

**COMPETITIVENESS OF FIRMS – DEVELOPING A MEASURE BASED
ON A STUDY OF THE PHARMACEUTICAL INDUSTRY IN INDIA**

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requirement for the award of the degree of**

**DOCTOR OF PHILOSOPHY
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By

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DECLARATION

I, K.V.Balasubramaniam, hereby declare that the research embodied in the present thesis titled 'Competitiveness of Firms – Developing a Measure Based on the Study of the Pharmaceutical Industry in India' is a bonafide work, which is free from plagiarism, for the full period prescribed under PhD ordinances of the University.

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CHAPTER 1

INTRODUCTION

1.1 Background

Human development is inextricably linked to improvements in the living standards of people, the level of liberty and substantive freedom of the people and institutions. (Sen, 1999). The means of achieving this are multifold through different social, political and economic systems. However, if this has to be achieved with productive use of resources, then there is no escape from the fact that there has to be an environment for free flow of goods and services, and for healthy competition to co-exist.

This chapter introduces the concept of competition and competitiveness; and the context of competitiveness at the level of the nation, industry/sector and the firm. The competitiveness diversity across select sectors and issues in measurement of competitiveness are also discussed.

The productive use of resources has been identified by World Bank as an important indicator of human development (Soubotina and Shera, 2000). Competition is what fundamentally drives the productive use of resources. Competition between firms and nations lead to better quality products, higher innovation, better wages and affordable prices (Farole, et. al., 2010). Thanks to competition, more and more people have a wider variety of goods and services to choose from and use.

Competition is no longer looked at with suspicion, but a welcome feature not only in industries and markets, but also among nations. In a globalized world, protectionism does not pay, free trade and competition does (Coughlin, et. al., 1988). Economic growth and prosperity of nations are now increasingly linked to their competitiveness and how they are able to make their nations attractive to investments and take leadership positions in a number of industries (Delgado, et. al, 2012). Competition and competitiveness are therefore buzzwords in the global economy.

Competitiveness is also now considered global from day one, whether for firms, industries or nations. This can be attributed to the increasing role of the World Trade Organization (WTO) to make markets more accessible and to reduce protectionism. This is driven by one of its six objectives viz. *‘to provide in the largest possible measure, more favourable and acceptable conditions of access to world markets for these products, and wherever appropriate to devise measures designed to stabilize and improve conditions of world markets in these products,* (WTO, 2012). Increasingly, a product introduced in one country can quickly find its way to markets around the world. In this manner, volumes are gathered and scales of operation are enhanced. This makes high cost innovation possible, which in turn changes the rules of the game and helps build huge barriers to entry for new players. Also due to disruptive innovation, market positions assiduously built can also get destroyed in no time (Christensen and Bower, 1996). The underlying phenomenon is competition among the market players. Without competition, there would be no compulsion to offer better value to customers.

Competitiveness is created, not inherited (Porter, 1990). Firms and nations with little or no resources are able to rule the markets, only because they have assiduously built competitiveness in what they do. Japan has no iron ore or coal, but has a strong position in the global steel market. Singapore, also as a young nation without natural resources, attracted capital, labor and enterprise to build a strong place in the league of competitive countries (Garelli, 2002). On the other hand, many nations in Africa with rich natural resources rank among the poorest nations and are not competitive for a variety of reasons. (Van der Ploeg, 2010).

1.2 Competitiveness

Business Dictionary.com defines competition as *‘rivalry in which every seller tries to get what other sellers are seeking at the same time - sales, profit and market share, by offering the best practicable combination of price, quality and service’*.

At the root of competition is the concept of competitiveness. The term *competitiveness* originated from the Latin word “competere” in early 17th century: from *com-* ‘together’ and *petere* ‘aim at or seek’. To compete, a firm needs to be competitive. To be competitive, an impenetrable list of

resources and capabilities has to be built. Competition is, therefore, an external play and competitiveness an internal character.

The term competitiveness, although used widely, has multiple definitions depending on the evaluation perspective, sometimes appears to be conceptually vague and open to multiple interpretations. Some economists view competitiveness as relevant only at the firm level and dismiss notions of nation level competitiveness (Krugman, 1996), whereas some others stress the importance of broader nation level competitiveness (Porter, 1990). While nations do not actually compete in global markets like firms do, country locations affect firm level competitiveness by the nature and quantum of natural endowments, human capital, market access, institutions and other factors. Also, in increasingly networked markets, the possibility of lower transaction costs and better access allow firms substantial choice over where they locate. Thus, the notion of location based competitiveness assumes importance. Competitiveness is not necessarily a zero-sum game, relative competitiveness does matter (Krugman, 1996).

