resulted in wrong signs, i.e., IT-related infrastructure (INFi), “Capital Accumulation” (IR), “Quality of firms” (Q) and “Openness of outsourcing market” (O). So, further equation specification is needed to modify.

d) The third overall regression

\[ C01 = \beta_0 + \beta_1 \log(L) + \beta_2 \text{Inf}_{b} + \beta_3 (M) + \beta_4 (HL) + \beta_5 \text{Infi} + \beta_6 \log(IR) + \beta_7 (LT) + \beta_8 \log(S) + \beta_9 (Q) + \beta_{10} \log(O) + \beta_{11} (T) + \beta_{12} (RD) + \beta_{13} (PR) + \epsilon_3 \]  

In the 2\textsuperscript{nd} regression, one more variable, “Openness of outsourcing market” (O), is found to be non-linear and need to be taken logarithm.

After that, the 3\textsuperscript{rd} regression shows that there are one more significant variable, “Protection of property right” (PR), and totally 3 significant (all at 1% level). Besides, Adj. \( R^2 \) increases to 0.8666 and SEE drops to 0.1680 from 0.2373. However, there are again 4 variables resulted in wrong signs, “IT-related infrastructure” (INFi), “Capital Accumulation” (IR), “Quality of firms” (Q) and “Openness of outsourcing market” (O). So model specification is needed to modify further.

e) The fourth overall regression (tackling problem of variable correlation)

\[ C01 = \beta_0 + \beta_1 \log(L) + \beta_2 \text{Inf}_{b} + \beta_3 (M) + \beta_4 (HL) + \beta_5 \log(IR) + \beta_6 \log(S) + \beta_7 (Q) + B_8 (T) + \beta_9 (PR) + \epsilon_4 \]  

- 27 -
In 3rd regression, due to the many wrong sign found when high Adj. R² existing, there may be the problem of Multicollinearity. The following table 2 shows there are significant correlation among “Research and Development” (RD), “IT-related infrastructure” (INFi), “Latest Technology” (LT) and “Quality of firms” (Q)\(^{12}\), and significant correlation between “Openness of outsourcing market” (O) and “Scale of firms” (S)\(^{13}\).

Table 2: The correlation of different factors

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>HL</th>
<th>M</th>
<th>INFi</th>
<th>INFb</th>
<th>LT</th>
<th>IR</th>
<th>S</th>
<th>Q</th>
<th>O</th>
<th>T</th>
<th>RD</th>
</tr>
</thead>
<tbody>
<tr>
<td>HL</td>
<td>0.2441</td>
<td>1.0000</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>0.1099</td>
<td>0.5152</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INFi</td>
<td>-0.2106</td>
<td>0.6324</td>
<td>0.1857</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INFb</td>
<td>-0.0502</td>
<td>0.6291</td>
<td>0.2621</td>
<td>0.6776</td>
<td>1.0000</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LT</td>
<td>-0.1213</td>
<td>0.7140</td>
<td>0.2341</td>
<td>-0.8154(^*)</td>
<td>0.6329</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>0.7837</td>
<td>0.3962</td>
<td>-0.0703</td>
<td>0.0969</td>
<td>0.1012</td>
<td>0.0764</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>0.5821</td>
<td>0.7145</td>
<td>0.6382</td>
<td>0.5559</td>
<td>0.4907</td>
<td>0.5373</td>
<td>0.4266</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>0.4927</td>
<td>0.3488</td>
<td>0.4498</td>
<td>0.8202(^{**})</td>
<td>0.0334</td>
<td>0.8888(^{**})</td>
<td>0.3337</td>
<td>0.3495</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>-0.5086</td>
<td>0.2953</td>
<td>-0.1378</td>
<td>0.4047</td>
<td>0.1139</td>
<td>0.2869</td>
<td>-0.2161</td>
<td>0.8161(^{***})</td>
<td>0.0597</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>0.4679</td>
<td>0.1825</td>
<td>0.4454</td>
<td>0.0594</td>
<td>0.1189</td>
<td>0.2124</td>
<td>0.2256</td>
<td>0.8872</td>
<td>0.3456</td>
<td>-0.2265</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>RD</td>
<td>0.1536</td>
<td>0.4189</td>
<td>0.4448</td>
<td>0.9211(^{**})</td>
<td>0.6389</td>
<td>0.9566(^{***})</td>
<td>0.3202</td>
<td>0.5826</td>
<td>0.8060(^{**})</td>
<td>0.1958</td>
<td>0.2392</td>
<td>1.0000</td>
</tr>
<tr>
<td>PR</td>
<td>0.0832</td>
<td>-0.6624</td>
<td>-0.3062</td>
<td>-0.8552</td>
<td>-0.6811</td>
<td>-0.8523</td>
<td>-0.0901</td>
<td>-0.6099</td>
<td>-0.0497</td>
<td>-0.3717</td>
<td>-0.1920</td>
<td>-0.7632</td>
</tr>
</tbody>
</table>

