Determinants of Intra-Industry Pharmaceutical Trades in China and Its Primary Global Partners

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Abstract

This study examined the relationship of knowledge sharing, gross domestic product, economic development, and global demand on competitive advantage among intra-industry trade among pharmaceutical companies operating in China and its international partners. ⊞ It presented the demographic profile, key variables on workforce, years founded, annual income and several indicators using a likert scale questionnaire. The research utilized a quantitative methodology that incorporated multi-regression analysis, ⊞⊞ to find trends, patterns, and correlations using the following statistical treatment frequency, percentage, mean, median, standard deviation, and multiple regression. The study highlighted the need for proactive measures and focused approaches to enhance knowledge exchange within firms and the value of GDP in supporting economic growth and in making strategic decisions. The study underscores the need for comprehensive methodologies and strategic position in formulating policies for long-term growth. It also presented the impact of knowledge sharing, GDP, economic development, and global demand on competitive advantage, emphasizing the need for proactive tactics and strategic considerations affecting economic development.

Keywords: Knowledge sharing, gross domestic product, economic development, global demand, competitive advantage

Introduction

China's pharmaceutical and healthcare value added output is expected to grow rapidly in 2022 and 2023, with an average annual growth rate of 9.4% from 2019 to 2025. ⊞The government's National Reimbursement Drug List (NRDL) and Volume-based Procurement (VBP) policy aim to provide widespread access to high-quality medications at reduced costs. Drug companies must compete to sell their goods in large quantities to public hospitals, requiring significant sales price reductions. ⊞The need for higher-quality medications will rise as consumer affluence rises and China's population ages quickly. ⊞The government is working to increase the average size of enterprises and consolidate the sector to support this. ⊞The distribution of drugs in China has been expanding gradually, and banks are eager to lend money to Chinese pharmaceutical companies. ⊞Intra-industry trading between China and the OECD has grown from 12% of all industrial trade in 1980 to over 20% in 1992. ⊞However, China's industrial policies favor state-owned businesses, disagreements over WTO commitments, and failure to uphold American intellectual property rights impact bilateral commerce. ⊞

China is the world's top manufacturer of medicinal chemicals, with a pharmaceutical market estimated to reach $154 billion by 2020. This growth is expected to overtake the US as the second-largest in the world, with the industry's value expected to reach $382 billion in 2020. China's government's increased investment in healthcare and R&D has created opportunities for cutting-edge goods and technology. However, the pharmaceutical industry faces challenges due to macroeconomic factors, such as restrictions on antibiotic use and tighter oversight of health insurance reimbursement. Chinese multinational pharmaceutical companies must also navigate

competitive pricing, erratic drug approval timelines, and regulatory changes. The growth of China's provincial and county healthcare markets is crucial for international pharmaceutical businesses, but foreign companies must overcome regional variations, fierce competition, and lesser illness awareness among rural populations. This research study aims to fill a contextual and knowledge gap in the pharmaceutical industry by investigating the relationship of knowledge sharing, gross domestic product, economic development, and global demand on intra-industry trade and competitive advantage.

The study's findings highlight the pharmaceutical industry's reliance on technology, research and development, and preventive healthcare to fuel its growth. Effective collaboration is crucial for tackling intricate medical issues through streamlined knowledge sharing. Knowledge management plays a pivotal role across various functions like R&D, sales, marketing, and quality assurance. Industry hurdles encompass steep product development expenses, the repercussions of the COVID-19 pandemic, and a shift towards preventive healthcare strategies. Collaborative data initiatives are reshaping drug discovery processes, enhancing research credibility, and fortifying data security within the industry.

Statement of the Problem

The objective of this study is to investigate the relationship of knowledge sharing, gross domestic product, economic development, and global demand on competitive advantage among intra-industry trade among pharmaceutical products in China and its main trading partners around the world. As well as to determine the role of competitive advantage. Specifically it answered the following questions:

1. What is the profile of the Pharmaceutical Companies in China in terms of:

1.1 Years of establishment

1.2 Capitalization

1.3 Factory scale based on the number of employees

2. How do the respondents evaluate the extent of knowledge sharing, gross economic product, economic development and global demand based on the listed indicators among the pharmaceutical companies in China?

