The Market Structure of Industry and Pricing Behaviour in a developing Economy: An Analytical Study of Pharmaceutical Industry of India

Synopsis

Submitted to

Saurashtra University, Rajkot

For the award of the degree

Of

DOCTOR OF PHILOSOPHY

In
Economics
(Faculty of Arts)

By
Niharika Sunil Bajeja

Research Supervisor

Dr. P G Marvania
Professor & Head
Department of Economics
Saurashtra University
Rajkot

February 2014
Table of Contents

1  Preamble                   1
2  Research Problem          4
3  Objectives                4
4  Hypothesis                5
5  Analytical Framework      5
6  Empirical Model           8
7  Methodology               9
8  The Sample                10
9  Data Analysis             11
10 Hypothesis Testing        12
11 Implications              14
12 Summary                   14
13 Recommendations           17
14 Challenges                19
15 Bibliography              20
16 Questionnaire             24
The Market Structure of Industry and Pricing

Behaviour in a developing Economy:

*An Analytical Study of Pharmaceutical Industry of India*

**Preamble**

There are two important goals that pharmaceutical industry is aimed to fulfil for society. First, it is in the benefit of society to improve competitiveness in the market for drugs in order to keep drug prices at a relatively competitive level. A competitive drug market is considered to limit the upsurge of health care costs in the country. Second, it is in the best interest of society if the industry’s technology advances at a reasonably fast rate. Looking at the history of the pharmaceutical industry, these two goals have been frequently perceived to conflict each other.

The pharmaceutical industry is structurally competitive, with low overall concentration. Although concentration within specific therapeutic categories is greater, the market is contestable in the long run, however, since there are no barriers to entering the process of research and discovery by established or new firms, as evidenced by the large number and high rate of turnover of start-up companies. It is incorrect to infer that entry would take 12 years (the mean time from discovery to approval for new drugs). Competitive entry is initiated long before a promising innovative compound for a new indication or with a new mode action reaches the market. Competitor firms can obtain information on the drug candidates under development by other firms in the industry, from patent filings and regulatory filings with the FDA. The techniques of rational drug design make it increasingly easy for competitors to develop similar but chemically distinct compounds to a promising new compound under development. Thus the pioneer may not necessarily be the first to reach the market and even if it is, follower compounds that are close therapeutic substitutes now enter the market within months.
To the extent that market power exists, it results largely from legal restrictions and other institutional factors. The role of patents in intentionally restricting competition has already been described. In addition, in most industrialized countries the demand for ethical drugs is channelled by legislation through physicians and other licensed professionals who are authorized to prescribe drugs. This separation of decision maker from payer makes demand less elastic, if physicians are uninformed about drug prices or, even if informed, are imperfect agents for patients. Insurance coverage further reduces price sensitivity. Traditional insurance that reimburses for the price of the drug, net of a fixed co-payment fee per script or a small co-insurance percentage, reduces demand elasticity in familiar ways. To offset this, both private and public insurers increasingly use strategies designed to make physicians more cost-conscious with respect to price and volume of prescriptions. An important consequence of this vital role of physicians and insurance coverage in influencing demand for drugs is that demand conditions differ across countries and over time, as medical reimbursement and insurance systems change. Thus any analysis of the form and extent of competition in the pharmaceutical industry is context-dependent and must take into account institutional arrangements in the local medical and insurance markets.

The pharmaceutical industry is of interest to the field of law and economics for two, related, reasons. First, the usual issues of structure, conduct and performance when applied to the pharmaceutical industry must take into account its unusually high rate of R&D, which implies a high rate of technical change, critical importance of patent protection, potential for market power and novel price and product competitive strategies. This raises interesting positive and normative issues related to prices, profits and public policy.

Second, the industry is heavily regulated in all major functions. Much of the early regulation and early economic literature focused on regulation related to safety and efficacy. Because pharmaceuticals may entail significant risks to health as well as potential benefits, all industrialized countries require that new drugs meet certain safety standards as a condition of market access.
The future structure of the industry, as it adapts to changing technology and regulation, is another interesting question with no certain answers. The emerging technologies of biotechnology and genomics are transforming the nature of R&D and comparative advantage within the industry. Small firms play an increasingly important role in the development of new drugs and new R&D technologies. Biotechnology and gene therapy have raised important safety and ethical issues for regulation. The alliances that link biotech firms with each other and with large pharmaceutical companies raise interesting questions related to agency and the nature of the firm.