Therefore, “Research and Development” (RD), “IT-related infrastructure” (INFi), “Latest Technology” (LT) and “Openness of outsourcing market” (O) are dropped to run the 4th regression at which there are no any wrong signs while there are one more significant variable, “Basic infrastructure” (INFb) and totally 4 significant. (all at 1% level, except INFb at 5% level).

\(^{12}\) If government spends more on R&D, the base of IT-related infrastructure could be strengthened by lowest cost and the latest technology level be enhanced in the same time. These all help to improve the quality of IT firms’ operation.

\(^{13}\) Probably if the IT service outsourcing sector is opened to foreign or private parties, the number of firms, thus the external scale of firms will increase.
f) The fifth overall regression (tackling problem of heteroskedasticity)

\[ C01 = \beta_0 + \beta_1 \log(L) + \beta_2 \text{Inf}b + \beta_3 \text{(M)} + \beta_4 \text{(HL)} + \beta_5 \log(IR) + \beta_6 \log(S) + \beta_7 \text{(Q)} + \beta_8 \text{(T)} + \beta_9 \text{(PR)} + \varepsilon_5 \]  

(5)

In the 5th regression, the method of Weight Least Square is applied since the variance of residual in the previous regressions is not constant.
The weighting series used is \( L + HL + M + IR + S + Q + T \). After this, the 5\(^{th}\) regression continues showing no wrong signs, but 2 more variables in significant, i.e., “General skilled labour” (L) and “Tax rate” (T) and totally 6 significant. (all at 1% level, except T in 5% level). Moreover, Adj. \( R^2 \) increases back to 0.8318 from 0.7303 and SEE drops back to 0.1830 from 0.2389.