3. Do the assessments of respondents on Knowledge Sharing, Gross Domestic Product, Economic Development, and Global Demand exhibit a notable correlation to Competitive Advantage?

4. Based on the findings, what international trade model could be proposed?

Conceptual Framework

The variables studied in this research are knowledge sharing, gross domestic product, economic development, and global demand as independent variables, with competitive advantage as the dependent variable. The aim of the study is to determine how the independent variables impact the dependent variable. Specifically, the research assessed the relationship of (a) knowledge sharing on competitive advantage; (b) gross domestic product on competitive advantage; (c) economic development on competitive advantage; and (d) global demand on competitive advantage based on the listed indicators under each independent variables from 40 pharmaceutical employees among executives and top managers in the pharmaceutical industry in the Eastern China zone and the South China zone.

Figure 1: Conceptual Framework
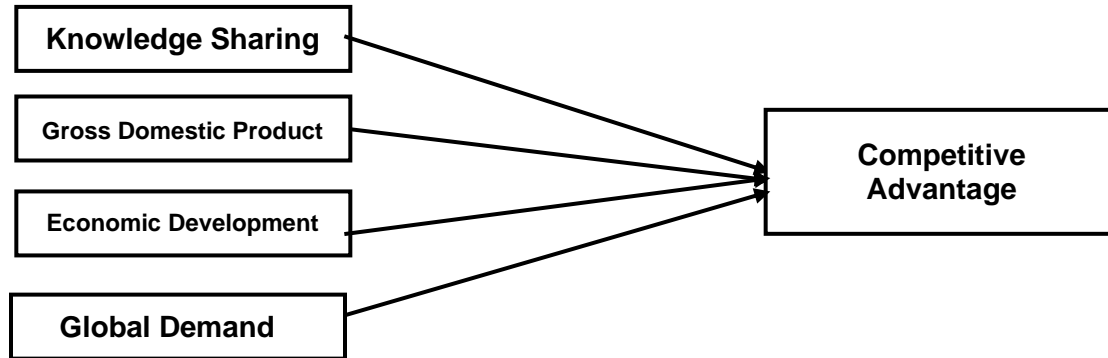
Methodology

The researchers used quantitative research with a correlational research design in this study. To qualify respondents for the survey, they must be an employee of the firm, have access to data on worldwide distribution/intra-industry trade, and have been with the company for at least two years. They were selected using a stratified random sampling using G Power with power $=.80(1 – \beta)$, effect size $=.25$, and $\alpha =.05$. This study used primary data from employers or top managers in pharmaceutical firms through electronic survey questionnaires via a BAIDU form. Cronbach's α was used for the reliability and validity of the questionnaire. The results were analyzed using frequency, percentage, mean, median, standard deviation, and multiple regression for the treatment of data.

Results and Discussion

1. Profile of the Pharmaceutical Firms

Table 1

Profile of the Pharmaceutical Company

Years of Establishment	Counts	%	Rank
Less than 5 years	38	10.9	3
Between than 5 years - 10 years	77	22	2
More than 10 years	235	67.1	1
Total	350	100	
Number of Employees	**Counts**	**%**	**Rank**
Small scales (50 to 100 workers)	88	25.1	1
Middle scales (101 to 300 workers)	120	34.3	2
Big scales (at least 301 workers)	142	40.6	3
Total	350	100	
Income	**Counts**	**%**	**Rank**
50 – 80 million yuan	36	10.3	4
81 – 100 million yuan	40	11.4	3
101 – 130 million yuan	108	30.9	2
131 – 150 million yuan	166	47.4	1
Total	350	100	

Table 1 shows the profile of the pharmaceutical firms in terms of years of establishments, number of employees and income. Predominantly, firms established for more than ten years(n=235 or 67.10%) constitute the majority, with large-scale establishments employing over three hundred one workers (n=142, or 40.57%) being the most common. Financially, firms generating

between one hundred thirty-one to one hundred fifty million Yuan (n=166 or 47.50%) in revenue

hold the top position.