In practice, the cost control strategies applied to drugs by private and public insurers differ across countries and continually evolve over time. A limited literature addresses the positive issue of measuring the effects of different insurance and regulatory structures on prices, drug expenditures and drug use. Harder to measure - and an important topic for future research - are effects of regulatory strategies on health benefits for current patients, on manufacturers’ incentives to invest in innovative R&D, and hence effects on future patients.

Under direct price regulatory schemes, the manufacturer must obtain approval of the price of a new drug before it can be reimbursed by the social insurance system. Subsequent price changes must also be approved and price decreases may be mandated. The criteria used for setting prices include cost, comparison with existing drugs and international price comparisons.

Manufacturers remain free to charge more than the reference price; however, since the patient must pay the difference, demand is highly elastic above the reference price, leading most manufacturers to drop their prices to the reference price.

The empirical analysis shows that reference pricing significantly reduced price levels and the rate of price increase, which is consistent with independent rather than collusive pricing by manufacturers. Branded drugs suffered a loss in market share despite a reduction in relative price under reference pricing. Prices of non-reference priced drugs increased, as predicted by an optimal life-cycle pricing strategy with reduced economic life and possibly with market segmentation.
Regulation and competition are to some degree substitutes: less regulated markets tend to have higher brand prices but larger generic market shares and lower priced generics, plausibly because substantial brand mark-ups and cross-price elasticity of demand are necessary conditions to attract significant generic entry.

Whereas the key research issue of the 1960s and 1970s was the design of market access controls, to appropriately balance reduction in risks to health and safety against delay in market access, the key issue in recent time's is the design of price regulatory strategies that provide an optimal trade-off between control of drug spending, access for patients to new, more advanced therapies, incentives for optimal use of drugs relative to other medical services and long-run incentives for manufacturers to develop new drugs for the future.

**Research Problem**

The proposed research will identify the behavior of entrepreneurs or managers of the pharmaceutical firms towards pricing of their products within given structure of Indian pharmaceutical market and industry.

**Objectives**

In the above context, the proposed research aims at analyzing:

1. To present an overview of Indian Pharmaceutical Industry and markets and to strategize means to identify anti-competitive activities prevalent in the pharmaceutical market.

2. To know the behaviour of the managers for pricing decision

3. To know the behavior of manager towards the competitive structure.

4. Review situation for the firm whether it is price leader / price follower in the industry.

5. To identify pricing strategies adopted by the firms.
Hypothesis

Based on the above objectives researcher has constructed following hypothesis:

Hypothesis 1 – Profit of the firm is depends upon sale, price and the market share of the firm.

Hypothesis 2 – Prices of the firm are influenced by sales, firm size, market concentration and experience of the firm in the market.

Hypothesis 3 – Prices are influenced by the cost and revenue of the firm.

Hypothesis 4 – There is no significant difference between sales turnover and cost of production of firms over past three years (2009 – 2011).

Analytical Frame Work

As is evident from the discussion so far, there is a vast body of literature in both the developed countries and in India that empirically explore the Schumpeterian hypothesis. However, there is no consensus with regard to the results of the analysis. The diverging results could probably be explained by measurement problems associated with the concept of Pricing and market concentration on the one hand and empirical procedures used in the estimation. However, the studies, in both the developed and developing countries, consider only R&D expenditure, R&D employment or patents as a proxy for pricing.

The input measures of pricing (R&D employment and R&D expenditure) are also widely used in studies in the developed country context. Scientists and research support staff are at the core of the research organization and are directly involved in the conduct of research. In this case, time units spent on research must be identified, which is always difficult. Kuznets (1962) calls for a study of specialized human capabilities to measure the inventive capacity of personnel. Exact time units, mental effort and human ability measures are beyond the scope of economics
(Rajeswari 1992). Thus, the measure of the research efforts of personnel fails to be a complete measure of its own. Research expenditure is the most important quantifiable measure of research effort that is used in empirical studies. It is a logical and direct measure, but can still be incomplete. Thus, the diverse and incomplete measurement of pricing could be one of the reasons for the observed variation of results in empirical studies.