1.3 Competitiveness Continuum

The terms *competition* and *competitiveness* have different connotations depending on the context in which they manifest – at the nation level, at the industry level or sector level and at the firm level. Each of these is explained subsequently for more clarity on their manifestations and how they are interlinked.

However, competitiveness is a continuum of firm, industry and nation competitiveness, interlinked with one part reinforcing and stabilizing the others. Companies, not governments, ultimately set the level of national productivity (Snowdon, et.al., 2006). It is the competitive ability of firms that collectively adds up to a nation's competitiveness. The rider to this is that while this can be said to apply to a laissez faire economic system, it cannot apply to a state controlled economic system.

This continuum has been touched upon by Michael Porter who states that while macroeconomic policies, human development, political institutions and natural endowments of the nation determine national productivity and competitiveness, productivity ultimately depends on

improving the microeconomic capability of the economy and the sophistication of local competition. Natural endowments create a foundation for prosperity, but true prosperity is created by productivity in the use of endowments. Macroeconomic competitiveness sets the potential for high productivity, but is not sufficient. At the microeconomic level, the quality of the business environment (again an industry factor), state of cluster development (industry/sector) and sophistication of company operations and strategy, determine competitiveness (Porter, 2012)

In the internet era, the basis for competition has changed with the internet being looked at as an enabling technology which enhances competitiveness. Likewise, in this era, competitiveness also has to address the discerning needs of a more aware and active customer, inter alia, through co-opting the customer in co-creating value and creating superior customer experiences. (Prahalad and Ramaswamy, 2006)

According to Stephane Garelli (2013), the fate of both nations and companies are intertwined due to enhanced communications and globalization. The frontiers among nations are losing importance with ideas, values and practices moving freely from one nation to the other. Even inside enterprises, boundaries are being dismantled to ensure free flow of knowledge.

Modern economic theories try to distinguish competitiveness of firms and nations, with competitiveness of industries in between (Momaya, 1998). Since the focus of this research study is on firm level competitiveness, the aspects regarding nation level and industry level competitiveness are only first touched upon before exploring in more detail the concept of firm level competitiveness and issues concerning its measurement. In this manner, the context of competitiveness of firms can be better appreciated.

1.4 Nation Level Competitiveness

The Organization for Economic Cooperation and Development (OECD) defines nation level competitiveness as “*a measure of a country’s advantage or disadvantage in selling its products in international markets*” (OECD, 2014). Garelli (2012) defines it as “*the degree to which a*

country can, under free and fair market conditions, produce goods and services which meet the test of international markets, while simultaneously maintaining and expanding the real incomes of its people over the long term". Productivity results in better returns on investment and this in turn helps improve prosperity in a country. Thus, competitiveness in many ways is related to growth and prosperity of nations.

Thus, at the nation level, competition and competitiveness have to do with how the nation or country generates real income and creates trade surplus (exports more than imports) better than most other countries. It has to do mainly with productivity on factors of production across a number of industries. It also has to do with improving the standard of living for its citizens and substantive freedom while safeguarding the interests of future generations.

It can do this even by not being in competition with other nations, in the classical sense by focusing on those sectors where it has higher factor productivity in capital, labour, enterprise and technology or where it is endowed with natural resources. To put it in an economist's language, this is 'comparative advantage' as propounded by David Ricardo (Cho, et. al., 2002). Comparative advantage can be measured. The 'revealed comparative index' (RCA) proposed by Balassa (1965) measures the relative comparative advantage (or disadvantage) of a nation for a certain class of goods or services. RCA is equal to the proportion of the nation's exports for the particular category of goods or services divided by the proportion of world exports that are of the same category.

Nation level competitiveness can also be achieved by bringing economies of scale on certain parts of the value chain in a particular sector. In this manner, even nations which do not have comparative advantage can build competitiveness, such as Japan through process efficiencies to deliver high quality across industries, whether in automobiles, consumer electronics or steel making; or by India through computer literacy and language skills to deliver cost effective coding work in software development and business process outsourcing (BPO).

However, modern theories of competitiveness of nations look not merely at trade competitiveness and productivity, but also at how well a nation is able to attract foreign

investments. A competitive nation provides a good, open environment for firms and industries to invest and grow. The example often quoted is of Singapore, which provides a facilitating business environment for industries and which makes the country attractive to investors.