2. **Respondents' evaluation on the extent of knowledge sharing, gross economic product, economic development and global demand**

Table 2
Extent of Knowledge Sharing

Indicators	Mean	Interpretation
The company stimulates staff to share their expertise for organizational success through both inward and outward innovation.	3.34	Good
The company promotes information sharing techniques.	3.39	Good
The company fosters environments where workers from all departments may practice and develop their knowledge manipulation abilities.	3.36	Good
The company develops initiatives for knowledge exploration and exploitation.	3.41	Good
The company introduce methods for information sharing. (example: meetings, presentation of new ideas, group brainstorming, etc.)	3.11	Good
Extent of Knowledge Sharing	**3.38**	**Good**

Table 2 shows that companies appear to be performing well in stimulating knowledge

sharing among its staff. Various initiatives, such as promoting information sharing techniques,

fostering environments for knowledge development, and introducing methods for information

sharing, receive positive ratings from respondents, with scores ranging from 3.11 to 3.41 out of

5. The overall extent of knowledge sharing, with a score of 3.38 with SD = 0.376), is deemed

good. This suggests that the company's efforts in encouraging knowledge sharing are perceived positively by the respondents, which could potentially contribute to organizational success through both inward and outward innovation.sharing promotes creativity inside the company. (Del Giudice & Straub 2011, Chen & Huang, 2009, Tsai, 2001) and Organizational commitment is the most significant influencer on knowledge sharing (Vasanthapriyan,2019).

Table 3

Extent of Gross Domestic Product

Indicators	Mean	Interpretation
The company receives funds for medical research from the government.	3.13	Good
The company's annual growth rate of pharmaceuticals market value increases.	3.12	Good
The company has business associates around the world.	3.03	Good
The company's income is influenced by government spending on pharmaceuticals.	3.04	Good
The company's trade allies are individuals that value life, and commit to share their expertise in the field.	3.07	Good
Extent of Gross Domestic Product	**3.08**	**Good**

Table 3 reflects, the company's performance in various aspects related to Gross Domestic Product (GDP) is generally rated as good by the respondents. The company's receipt of funds for medical research from the government, along with the increase in the annual growth rate of the pharmaceutical market value, receives moderately positive ratings of 3.13 and 3.12, respectively. Additionally, the presence of business associates worldwide and the influence of government spending on pharmaceuticals on the company's income are perceived positively, albeit with

slightly lower ratings of 3.03 and 3.04. Moreover, the company's trade allies, who value life and share expertise in the field, also receive a favorable rating of 3.07. Higher product quality and investment attractiveness increase the competitiveness of an enterprise, with more conservative investors perceiving it as more profitable (Yekimov, 2023).

The findings on the extent of Gross Domestic Product (GDP) related factors within the company, with a score of 3.08 SD = 0.379, is considered good. This indicates that the company is perceived to be effectively leveraging various aspects of GDP to its advantage, potentially contributing to its overall success in the pharmaceutical industry.

Table 4

Extent of Economic Development

Indicators	Mean	Interpretation
The company asserts the function of trade in the development plan or strategy of economic development and growth.	3.49	Good
The company includes general statements on the role of trade in economic growth and development.	3.52	Excellent
The company distributes their goods globally.	3.40	Good
The company has their own industrial units in growing their medicinal plants.	3.48	Good
The company has allied transportation groups that ship their goods locally/internationally.	3.08	Good
Extent of Economic Development	**3.50**	**Good**

Table 4 shows the company's performance in various aspects related to Economic Development is generally rated positively by respondents (M = 3.50, SD = 0.282). The extent of

Economic Development within the company, with a score of 3.50, is considered good. This indicates that the company's strategies and initiatives related to economic development are generally perceived positively by respondents.

The company's assertion about the function of trade in its development plan or strategy for economic development and growth receives a rating of 3.49, indicating a good perception. Additionally, the inclusion of general statements on the role of trade in economic growth and development is perceived even more positively, with an excellent rating of 3.52. The company's global distribution of goods is also viewed favorably, with a rating of 3.40. Moreover, having their own industrial units to grow medicinal plants is seen as a positive attribute, with a rating of 3.48.