**Table 3: Overall Regression Table**

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th (WLS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.6908</td>
<td>0.7651</td>
<td>1.6754</td>
<td>0.2770</td>
<td>-0.4861</td>
</tr>
<tr>
<td>L</td>
<td>0.0000</td>
<td>0.0345</td>
<td>0.0083</td>
<td>0.0854</td>
<td>0.2076***</td>
</tr>
<tr>
<td>HL</td>
<td>0.4191</td>
<td>0.0775</td>
<td>0.0204</td>
<td>0.0727</td>
<td>0.0547</td>
</tr>
<tr>
<td>M</td>
<td>-0.1408***</td>
<td>-0.3760***</td>
<td>-0.6814***</td>
<td>-0.4668***</td>
<td>-0.6934***</td>
</tr>
<tr>
<td>INFf</td>
<td>0.0050</td>
<td>-0.0063*</td>
<td>INFf</td>
<td>-0.0052*</td>
<td>INFf</td>
</tr>
<tr>
<td>INFb</td>
<td>0.0841</td>
<td>0.0625</td>
<td>0.0033</td>
<td>INFb</td>
<td>0.0778**</td>
</tr>
<tr>
<td>LT</td>
<td>-0.1885</td>
<td>0.0615</td>
<td>0.0079</td>
<td>LT</td>
<td></td>
</tr>
<tr>
<td>IR</td>
<td>-0.0003</td>
<td>-0.0181</td>
<td>log(IR)</td>
<td>-0.0021</td>
<td>log(IR)</td>
</tr>
<tr>
<td>S</td>
<td>0.0367</td>
<td>0.2391***</td>
<td>log(S)</td>
<td>0.4510***</td>
<td>log(S)</td>
</tr>
<tr>
<td>Q</td>
<td>-0.0049</td>
<td>-0.0005</td>
<td>Q</td>
<td>-0.0018</td>
<td>Q</td>
</tr>
<tr>
<td>O</td>
<td>0.4817</td>
<td>-1.6595</td>
<td>log(O)</td>
<td>-0.3381</td>
<td>log(O)</td>
</tr>
<tr>
<td>T</td>
<td>-0.0009</td>
<td>-0.0025</td>
<td>T</td>
<td>-0.0040</td>
<td>T</td>
</tr>
<tr>
<td>RD</td>
<td>-0.1643</td>
<td>0.0262</td>
<td>RD</td>
<td>0.0174</td>
<td>RD</td>
</tr>
<tr>
<td>PR</td>
<td>0.0020</td>
<td>0.0101</td>
<td>PR</td>
<td>0.0087***</td>
<td>PR</td>
</tr>
<tr>
<td>N</td>
<td>59</td>
<td>59</td>
<td>59</td>
<td>59</td>
<td>59</td>
</tr>
<tr>
<td>Adj. ( R^2 )</td>
<td>0.2316</td>
<td>0.7339</td>
<td>0.8666</td>
<td>0.7303</td>
<td>0.8318</td>
</tr>
<tr>
<td>D.W.</td>
<td>1.7423</td>
<td>1.7889</td>
<td>1.6774</td>
<td>1.6573</td>
<td>1.7068</td>
</tr>
<tr>
<td>SEE2</td>
<td>0.4032</td>
<td>0.2373</td>
<td>0.1680</td>
<td>0.2389</td>
<td>0.1830</td>
</tr>
</tbody>
</table>

Grey Colour = variables in wrong sign to my hypothesis; *Italic* = variables in correct sigh and significantly larger than zero
V. Model Implication

From the fifth regression, we can see that traditional factors of production are still crucial in setting a foundation for the IT service outsourcing industry, including a large pool of Generally-Skilled labour and Basic Infrastructure, rather than those new ideas, mentioned to be extremely important by the mainstream academy, including lots of high skilled labour, IT-related infrastructure (or latest technology) and capital accumulation.

For firms’ strategy, traditional idea about economies of scale (Scale of firms and Openness of the IT Outsourcing market) still carry a relative higher weight than the quality of firms, to the development of IT service outsourcing industry although whom is crowned as new industry by media.

For government, success cases of Taxation Benefit in traditional manufacturing industry will probably appear again in service export industry, but the effect of government’s R&D expenditure is not clear. Moreover, government’s effort in Protecting the Intellectual Property Right will bear fruit in IT service outsourcing industry which is related to thousands of patients every year.

The above findings give us an important message about those outsourcing firms or outsourcing countries (outsourcing service customers): their major area of concern is not quality of the service, but the price of the service. There is a implication that most of the firms or countries are not going to outsource those highly value-added and knowledge-intensive service processes to other firms or countries, but those low-skilled, labour-intensive service processes in which quality requirement
is not so high. I found that the reason of such practice is two-fold.

First, it is costly and risky to outsource those working processes in higher value chain.

By (Jason Dedrick, Erran Carmel, Kenneth L Kraemer, 2011), there are two areas of concern about the nature of activity which is considered whether to be outsourced or not.