The measurement of concentration is yet another problem faced by researchers. It is not possible for a single concentration measure to capture all components of market structure. The most commonly used index in the empirical studies in the developed and Indian context is the K-firm concentration index, defined as the cumulative share of the Kth firm. Its popularity is mainly due to easy availability of data and ease of computation. The choice of K is, of course, arbitrary. Conventionally in developed economies, K takes the value between 3 to 8. The problem with the measure is that it does not disclose any information on firms ranked after K. A more comprehensive measure of market concentration is the Hirschman-Herfindahl index. It is defined as the sum of the squared shares of ‘n’ firms; its advantage is that it takes into account the shares of all the firms in the market. At the same time, the squaring up of the values means that smaller firms contribute less than proportionately to the value of the index. This is a valid approach, as the entry of a number of small firms with minuscule market shares would hardly affect the market power of the top firms. But a prerequisite for this index is that information on the market shares of all firms be available, a fact which restricts its use.

A problem common to these two measures is that they are static in nature and do not capture movements in concentration levels, as top firms keep on changing their ranks over the years. This is an obvious defect as the intensity of competition depends largely on the ability of the top firms to maintain their position (Vijayabhashkar 1991). Still, most of the empirical studies have taken a four-firm concentration ratio or the Herfindahl index, as they are easy to compute and serve the purpose with little defects, which usually can be ignored. However, these incomplete measures of concentration could probably have resulted in the diverse
results seen in the empirical studies attempting to verify the market concentration/innovative activity relationship.

Inter-industry specificities or technological opportunities can play a major role in determining the relationship between innovation and firm size, and innovation and market concentration. Very few studies in India recognize inter-industry differences in the Indian context. Understanding the importance of inter-industry differences in the sample, Kumar (1987) introduces industry dummies to control for technological opportunity. The problem is that in addition to technological opportunities, industry dummies also represent other characteristics of the industry. Kumar and Saqib (1996) in analysing the probability and intensity of firms that do R&D, also use industry dummies to counter inter-industry differences. According to these authors, inter-industry differences in the opportunities for product or process innovation play an important role for pricing.

The opportunities for adaptation vary across industries, depending on many factors, including the maturity of technology, the gap between local and global standards, the degree of monopolistic hold over technology, the nature of intellectual property protection and the need for such adaptation arising from different local conditions. Kumar and Saqib use a total of nine industry dummies to capture inter-industry specificities for a sample of 291 manufacturing firms and find that technological opportunity is very high in the chemicals and pharmaceuticals industry. The best way to capture the inter-industry differences in the sample is to test the hypothesis in different industries separately. Siddharthan (1988) attempts this in four industries, apart from pooling the whole sample and testing the hypothesis, indicating that inter-industry specificities are an important determinant of research effort and should be included to obtain a reliable relationship between market structure and innovative activity.
Empirical Model

Linear regression

The interest of this test lies in the relationship between variables profit (dependent) and Sales and Price (independent). This linear regression gives an answer to different hypothesis used in the research. The next paragraph gives the equation for the linear regression models. The non-standardized coefficients are used to calculate the value of the utility of the dependent variable. The results are in a ceteris paribus condition.

The regression analysis is done in SPSS. The main effect of this regression analysis is to find what relations exist between the variables, more precisely, whether one variable 'causes' the other. In this study the regression analysis explains what effect price and sales has on the profit of a specific pharmaceutical firm. The general equation model of the linear regression model is:

\[ y_i = \beta_0 + \beta_1 x_{1i} + \epsilon_i \]

For this study the following equations are used:

A) \( y = \beta_0 + \beta_1 \text{Firm Size} + \beta_2 \text{market concentration} + \beta_2 \text{experience} + \epsilon \)

B) \( y = \beta_0 + \beta_1 \text{sale} + \beta_2 \text{price} + \beta_3 \text{market share} + \epsilon \)

OR

A) Price = \( \beta_0 + \beta_1 \text{Firm Size} + \beta_2 \text{market concentration} + \beta_2 \text{experience} + \epsilon \)

B) Profit = \( \beta_0 + \beta_1 \text{sale} + \beta_2 \text{price} + \beta_3 \text{market share} + \epsilon \)
**METHODOLOGY**

The study is based on the operational framework provided by DFID’s “Competition Assessment framework (CAF): An Operational Guide for Identifying Barriers to Competition in Developing Countries”, published in 2008. The CAF provides a flexible diagnostic tool that poses sets of questions that are grouped by theme. The nature of questions will depend on the particular sector taken up for assessment. It then follows with steps to analyse the state of competition in the selected sector. It includes: identifying the markets and competitors, examining the market structure, looking for barriers to entry, looking for anticompetitive conduct, considering vested interests and the principal beneficiaries, and identifying government policies or institutions that limit competition.