However, the rating for having allied transportation groups that ship goods locally/internationally is slightly lower at 3.08, suggesting a relatively weaker perception compared to other aspects of economic development. Economic development is influenced by government spending, GDP, fertility rate, and agricultural, forestry, and fishing values, with the final consumption expenditure of the general government being the most significant factor. (Maksimović, 2019)

Table 5

Extent of Global Demand

Indicators	Mean	Interpretation

The company includes trade as a priority area and specific operational trade objectives to be achieved in specific sectors.	3 .25	Good
The company supplies both national and international public hospitals and clinics.	3 .27	Good
The company produces around a hundred thousands of medicines of any kind daily.	3 .23	Good
The company has enough supply to distribute to their respective partners.	3 .22	Good
The company has strategic plans for the increase of demands globally.	3 .20	Good
Extent of Global Demand	**3** **.24**	**Good**

Based on the analysis provided, the company's performance in various aspects related to Global Demand is generally rated positively by respondents. The overall results show a good level of global demand (M = 3.24, SD = 0.256). the extent of Global Demand within the company, with a score of 3.24, is considered good. This suggests that the company's strategies and initiatives related to meeting global demand are generally perceived positively by respondents, although there may be room for improvement in terms of strategic planning for increasing global demand.

Specifically, the inclusion of trade as a priority area and the establishment of specific operational trade objectives are perceived as positive attributes, with a rating of 3.25, indicating a good perception. Also, the company's ability to supply both national and international public hospitals and clinics is viewed favorably, with a rating of 3.27 while production of a significant quantity of medicines daily, estimated at around a hundred thousand of any kind, also receives a positive rating of 3.23. Furthermore, having sufficient supply to distribute to respective partners is seen as a positive aspect, with a rating of 3.22. This confirms that GDP per capita at

purchasing power parity (PPP) is a more useful measure for comparing living standards between nations, as it better reflects differences in cost of living and inflation rates. (Agarwal, 2018)

However, the rating for having strategic plans for increasing global demand is slightly lower at 3.20, indicating a relatively weaker perception in this area.

Table 6

Extent of Competitive Advantage

Indicators	Mean	Interpretation
The company always produces premium quality goods/services.	3.12	Good
The company commits on using AI to produce goods.	3.14	Good
The company has sections of human labor that weighs and checks the amount of medicine made by AI are fair.	3.51	Good
The company used the modern packaging of products. (example: film coating, vials, ampouls, etc.)	3.01	Good
The company hires qualified personnels that render services to their clients. (example of services: check-ups, healthcare treatments, etc.)	3.90	Excellent
Extent of Competitive Advantage	**3.24**	**Good**

Based on table 6, the company's performance in various aspects related to Competitive Advantage is generally rated positively by respondents, with a score of 3.24, is considered good. This suggests that the company's strategies and initiatives related to product quality, technological innovation, workforce management, and customer service are generally perceived positively by respondents, contributing to its competitive position within the industry.

The company's commitment to producing premium quality goods/services is perceived favorably, with a rating of 3.12, indicating a good perception. Additionally, the utilization of AI

in production processes is viewed positively, with a rating of 3.14. The presence of sections of human labor to ensure fairness in the production process conducted by AI receives a notably high rating of 3.51, suggesting a strong perception of this aspect. Economic development is driven by the co-evolution of technologies and institutions, with institutions playing a key role in shaping the evolutionary processes at work (Nelson,2019).

However, the rating for using modern packaging of products is slightly lower at 3.01, indicating a relatively weaker perception in this area. Nevertheless, the company's exceptional performance in hiring qualified personnel to render services to clients is highly praised, with an excellent rating of 3.90.

3. Assessments of respondents on Knowledge Sharing, Gross Domestic Product, Economic Development, and Global Demand in relation to Competitive Advantage

Table 7

Analysis of Knowledge Sharing towards Competitive Advantage

Predictor	Estimate	SE	t	p	Interpretation
Knowledge Sharing to Competitive Advantage	0.218	0.0804	2.706	0.008	**H₀1 Rejected**

Note: If the p-value is lower than 5% or 0.05, it is statistically significant. If the p-value is greater than 5%, the result is statistically non-significant.

The analysis indicates that Knowledge Sharing has a significant effect on Competitive Advantage, with an estimated coefficient of 0.218 and a standard error of 0.0804. The t-value associated with this coefficient is 2.706, which corresponds to a p-value of 0.008. Since the p-

value is less than the conventional significance level of 0.05, the null hypothesis (H01), is

rejected. This suggests that Knowledge Sharing positively influences Competitive Advantage,

highlighting the importance of fostering a culture of knowledge exchange within the organization

to gain and sustain a competitive edge. Knowledge-sharing strategies enhance innovation and

business potential in manufacturing and new product development firms (Mathrani,2020) and

Knowledge sharing significantly influences innovation culture, business performance, and

sustainable competitive advantage in SMEs. (Arsawan, 2020).