1. *Complexity*. Conceptual and empirical researches have showed that there is a positive relationship between complexity of activity and vertical integration of working process\(^\text{14}\) (Masten, 1984; Novak and Eppinger, 2001). That means, when complexity increases, the need for additional coordination increases, so do the cost and difficulty of working across distances (Sargent and Meares, 2006; Hirschheim *et al.*, 2007). It is because complex working process requires tacit knowledge. Such knowledge resides in the minds of individuals, requires experience to understand or may be embedded within a certain social context, making it difficult to specify or communicate outside that context (Polanyi. M., 1983). Work that involves higher degree of tacit knowledge is less likely to be outsourced.

2. *Modularity*. There is a positive relationship between modularity of activities and service process outsourcing empirically (Tanriverdi *et al.*, 2007). Modularity means that activities can be performed independently and then later integrated (Schilling and Steensma, 2001), thus enabling Process Portability – the breaking down of these services and packaging them into smaller, manageable segments for outsourcing to lower cost regions or firms. When modularity is low,

\(^\text{14}\) Vertical integration means that the whole production line of a service or product is worked out by one production unit.
knowledge activities are difficult to separate from each other because the performance of one element depends on integration with another. This situation calls for close and frequent communication to iterate and solve problems, making outsourcing more difficult. By contrast, when modularity is high, it is easier to carry out separate tasks in different locations.

To make it further, TPI, the leading global sourcing advisory firm says: the higher value the activity has, the more complex it will be; and the more complex the activity is, the lower the level of modularity and Process Portability will be, thus the probability of outsourcing. (TPI, 2007)

Diagram 12 (Source: TPI, 2007)

Diagram 13 (Source: TPI, 2007)

Legend:
- Highly obvious feature / Highly necessary requirement
- Generally obvious feature / Generally necessary requirement

15 Appendix 3: reference for the features/requirement of KPO, BPO, ITP
This argument is supported by (Sundar. Gayathri, 2008), in which, by interviews with executives involved in BPO relationships and a Web survey of business firms, there is a finding that outsourcing of asset specific / core business functions are negatively related to BPO success. Besides, the fact that the low-end IT service outsourcing, ITO maintains the largest portion of the total service outsourcing market, then BPO and KPO, confirms the above argument.

The second reason of not outsourcing high-valued service process outside is that there is national security problem. Many developed countries are sensitive to the protection of their high-valued knowledge against any overseas spill. For example, all U.S. owned, national-force weapon suppliers are not allowed to set up production line beyond the territory.

When outsourcing countries value cost more than quality and only outsourcing the low-ended service process, there is no doubt that the amount of Generally-Skilled Labour is much more important than the amount of high skilled one (scientists and engineers) and thus a large labour force and thorough system of universal education; Basic Infrastructure is more useful than the IT-related infrastructure because those ITO services, e.g. system testing and data processing & storage do not require the “Silicon Park styled” infrastructure, but the reliability of electricity is
crucial; **Openness of the Outsourcing Market** and **Scale of Firms**, both internal (measured by size of firms or number of workers) and external (measured by number of clusters), helping to develop economies of scale (minimizing AC), are more essential than the quality of firms, therefore, company survey showed that outsourcing service customers valued diversification of service provision and stable financial background\(^\text{16}\) of service vendors more than the value of their service, given that only 5 out of 360 executives acknowledged few formal process quality measures, for example CMMI, ISO20000 or BS5750 (Vaughan Michell, 1997); **Government’s Taxation Benefit** is more helpful than R&D expenditure (thus high level of technology) since low valued-added IT service, e.g. “back-office” work does not require “space shuttle styled” technology; **Property Right Protection** is essential in any levels of IT service outsourcing, shown in Diagram 13.

**VI. Prediction based on model**

Based on those significant driving factors in the competitiveness model estimated by empirical study above, a comparison between China and India in competitiveness to develop IT service outsourcing is deduced.

1. **Generally Skilled Labour**

The size of China’s scientists and engineers may not be able to catch up that of India’s in short time (Global Competitiveness Report, 2009), but the base of China’s generally-skilled labour is

\(^{16}\) Diversification of service provision and stable financial background are contributed by a large company scale.
much stronger than the India’s one because of the universal education in China (Nine-year compulsory education), providing many technical workers in low wages to the industry of low-ended IT service outsourcing, including ITO and first stage of BPO (e.g. call center service) (McKinsey & Company, 2005). Therefore, in below diagrams, we can see that China has no cost advantage in BPO workers, but in ITO workers, wage level only 12% of U.S., comparing to India’s 14%.