A novel concept of nation competitiveness put forth by Delgado, Ketels, Porter and Stern (2012) looks at competitiveness as ‘foundational competitiveness’ which includes productivity of not only the employed worker but all potential workers. ‘Foundational competitiveness’ has been defined as ‘the expected level of output per working age individual given the overall quality of a country as a place to do business’. Foundational competitiveness is a function of both macroeconomic factors – social and political institutions (SIPI), monetary and fiscal policy (MFP); and microeconomic factors – mainly company operations and strategy, factor conditions and demand conditions.

Attractiveness of a country for investment is also affected by its factor costs on land, labour and capital. Countries with low factor costs relative to foundational competitiveness, such as China and India, will be able to attract more investments. Conversely, countries with high factor costs relative to foundational competitiveness, such as some European countries, will find it difficult to sustain investments. Thus investment attractiveness has been defined as a country’s foundational competitiveness relative to its factor costs. (Ketels, 2006).

1.5 Industry Level Competitiveness

At the industry or sector level, competition and competitiveness *‘have to do with how the industry or the sector can collectively add value’*. It has to do with the intrinsic ability of the industry/sector to compete and create competitive advantage in relation to global competition. Industry competitiveness cannot just be at the nation level. It is at a global level across firms in the same industry. It is creation of specialized capability factors, such as a highly specialized talent pool, ability to self-regulate and create industry standards. It is not really on factors of investment facilitated by props of government or subsidies. It has been proved that this happens when the home environment for the industry is dynamic and challenging. Competitiveness of

industries or sectors has also to do with high level of attractiveness of the industry for investment (Garelli, 2012).

Collective competitiveness of all firms in an industry does not necessarily ensure that the particular industry is competitive. There may still be factors that collectively favour or disfavour the firms. An example of this is the US steel industry in the last century, which lost competitiveness with the advent of new technology in steel manufacturing. It could also be on account of direct and indirect government props. An example of this is the Chinese pharmaceutical industry which has thrived because of regulatory barriers created by the government which makes registration of medicines by foreign entities difficult.

Even when an industry is not competitive, there could be firms within the industry which could be competitive. Examples of such situations abound. South West Airlines in the US airline industry and Tata Motors in the Indian automobile industry are but a few examples. However, it can be expected that this cannot be sustained if there is negative impact of governmental policies on the industry.

An element of competitiveness at the industry level is served by clusters of supporting industries, which help the firms in the industry raise their overall productivity and competitiveness (Audretsch and Feldman, 1996). The examples often touted are the Silicon Valley in California, USA or the Biotechnology clusters in Munich, Germany.

Nevertheless, it must be said that a competitive industry helps firms expand their business even beyond their national borders. They help create more competitive firms. Further, they help sustain the competitiveness over longer periods of time since a competitive firm in a competitive industry will always mobilize resources and build capabilities to constantly take on firms from competing industries in other nations.

1.6 Firm Level Competitiveness

The concept of competitiveness of firms is more easily understood as compared to competitiveness of nations or of industries. At the firm or company level, competition and

competitiveness *‘have to do with how well the firm is able to create ‘sustainable competitive advantage’ over other firms in the industry (Porter, 1985).* The context is always the industry that the firms operate. Creation of sustainable competitive advantage would be through key firm specific resources and execution of the firm’s unique ‘capabilities’ in a sustained manner. Emphasis is growingly placed on capabilities since resources are tradeable and can be acquired, whereas capabilities are firm specific and can only be built. This has now come to be accepted as the ‘resource based view’ of firm level competitiveness (David and Montgomery, 1995).

Michael Porter (Porter, 1985) suggested that as far as firms are concerned, they have to look at building “competitive advantage” using generic strategies. The generic strategies could be either by differentiating their products and services from those offered by competition, or by creating cost leadership, both in a manner which competition would find difficult to emulate.

Competitive advantage is realized in the long run by understanding how value could be created for the customer, choosing appropriate internal activities and configuring these internal activities to constantly deliver the value expectation of the customer. This calls for constantly reviewing the value proposition and developing strategies which reinforce the value proposition. This is to be followed by appropriate deployment of resources, development and the execution of capabilities. Competitive advantage has to do more with the quality and sophistication of the firm’s strategies than really the endowments of assets and resources of the firm management (Goold and Luchs, 1996).

1.7 Competitiveness Diversity Across Industries

The level and degree of competitiveness among firms in different industries vary, based on industry structure and the interplay of the five forces, as propounded by Michael Porter, viz - intensity of competitive rivalry, threat of new entrants and threat of substitute products or services, bargaining powers of buyers/ customers and bargaining powers of suppliers (Porter, 1980).