In the survey, data are collected on the availability and pharmaceutical firms from the public, private and other sectors (e.g. NGOs) in six regions of a country. Data on medicine prices, but not availability, are also collected for government procurement; these data are usually collected at the central level (e.g. government procurement office). As survey is at national level, the methodology be applied at the state or provincial level or that the number of regions surveyed be increased. Sampling is done in a systematic way to ensure that the findings are representative of the country or state/province in which the survey is being conducted.

A range of semi-structured interviews with experts in the area of pharmaceutical innovation and intellectual property rights were conducted as the second step in order to firstly, help clarify the structure and content of the study framework and secondly, to refine and provide content validation to the survey questionnaire.

Based on the Primary research and semi-structured interviews, a structured questionnaire was completed. A background report on the Indian pharmaceutical industry and emerging prospects and strategies from 2005 onwards was prepared to assist in identifying the main issues. The 181 firms that participated in the survey were chosen using a purposive probability sampling technique, from a list of
companies’ generated for purposes of this study using major Indian databases like the *India Info line* and *Pharmabiz* (export potential, R&D investments and total sales were used as the three main parameters to arrive at the ranking for the list generated for the survey).

The questionnaire consisted of five main parts: firm demographics, R&D issues and emerging strategies for process and product technologies, collaboration and inter-linkages, finance, and lastly, emerging marketing and business strategies. These sections were designed with the aim of generating as much information as possible on:

(a) Firm demographics, such as net sales turnover, focus of pharmaceutical activities, ownership structure of the firm, and main firm policies on various issues such as pricing;
(b) Emerging R&D and business strategies amongst firms in response to a transition towards increased intellectual property protection in India, especially the introduction of product patents; and,
(c) Firm views regarding the viability of compulsory licensing as a supply mechanism for least developed countries, and the circumstances under which they would consider this option as contained in the Indian Patent (Amendments) Act of 2005.

**The Sample**

The Sampling frame used was the ORGIMS Company list of Pharmaceutical companies for which ORGIMS Company conducts a retail audit in India. This ORG Retail audit data is also used by the Government of India as it is the only authentic data regarding Indian Pharmaceutical Industry available in India. The ORGIMS list contains 450 Pharmaceutical companies.

The sampling method chosen is simple random sampling which is a type of probability sampling. To calculate the sample size following formula was used.
If the researcher plans the results in a variety of ways or if he/she has difficulty in estimating the proportion or standard deviation of the attribute of interest, the following formula may be more useful.

In this study we determine 176 samples at 95% confident and accept 05% probability error, this calculation from Taro Yamanee formula.

\[ n = \frac{N}{1 + Ne^2} \]

\( n = \) sample
\( N = \) population
\( e^2 = \) probability of error

\[ n = \frac{315}{1 + 315 (0.05)^2} \]

\( n=176 \)

**Data Analysis**

Data analysis would be carried out by using concentration ratio, and linear regression analysis. These methods will be used accordingly the availability of data. Other than these certain statistical techniques such as factor analysis, rating scales, ANOVA, etc. will be used by the researcher.

A three page, two sided Questionnaire was designed keeping in mind the objectives of the study which were to find out the impact of Pricing Behavior of the Indian pharmaceutical firms and to find out the change in marketing strategies of pharmaceutical industry after implementation of the different market structure. The Literature survey and pre study consultation with industry experts were taken into account. The questionnaire consisted of few open ended questions, some questions were either using ranking scale or Likert scale, however the questions related to this paper on role of Government of India were open ended questions.
**Hypothesis Testing**

Hypothesis 1 – Profit of the firm is depends upon sale, price and the market share of the firm.

\[
\text{Profit} = \beta_0 + \beta_1 \text{sale} + \beta_2 \text{price} + \beta_3 \text{market share} + \varepsilon
\]

In the above Multiple Linear Regression model, Profit is taken as dependent variable, while sale, price and market share has been taken as predictor (independent variable). Here researcher was interested to check the effect of each predictor on dependent variable profit. Researcher has done Regression Analysis using SPSS.