![Diagram 15](Source: NeoIT, 2007)

![Diagram 16](Source: Payscale, 2007)

Then we see the projected salary of ITO in 2012 (NeoIT, 2007), China still have an advantage here although it is known that the China’s “population dividend”, by population growing faster than death cases (in the past 30 years), is going to disappear soon while India’s one is going to appear.  

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17 India will emerge as the country with the largest labor pool in the world due to its low median age, which was only
2. Basic Infrastructure

China’s basic infrastructure has long been praised for the success of manufacturing sector and it is going to contribute to another success of IT service sector under the above competitiveness model. China not only can provide the most stable electricity supply among the lowest-energy cost countries, but also a large telecommunication cover, reaching most IT firms in different regions. In 2009, International Telecommunication Union (ITU) of the United Nations’ Development Index (IDI) ranked China at 17, India only at 47, among 154 countries.

To the contrary, India's physical infrastructure remains weak and needs massive investments in order to achieve improvements. Given the shortage of funds and bureaucratic delays, its outward physical infrastructure is being upgraded only slowly. It may not improve enough to match Western
or Chinese standards within several decades.

In India, even planned and budgeted infrastructural projects are inordinately held back due to bureaucratic delays in approvals, political interference in land acquisition and allotment, and a lack of political commitment\(^{18}\), besides a paucity of funds. To make it better, India is slowly allowing partnerships between the private and the public sectors in developing infrastructure such as roads, power, and airports and in the creation of special economic zones. For example, communication and travel costs to India and within India are also falling significantly due to deregulation and privatization in the telecommunication and airline sectors (Kailash Joshi and Srikanth Mudigonda, 2008).

### Table 5

<table>
<thead>
<tr>
<th>Factor</th>
<th>2000</th>
<th>2004</th>
<th>2000</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone lines (per 1000 people)</td>
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<td>43</td>
<td>115</td>
<td>241</td>
</tr>
<tr>
<td>Mobile phone subscribers (per 1000 people)</td>
<td>4</td>
<td>48</td>
<td>68</td>
<td>258</td>
</tr>
<tr>
<td>Internet users (per 1000 people)</td>
<td>5</td>
<td>23</td>
<td>18</td>
<td>73</td>
</tr>
<tr>
<td>Personal computers (per 1000 people)</td>
<td>3</td>
<td>31</td>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td>Broadband subscribers (per 1000 people)</td>
<td>0.0</td>
<td>0.6</td>
<td>0.0</td>
<td>16.5</td>
</tr>
<tr>
<td>International Internet bandwidth (bits per person)</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>57</td>
</tr>
<tr>
<td>ICT expenditure (% of GDP)</td>
<td>3.6</td>
<td>3.7</td>
<td>4.1</td>
<td>5.3</td>
</tr>
<tr>
<td>Secure Internet servers (per one million people)</td>
<td>0.1</td>
<td>0.4</td>
<td>0.1</td>
<td>0.2</td>
</tr>
</tbody>
</table>


3. **Scale of Firms**

For internal scale of firms, due to the first-mover advantage enjoyed by Indian IT service outsourcing companies, the average annual sales revenue of them in 2008 is US$ 1.5 billion, while