It will be useful to understand the key aspects of competitiveness of some important industries in order to appreciate that there will be significant variations in practices on the ground and that the factors determining competitiveness in different industries are considerably different. Therefore,

the concept of competitiveness of firms is industry specific. For this purpose, four industries/sectors are briefly looked at - the fast moving consumer goods (FMCG) industry, the agro products and food industry, the information technology (IT) industry and the pharmaceutical industry.

The FMCG industry witnesses significant competition and competitive rivalry thanks to a large span of products catering to different consumer tastes and a large number of players –existing and new, both organized and unorganized. The bargaining power of buyers therefore is high. At the same time, the firms establish strong consumer preferences to their products by branding them, communicating the same and creating strong consumer experiences. Market share goals are the dominant drivers in the business. This translates to driving volumes in sales. High value addition on raw materials reduces the bargaining power of suppliers (Kitchen, 1989). Retail management is important with need for good distribution network and low cost of logistics operations (Jha and Banerji, 2013). Use of information technology and electronic data interchange, especially in procurement, distribution and retail management is also key to efficiency (Fynus and Ennis, 1993). At the turn of this century, e-commerce technology solutions have radically changed the competition landscape in the FMCG industry. E-commerce still needs enhancement of the integration between front-end e-commerce capability and back-end IT infrastructure in order to reap the benefits of e-commerce investments. (Zhu, 2004).

The agro products and food industry has a different set of competitiveness factors. Unlike the FMCG sector, here the suppliers (intermediaries, not farmers) have high bargaining power due to their strong networks in commodity markets. Natural endowments such as abundant and fertile land and availability of water matter. However, technology has often reduced the importance of such natural endowments. (Abbott and Bredahl, 1992). Competitiveness also rests on how procurement is managed considering the seasonality of agricultural inputs and their considerable price fluctuations. The power of buyers is limited unless the products are marketed directly to consumers, in which case it follows the FMCG industry's competitive forces. The scope for substitute products is almost absent. The scale of operations is also important in the business for achieving cost competitiveness. Often what is not always apparent is the impact of trade barriers among nations which directly impact firm level competitiveness (Kim and Marion, 1997).

The information technology industry has very different set of competitiveness factors. Being technology led and technology driven, the threat of substitute products and new entrants is immense and also constant. As a result, competitive rivalry rests on the firms' ability to innovate, hire and retain an intelligent work force, and continuously invest in research and development. Since every company cannot work on every aspect of the technologies required, the power of partnership is an important determinant of competitiveness (Bhatnagar, 2006; Madhani, 2008). Deployment of resources, especially in communications and related hardware, and access to finance has also been identified as important determinants of competitiveness (BSA, 2011). Of particular importance is the quality of human capital which contributes to innovation capability. The bargaining power of sellers or that of buyers is not significant. Thus, the IT sector creates its own competitive landscape as it is with any emerging industry.

The competitiveness factors in the pharmaceutical industry are different and in some ways it combines the market factors of FMCG industry and the innovation quotient of the IT industry. The market is dispersed among several players, both in terms of therapeutic segments and in geographies, with intense competition. Therefore, the bargaining power of buyers, mainly the medical fraternity is high. The role of marketing is therefore significant since market position is achieved by the power of brands built through sustained marketing efforts. Many firms have significant global presence. The bargaining power of suppliers, mainly the suppliers of drug intermediates and active ingredients, is limited. The threat of substitution is also high as the industry has a strong innovation base, driven by research leading to patents and intellectual property rights; and various levels of sophistication in technology are applied by the players. It is also highly regulated industry, which poses certain barriers of entry to new players. Thus the threat of new entrants is limited. In short, the pharmaceutical industry it has all the features of a market oriented and innovation driven industry.

1.8 Measuring Firm Level Competitiveness

It was earlier explained that the determinants of competitiveness of firms across industries and sectors are many. Some of the important ones mentioned in literature are the quality of management, pursuit of productivity and profitability, product-market bandwidth, export

orientation, knowledge and innovation ability, sophistication of the strategic process, risk orientation, decisiveness, sophistication of operations, execution ability, the assets and resources endowments, access to capital, quality of human resources and their skill levels, to name a few the important factors (Porter and Rivkin, 2012; Depperu, and Cerrato, 2005; Delgado, et. al., 2012). How important are these factors in the overall competitiveness of the firms; and whether firm competitiveness can be measured are questions that need to be probed before a measure of competitiveness is attempted.