Multiple linear regression models can be written as

\[
\text{Profit} = \beta_0 + \beta_1 \text{sale} + \beta_2 \text{price} \\
= 1.883 + 0.326 \times \text{sale} - 2.063 \times \text{price}
\]

Hypothesis 2 – Prices of the firm are influenced by sales, firm size, market concentration and experience of the firm in the market.

\[
\text{Price} = \beta_0 + \beta_1 \text{Sales} + \beta_2 \text{Firm Size} + \beta_3 \text{Market Concentration} + \beta_4 \text{experience} + \varepsilon
\]

In the above Multiple Linear Regression model, Price is taken as dependent variable, while sale, Firm Size, Market Concentration and experience has been taken as predictor (independent variable). Since our regression model contains one categorical variable Firm size, Multiple Linear Regression cannot be done directly in SPSS. To conduct Multiple linear regressions one has to do Dummy Coding. The
categorical variable Firm size has three options Small, Medium and Large, so here we use two dummy variables. Since researcher was interested in comparison of Large against small and Large against Medium, considering this he has define two dummy variable accordingly as firm size1 (Large vs Small) and firm size 2 (Large vs Median).

Multiple linear regression models can be written as

\[
\text{Price} = \beta_0 + \beta_1 \times \text{Sales} + \beta_2 \times \text{Firm Size} + \beta_3 \times \text{Market Concentration} + \beta_4 \times \text{experience}
\]

\[
= -88.728 + 0.112 \times \text{sales} + 40.576 \times \text{Firm size 1} + 29.002 \times \text{Firm Size 2} + 0.653 \times \text{Market Concentration} + 0.147 \times \text{experience}
\]

Hypothesis 3 – Prices are influenced by the cost and revenue of the firm.

To test hypothesis “Prices are influenced by the cost and revenue of the firm” Researcher has done correlation analysis and Multiple Linear Regression. In this Multiple Linear Regression model, Price is taken as dependent variable, while Cost and Revenue has been taken as predictor (independent variable).

While doing correlation analysis researcher has seen that there exist strong positive correlation between price and cost \((r=0.731\) with significance value \(p<0.001\)), which shows price is strongly influenced by production cost, similarly Correlation Coefficient between Price and Revenue is \(r=0.648\) with significance \(p<0.001\), which represents moderate to good relation between price and revenue in the researcher regression model.

The value of multiple correlation coefficients is 0.738, which shows that Price are strongly influenced by Cost and Revenue. In this model R Square is 0.545 which means that the 54.5% variations in Price has been explained by Cost and Revenue. Also F-statistics for Model is 310.619 with significance value \(p<0.001\) indicating Model suitability. Finally, Durbin-Watson statistics is 2.008, which is closed to 2, indicating errors in regression model are independent.
Multiple Linear Regression models can be written as:

\[
\text{Price} = \beta_0 + \beta_1 \text{Cost} + \beta_2 \text{Revenue} + \epsilon
\]

\[
= -9.585 + 0.118 \times \text{Cost} + 0.016 \times \text{Revenue}
\]

**Hypothesis 4** – There is no significant difference between sales turnover and cost of production of firms over past three years (2009 – 2011).

To test the above hypothesis researcher has done one way ANOVA. For Cost of firms **F statistics** is 0.828 with significant value \(p>0.05\), which shows that there is no significant difference between cost of firms over past three years.

For Sales data of firms **F-statistics** is 0.815 with significant value \(p>0.05\) which indicates sales of firms over past three years are not significant.

**Implications**

1. This study will help researcher and other theoreticians to know the behavior of firm towards strategic decision with special context to the pricing, in Indian context.
2. This study will help to the policy makers to review the recommendations to review the changes in the competition policy or we need separate competition policy for the particular industry.

**Summary**

The pharmaceutical industry is an important source of health care for billions of population globally and in India. Hence it is a highly regulated sector. The pharmaceutical industry is influenced by a host of practices which may primarily relate to price regulations, insurance and reimbursements, drug procurement by government agencies, patent laws, innovation policies, biotechnology and safety policies, drug regulation, data protection, trademarks and use of international non-
proprietary names, drug promotion regulation, drug advertising regulation etc...
Hence competition law has to work in tandem with all such diverse set of laws, polices and regulation governing the pharmaceutical sector.

The main focus of the present study is the analysis of the role of market structure variables on a firm’s decision to participate in innovative activity and its depth. The study also attempts to determine whether the same set of firm-specific, industry-specific and product-specific factors affects the probability of undertaking innovative activity and its intensity for the two industries.