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\(^{18}\) Traditionally, the ruling Congress and other socialist parties in India have focused on gaining votes through subsidies and social welfare schemes, at the cost of infrastructural investments. After the opposition party – Bharatiya Janata Party (BJP) – came into power in 1999, it emphasized infrastructural development. However, the BJP was viewed as favoring urban development at the expense of rural voters and it lost national elections in 2004. Upon its return to power, the Congress party has re-emphasized subsidies and social welfare schemes for the rural population (Kailash Joshi and Srikanth Mudigonda, 2008).
that of the best selling Chinese company in the industry, Neusoft (中軟) is just US$ 0.062 billion. The average labour size of the dominant five forces in Indian outsourcing (Tata Consultancy Service, Infosys Technologies, Wipro Technologies, Satyam Computer Services and HCL Technologies) is 60,000 (對外經濟貿易大學國際經濟研究院課題組, 2007); while the average of the dominant three in China (Neusoft 中軟, HiSoft 海輝軟件, SinoCom Software 中訊軟件) is under 10,000 (對外經濟貿易大學國際經濟研究院課題組, 2007) which cannot be able to develop a large internal economies of scale.

For external scale of firms, again, due to first-mover advantage, there are many high-tech scientific parks in considerable size in New Delhi, Mumbai, Bangalore, Hyderabad and Ahmedabad. For example, Bangalore, the so-called “Indian Silicon Valley” consists of the famous IT university, India Institute of Technology (IIT) and two of the biggest 5 IT firms in India, Tata and Infosys, developing the second-large clustering effect in the world (張燕, 2008). In China, only the Zhongguancun Science Park consisting the Tsing Hua and Beijing University has the size comparable to the average of Indian’s IT clusters (鄭昱君, 王豔霞, 2009).

Moreover, China's vendor community is small, fragmented, and lacks quality and experience, implying that generally a foreign client would need to invest in its own in-house offshore development centers (ODC). This imposes significant costs and additional risks for a potential client, something that only very large organizations or those aiming to serve the Chinese markets may be able to bear.

To the contrary, India has a well-organized association of IT and ITES vendors, called
NASSCOM, which is able to influence and guide government policies and actions. It represents Indian vendors in various international forums and interacts with overseas industry associations and government agencies. It assists Indian vendors in organizing their efforts to meet emerging challenges such as data protection, security, a centralized repository for supporting employee background verification, skill testing for IT and ITES candidates, forecasting the demand for services, and identifying future trends. It also works actively with Indian educational institutions to help update their curricula and programs to meet emerging industry needs in IT and ITES sectors. It is expected to play a strong leadership role in the future growth of the IT&ITES sector in India (Kailash Joshi and Srikanth Mudigonda, 2008).

4. Openness of the Outsourcing Market

Under the Service Trade Openness Index (IT service), its formula given by IMF, India is ranked at 5 while China at 41 only, out of 59 countries in our data base\(^\text{19}\) (Appendix 4). Therefore, it shows that although a revised Foreign Trade Law has been established in 2004, following the entry of World Trade Organization in 2003, there are still entry barrier of IT service market for foreign owned enterprises in China. From the below table, we can see that China is keeping to increase the market openness, but still under 0.002 till 2006, while India has been above 0.02 since 2002.

\(^{19}\) Ireland is at the top and it is interesting to see that those developed world power are among the lower rank, e.g. U.S.(49), Japan(57), probably due to their (strategic) barrier of technology transfer.
Table 6

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>0.0005</td>
<td>0.0006</td>
<td>0.0012</td>
<td>0.0013</td>
<td>0.0015</td>
<td>0.0013</td>
<td>0.0018</td>
</tr>
<tr>
<td>India</td>
<td>0.0105</td>
<td>0.0174</td>
<td>0.0204</td>
<td>0.0221</td>
<td>0.0266</td>
<td>0.0317</td>
<td>0.0381</td>
</tr>
</tbody>
</table>

Data Source: IMF data, 2006

5. **Taxation Benefit**

Under KPMG’s data in 2009, China imposed 25% corporate tax, much lower than India’s 33.99% (Appendix 1). Although removing the tax seems to be easy for any government, the high corporate tax in India is probably related to the idea of equity which is valued high and generally accepted in society, and thus the tax cannot be easily removed. To the contrary, China society always advocate the idea that development is the biggest “dao li” (argument).