Table 8

Analysis of Gross Domestic Product towards Competitive Advantage

Predictor	Estimate	SE	t	p	Interpretation
Gross Domestic Product to Competitive Advantage	0.413	0.0949	4.356	< .001	**H₀2 Rejected**

Note: If the p-value is lower than 5% or 0.05, it is statistically significant. If the p-value is greater than 5%, the result is statistically non-significant.

The analysis of Gross Domestic Product (GDP) towards Competitive Advantage reveals a

significant relationship between the two variables. The estimated coefficient for GDP is 0.413,

with a standard error of 0.0949. The corresponding t-value is 4.356, and the p-value is less than

0.001, indicating a highly significant relationship. Therefore, the null hypothesis which suggests

no significant effect of GDP on Competitive Advantage, is rejected. This implies that GDP has a

positive influence on Competitive Advantage within the context of the analysis, emphasizing the

importance of economic factors in shaping organizational competitiveness.

Table 9

Analysis of Economic Development towards Competitive Advantage

Predictor	Estimate	SE	t	p	Interpretation
Economic Development to Competitive Advantage	0.334	0.0642	5.209	< .001	**H₀3 Rejected**

Note: If the p-value is lower than 5% or 0.05, it is statistically significant. If the p-value is greater than 5%, the result is statistically non-significant.

The analysis of Economic Development towards Competitive Advantage demonstrates a significant relationship between the two variables. The estimated coefficient for Economic Development is 0.334, with a standard error of 0.0642. The associated t-value is 5.209, and the p-value is less than 0.001, indicating a highly significant relationship. As a result, the null hypothesis which posits no significant effect of Economic Development on Competitive Advantage, is rejected. This suggests that Economic Development positively influences Competitive Advantage within the context of the analysis, emphasizing the importance of economic growth and development strategies in enhancing organizational competitiveness.

Table 10

Analysis of Global Demand towards Competitive Advantage

Predictor	Estimate	SE	t	p	Interpretation
Global Demand to Competitive Advantage	0.187	0.0745	2.879	0.012	**H₀4 Rejected**

Note: If the p-value is lower than 5% or 0.05, it is statistically significant. If the p-value is greater than 5%, the result is statistically non-significant.

The analysis of Global Demand towards Competitive Advantage reveals a significant relationship between the two variables. The estimated coefficient for Global Demand is 0.187, with a standard error of 0.0745. The corresponding t-value is 2.879, and the p-value is 0.012, indicating a statistically significant relationship. Therefore, the null hypothesis (H04), which suggests no significant effect of Global Demand on Competitive Advantage, is rejected. This implies that Global Demand positively influences Competitive Advantage within the context of the analysis, highlighting the importance of understanding and addressing global market dynamics to enhance organizational competitiveness. The pharmaceutical industry contributes significantly to US research and development, but rising costs and pressure on price controls require further policy changes (Lakdawalla, 2018).

These findings reveal the significant effects of various factors on Competitive Advantage within the pharmaceutical industry. Firstly, Knowledge Sharing exhibits a substantial impact on Competitive Advantage, with a p-value of 0.0089,, Gross Domestic Product (GDP) demonstrates a significant influence on Competitive Advantage, as indicated by a p-value of less than 0.001, Similarly, Economic Development showcases a noteworthy effect on Competitive Advantage, with a p-value of less than 0.001, Lastly, Global Demand is identified as significantly affecting Competitive Advantage, with a p-value of 0.012. All of these results lead to the rejection of the null hypothesis presented. These findings highlights the importance of knowledge sharing, GDP, economic development, and global demand in shaping and enhancing Competitive Advantage within the pharmaceutical sector.