In order to arrive at an analytical framework on the market structure/innovative activity relationship, the available empirical literature is examined both in the context of both developed countries and India. During this review, it is obvious that no consensus on the results exists. An attempt is made to explain this in terms of the innovation concept used in the studies as well as diverging empirical procedures.

The present study is based on firm-level data, prepared by the Capitaline Database. The selection of this database is guided by its comprehensive nature and easy accessibility as compared to official data sources for the post-liberalization period. For analysing the relationship between market structure variables, the period of analysis (2009-2011) is extended to account for the dynamic policy changes taking place after liberalization.

The results of the study indicate several conclusions. Firstly, the most important critical success factors in the pharmaceutical branch are customer orientation and social responsibility. The relevance of process orientation, innovation, scale effects, and the ability to adapt to changes seems to be gaining more and more importance in the future, since the participants evaluated the importance of these success factors significantly higher for the future. Secondly, a specific set of three critical success factors can be identified for each enterprise segment by examining the “best-in-class”-companies. Thirdly, companies that focus on less critical success
factors are more successful. Different combinations that fit best to different company segments are identified. Finally, for each company segment strategic directions of impact are derived from the study results.

The study has examined issues concerning working of pharmaceutical sector both from a horizontal and vertical point of view. It should not be lost sight of the fact that the pharmaceutical sector in India has grown out of policy patronage adopted since 1970s. The most important policies decisions were to limit the grant of patent only to process and not to products and the drug policy of 1970. Subsequent to this pharmaceutical prices came to be regulated through the Drug Price Control Orders which have been amended from time to time. The pharmaceutical industry is currently divided in to a three tier structure. Large MNCs operate as originator drug companies and generic companies along with large Indian generic companies. Medium and small scale industries are also engaged in production of branded generics and contract manufacturing related activities. Much of the units in small scale sector are engaged in production of generic-generic medicines. India is the 4th largest manufacturer of pharmaceutical products and it ranks 14th in terms of value. Indian generic export have shown a steady increase since 1990’s and are a major supplier of generic drugs to both developed and developing countries. At the same time generic price competition offered by Indian companies has been globally recognised.

The study has examined market shares of top companies based on sales. It is noted that sales are largely driven by nature, operation and brand of the firm. While there is prima facie no evidence for such market shares having been gained through direct exercise of market power, it is evident that in the pharmaceutical industry passive market power and information asymmetries can lead to higher market shares.


**Recommendations**

Policy recommendations for action at the Indian level that follow from the analysis are as listed below:

1. The Indian government needs to invest extensively in strengthening existing institutions such as local competition enforcement agencies, patent examiners, an informed judiciary which is more attuned to the public health and local industry needs in a country like India, and price control mechanisms in order to promote access to medicines in the local market and other LDCs.

2. The patent regime incorporates several major TRIPS flexibilities. But it also contains several provisions that are open to different sets of interpretations and therefore whether all the flexibilities that are permissible under the TRIPS Agreement will be used by India in day-to-day practice or not, is still much in the open.

3. Other rules affecting the industry, such as those on data exclusivity should be enacted only after taking into consideration the interests of the generics industry and the scope of its impact. If the generic industry in India is curbed further, a large amount of cheap supply of medicines at very competitive prices will be seriously affected.

4. The government should apart from providing an expedient administrative procedure for the implementation of Section 92(A) of the Act, create a higher level of awareness amongst the local industry on the option of compulsory licensing to supply to other least developed countries. This could result in a more conducive attitude amongst the firms to deal with requests from other least developed countries in future.

5. The government should, in a concerted effort with the industry, plan ways in which to reduce bottlenecks to pharmaceutical R&D in the local Indian
context. These will be very helpful to aid the industry to devise and implement strategies for survival.

6. The government should strengthen its activities in terms of identifying key areas where there is potential (for example, clinical research) and invest in development of these facilities systematically.

7. Promotion of R&D into diseases of the developing world, as the survey goes on to show, will remain a public good problem, irrespective of the capacities in the pharmaceutical sectors in developing countries. The government of India (either singularly or in collaboration with other governments in developing countries) should initiate more public R&D programmes that utilize the strengths of the Indian industry to find cures for neglected diseases. There are already several such programmes in which the Government of India is involved. This recommendation is to augment these efforts further.
Challenges

1. Failure of the new patent system: Prerequisites associated with Sec 3(d) of the Patent (Amendment) Act 2005 restrict the copyright of an existing drug. Moreover, mandatory licensing permits Indian companies to keep producing generics of copyright products for overseas selling to underdeveloped nations.