6. **Property Right Protection**

Property right protection in China is always lagging behind, comparing to the developed countries. In Global Piracy Study, 2008 by Business Software Alliance & IDC shows that although China government has spent lots of effort in protecting intellectual property, e.g. having released new patient law with heavier penalty in 2003, piracy case is still among the top of the world. Therefore, China (4) scored higher in protecting property right than India (3.6)\textsuperscript{20} in 2008 (Appendix 1), she (80%) still had higher piracy rate than India (68%), comparing to the world average, 54%. The most probable reason is that China government is reluctant to enforce the law strictly.

\textsuperscript{20} The score is among (lowest)1-7(highest)
In a nutshell, both China and India have their own area of advantage in the competition in the leading position of future IT service outsourcing market. China has its resource endowment advantage, including a large pool of generally-skilled labour, relatively more completed basic infrastructure and taxation benefit; while India has its first-mover advantage in scale of firms, enjoying large economies of scale, and her stronger property right enforcement helps her a lot in the competition. Therefore, there will not be any party gaining the upper hand against the other unless any new economic or social or political factors appear.

VII. Model Limitation and Suggestion

There are two limitations in this research report, which is the source and size of data base.

1. **Data Source**

   The data of 13 driving factors comes from different single years between 2006 and 2010 because there is no any particular year of which all driving factors’ data are available while generally the most updated data are always not in free use. The suggestion here for future study is to use more parameters which are completely free, to be the proxies of those driving factors.

2. **Size of Data Base**

   This report uses cross-section data of 59 countries in a point of time (06, 07, 08, 09, or
10), but not the panel data of those countries in a period of time. The reason is that the IT service outsourcing sector is a relatively new industry and there are no enough accurate period data of all 59 countries from independent organizations or statistic bureaus of governments. However, when time goes on, more data will probably available for future study.

**VIII. Conclusion**

By the new competitive model we have developed specific to the IT service outsourcing industry, those outsourcing service customers basically put *cost of the service* they get at the first priority, rather than the *quality of the service* because they would probably outsource the *lower part of a whole value chain* only, rather than those *high-end service processes* due to difficulty in outsourcing and national security concern.

In this way, the most probable winner in the IT service outsourcing market should be those countries having a large pool of generally-skilled workers, completed basic infrastructure, large scale of firms (& higher level of market openness), sound government tax benefit. All these factors were only considered as important to those traditional (manufacturing) industry by the general academy while IT service outsourcing was generally considered as a “new” industry, especially by mainland literature. By empirical study of the international experience, a large amount of highly skilled labour (e.g. scientists), strong base of IT infrastructure, good quality of firms, large public spending in R&D (thus high technology level) and huge size of domestic capital accumulation are not so significant to the development of IT service outsourcing which is, in fact, more or less the
same as those traditional industries in term of driving factors and stage of the value chain. However, property right protection (both law setting and enforcement) looks more crucial in developing modern service outsourcing industry, than in traditional manufacturing export industry.

Under this framework, two important messages should be given to our readers. First, neither China nor India could be said to have gained an upper hand in the struggle of service outsourcing industry (except the emergence of new factors or new constraints) because both parties have different advantages in service outsourcing now and in foreseeable future. Moreover, Will the large domestic market of China with potentially high purchasing power be good for the development of outsourcing industry (especially onshore outsourcing as many people say)? The answer by empirical study is “NO”, because the generally low-level service quality of China’s service providers may not catch up with the increasing service quality demand of Chinese customers.

Second, there may not be technology transfer or spillover from foreign developed countries since the service outsourced to low-cost countries is probably those service processes in lower value chain. The ideal of some Chinese to transforming China into World Corporate from World Factory by developing service outsourcing industry may not come into the reality. China may just transform from World Goods Factory to World Service Factory. Therefore, we could only say service outsourcing is only one check point of our economic “Long March” of 21st century. That means it could help keeping China a fast economic growth and absorbing large labour force without using extensive method which empowers the economy in the expense of limitless amount of energy, land and labour force. However, service outsourcing must not be the end.
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