4.   **The proposed international trade model based on the findings.**

Figure 2 *Output of the Study*
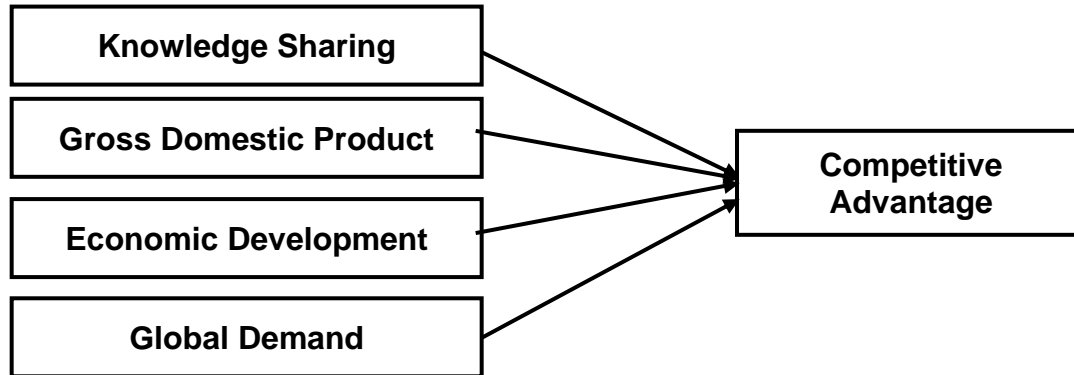
Organizations must implement comprehensive strategies in light of the substantial influence that global demand, GDP, economic development, and knowledge sharing have on competitive advantage. By incorporating these components into their operations, organizations may become more resilient, innovative, and successful over the long term in a very competitive global economy.

The determinants of intra-industry pharmaceutical trades between China and its main international allies have a profound effect on competitiveness, innovation, market dynamics, regulatory frameworks, economic growth, and global health outcomes. Comprehending and using these factors can result in reciprocal partnerships, fostering a vibrant and interdependent worldwide pharmaceutical environment. Dynamic capabilities positively influence competitive advantage in SMEs, with performance variables mediating the impact on innovation capacity. (Fabrizio, 2021)

Conclusions

In conclusion, the study provides comprehensive insights into various aspects of the pharmaceutical industry and their implications for organizational success and competitive advantage. Firstly, the demographic profile of pharmaceutical firms reveals key attributes such as the number of workers, years of establishment, and income, indicating a good understanding among respondents regarding knowledge sharing, GDP, economic development, global demand, and competitive advantage. The findings emphasize the importance of proactive measures and focused approaches in augmenting knowledge exchange within firms, underscoring the significance of cultivating a culture of knowledge sharing for long-term organizational success. Similarly, insights into GDP highlight the complex elements supporting economic growth in the pharmaceutical industry, informing strategic decision-making and policy formation to maintain and improve economic success.

The study provides valuable data on variables affecting economic development, stressing the need for comprehensive methodologies and strategic deliberations in formulating policies and programs to promote long-term growth. Additionally, the analysis underscores the crucial role of addressing global demand through proactive strategies to gain a competitive edge in the interconnected and dynamic business environment. Furthermore, the study reveals a significant effect of knowledge sharing, GDP, economic development, and global demand on competitive advantage, highlighting the proactive tactics and strategic considerations necessary for organizations to thrive in an environment where innovation and adaptation are critical. These findings contribute to a deeper understanding of the complex interplay between macroeconomic variables, organizational strategies, and competitive advantage in the pharmaceutical industry,

providing valuable insights for stakeholders, policymakers, and companies alike to inform decision-making and drive long-term success.

Recommendations:

Based on the comprehensive insights provided by the study on various aspects of the pharmaceutical industry, several recommendations can be made:

1. Encourage pharmaceutical firms to prioritize and invest in initiatives that foster a culture of knowledge sharing among employees..

2. Encourage pharmaceutical firms to utilize insights from GDP analysis to inform strategic decision-making and policy formation.

3. Advocate for the development and implementation of comprehensive economic development strategies within the pharmaceutical industry.

4. Encourage pharmaceutical firms to address global demand through proactive strategies aimed at gaining a competitive edge in the dynamic business environment.

5. Advocate for pharmaceutical firms to prioritize innovation and adaptation in their strategic planning.

Recommendations for further study:

1. A study to test the recommended model for subjective measurement, validation and further verification for practical application.

2. A study to replicate and compare the differences between locales in different areas and compare results to broaden the scope of this research.

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