2. Lack of proper infrastructure: Issues associated with regular power cuts and lack of suitable transport infrastructure will decelerate the expansion of the sector.

3. Inadequate funds: Restricted funding from FIs, venture capitalists and the government may decelerate the expansion of biotechnology sector in India.

4. Regulatory impediments: Rising of due meticulousness and conformity with product standards leads to high costs and interruption in the launch of new products.

5. Severe competition: Low margins and restricted capital to assist R&D is the result of intense pricing competition among local producers. This rivalry will further deepen from the joining in of the big drug companies in the Indian market to control the cost benefit and large reserve sources.
Bibliography


Charya (2004), KVVV, “Venture Capital Firms Keen on Financing Pharma Research”.


D. N. Dwivedi (1990), Managerial Economics, Vikas Publishing House, Delhi.


Haritha saranga, BV Phani, “The Indian Pharmaceutical Industry-An overview of cost efficiency using DEA”, www.iitk.ac.in.

http://www.cygnusindia.com/Articles/Indian_Pharma_Industry_Quest_for_Global_Leadership-09.11.pdf

IBEF (2004), India Brand Equity Foundation and Ernst and Young, "Pharmaceuticals." India Brand Equity Foundation: Haryana, India.


Sudip Chaudhuri (2005), The WTO and India’s Pharmaceuticals Industry, Oxford University Press.


The Financial Express, 10 January 2005.

QUESTIONNAIRE
(About the Market Structure of Industry and Pricing Behaviour in a developing Economy: An Analytical Study of Pharmaceutical Industry of India)

Department: Economics
University: Saurashtra University, Rajkot, Gujarat, India
Degree: Doctor of Philosophy (Ph.D.)
Researcher: Niharika Bajeja
Supervisor: Dr. P. G. Marvania, Professor, Dept. of Economics, Sau. Univ., Rajkot

Thank you very much for spending your time and effort to fill this form. Your support will help me complete the questionnaire of the Market Structure of Industry and Pricing Behaviour in a developing Economy: An Analytical Study of Pharmaceutical Industry of India in order to contribute information for my thesis in Doctoral program.

The questionnaire is divided into 3 parts:
(I) Personal and company information,
(II) Industry Structure, and
(III) Pricing Behaviour.

Part I: Personal & Company Information

1. Company’s Name:

2. Respondent’s Name:

3. Designation / Status of Respondent in the Firm:

4. Age:

5. Number of years that the company operate in pharmaceutical industry:

6. Is your company:
   a. State Owned Enterprise
   b. Private Enterprise: Partnership / Private Limited / Limited
   c. Others

7. Annual Growth rate of company from the year of start in terms of turnover:
   a. 10 – 20%
   b. 20 – 30%
   c. 30 – 40%
   d. 40 – 50%
   e. More than 50%

8. Has government policy affected company’s performance, and (If yes) then how?
9. Which drug types are manufactured by your firm?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Originator of drugs</td>
</tr>
<tr>
<td>B</td>
<td>Branded</td>
</tr>
<tr>
<td>C</td>
<td>Generic original drug</td>
</tr>
<tr>
<td>D</td>
<td>Similar drug (copy)</td>
</tr>
</tbody>
</table>

10. Your firm deals in single product or multi products? Are you a single product or multi product firm?
   a. Single Product
   b. Multi product

11. Which segment of medicines you deal in?
   a. Tablets
   b. Capsules
   c. Ointments & Creams
   d. Liquid Orals
   e. Injectibles

12. Under Therapeutic segmentation, which products are manufactured by your firm?
   a. Dermatology
   b. Anti-infective
   c. Vitamins/food supplements
   d. Gynaecology
   e. CNS
   f. Anti- diabetic
   g. Gastro Intestinal
   h. Respiratory
   i. Analgesics
   j. CVS
   k. Others, Specify..........................
13. Which type of competition is your firm face for the products manufactured by the firm?

<table>
<thead>
<tr>
<th>Kind of competition/Intensity</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monopolistic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oligopoly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monopoly</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Part 2: Industry Structure

14. How do you evaluate the importance of demand conditions of pharmaceutical Industry?
Rate between 1 to 5 (1 – Very bad 5 – Very good)

<table>
<thead>
<tr>
<th>Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Domestic Consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Quality Requirement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Security Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Price Sensitivity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) Brand Identity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. What do you think about your company’s performance under industry?
1 – Very bad 5 – Very good

<table>
<thead>
<tr>
<th>Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>a Product(s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b Market share</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c Pricing of the product</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d Competition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e Turnover</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. What are the percentage of the total market that is covered with generics and with similar drugs?

<table>
<thead>
<tr>
<th></th>
<th>% monetary value</th>
<th>% of number of units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Similar(Brands &amp; INN)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
17. What do you think about impacts on firm strategy, structure & rivalry among domestic firms and supporting industries on performance base on following items?

Rate between 1 to 5 (1 – Very bad 5 – Very good)

<table>
<thead>
<tr>
<th>Items</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Marketing Strategy of firms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Price Strategy of firms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Competition among domestic firms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Middlemen role in the Market</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) Domestic medicine instrument industry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) Imported medicine instrument</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

18. How do you evaluate the role of government in promoting medicine in country, based on following policies:

Rate between 1 to 5 (1 – Extreme Unfavourable 5 – Very favourable)

<table>
<thead>
<tr>
<th>Policies</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Control by setting floor price</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Import tariff on imported medicine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Impose tariff &amp; quota on imported medicine instrument</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Export subsidy per unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) Trade relation with other countries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) Government to Government business</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) Medicine Import management policies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(h) Medicine production management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

19. Is the Indian Pharmaceutical Market is getting more competitive?

<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
20. How do you evaluate about following factors in the Indian Market?

1 – Very Low  
5 – Very High

<table>
<thead>
<tr>
<th>Factors</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Competition among medicine import countries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Competitors price of medicine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Competitors quality of medicine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Competitors marketing policy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) The Indian pharmaceutical market growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) Switching cost of medicine export countries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) Diversity of rivals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(h) Substitute growth rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Customer’s attitude to substitute</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(j) Customer perception of brand identity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(k) Threat of substitute</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(l) Quality requirement of India</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(m) Price sensitivity in India</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n) Market segmentation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(o) Customer’s bargaining power</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(p) Threat of new entrants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(q) Competition in the world medicine instrument market</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

21. What are the factors (in your assessment) which will affect your performance in next 5 years? (please list them)

22. Give your comments on opportunities & challenges of pharmaceutical industry in future.

23. What are your suggestion about government’s policies in pharmaceutical industry trade?
Part 3: Pricing Behaviour

24. The value of a medicine is determined by (rank 1-5)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Whether there are other treatments available</td>
</tr>
<tr>
<td>b.</td>
<td>Whether the new medicine offers a significant advantage compared to existing treatments</td>
</tr>
<tr>
<td>c.</td>
<td>Its total research and development costs</td>
</tr>
<tr>
<td>d.</td>
<td>The costs of continuing reinvestment in new medicine research and development</td>
</tr>
</tbody>
</table>

25. Is the price of pharmaceutical products regulated in our country? If your answer is more than one priority please prioritise them from 1 to 5.

   a. Yes, for all products
   b. Only for reimbursable products
   c. Only for locally manufactured products
   d. There is no (direct) product price regulation
   e. Others (Please explain)

26. Do you use other elements to define prices than clinical performance, economic evaluations, cost of existing treatments, cost-plus or international price comparisons? If so, can you briefly explain?

27. How do you regulate the price of the product? (Rate them between 1 to 5)

   a. Initial price decision based on clinical performance
   b. Initial price decision based on economic evaluation
   c. Initial price decision based cost of existing treatments
   d. Initial price decision based cost-plus calculations
   e. Initial price decision based on international prices
   f. Controlled price updates
   g. Other (indicate)
28. Which Factors does the firm take into consideration while formulating pricing policy? (If more alternatives are chosen then rate them between 1 to 5)

a. Domestic Physicians /Doctors price sensitivity

b. Disease for which the drug has been manufactured (e.g. chronic disease)

c. Firm’s product (drug) attributes like quality, efficiency, safety, tolerability, convenience with competitors product

d. Price sensitivity of a particular segment

e. Income of the consumers

f. Third Party Payers
   i. Government Agencies
   ii. Insurance companies
   iii. Managed Care Organization (MCO)