Empirical work on measuring competitiveness of firms is scanty. Competitiveness of a firm can be measured in the context of the industry that it is part of. It is also a relative measure and can change with time. If an indicative measure can be formulated, not only can it be used to assess the relative competitive position of the firm vis-a-vis others in the industry, it can also be used at discrete periods of time to evaluate whether a firm is improving its competitiveness or not. Therefore, it would be useful to develop a reliable and composite measure of competitiveness of firms in an industry.

Using a firm level competitiveness index to measure and assess competitiveness has not been seriously attempted in the past and this would be a new area for research. This research is therefore a modest attempt to understand the determinants of competitiveness and how competitiveness of firms can be measured.

The pharmaceutical industry in India has been selected for the study, since it has several features of a very competitive industry, with firms deploying capabilities across a spectrum of functions.

Chapter 2 presents an overview of the Global and Indian pharmaceutical industry. It is an industry which is highly innovation driven. It has high level of competition among the players who creatively use the power of patents and brands to build entry barriers, and thereby derive high margins and thus make the industry profitable. The Indian pharmaceutical industry, thanks to its technology ability to reverse engineer innovator products and ability to focus on exports to developed markets, has admirably built a fast growing and profitable industry. It is reckoned as one of the most globally competitive industries in India. It therefore lends itself well to a study of competitiveness.

CHAPTER 2

THE PHARMACEUTICAL INDUSTRY

2.1 The Global Pharmaceutical Industry

Global Healthcare Industry

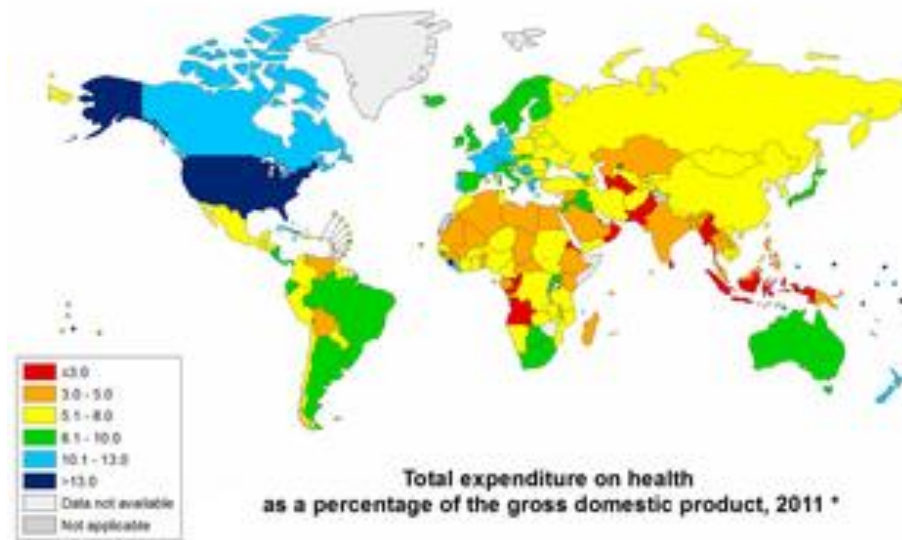
The pharmaceutical industry plays a critical role in the physical and mental health of all living beings, both human and animal. It researches, develops, manufactures and markets a wide variety of drugs essential for treatment of diseases and for improvement of life of living beings.

This chapter presents an overview of the pharmaceutical industry at the global level and in India.

Healthcare systems face challenges due to growing populations in developing countries and ageing populations in developed countries. People now suffer from more diseases, both communicable and non-communicable, due to a complex set of factors from changing lifestyles, ecological change and social stress. Treatments are getting expensive, resulting in considerable stress to limited resources at the disposal of governments. Even developed countries such as USA feel the pinch and this has resulted in the passing of the Patient Protection and Affordable Care Act (also known as the Obamacare Act)

Healthcare spending per capita varies widely among countries and even within countries it can also significantly influence access to healthcare. It can vary widely from over 13% of GDP in USA, to over 10% of GDP in Canada and Western Europe and to less than 3% of GDP in developing countries, as can be seen from Figure 2.1 below (WHO, 2011).

Figure 2.1 – Total Expenditure on Health as Percentage of Gross Domestic Product



Source: World Health Organization, 2011

However, if we factor the population of countries, the per capita expenditure on health care drops drastically for many developing countries. For example, in 2013 it was US \$ 13 in Central African Republic (lowest), US \$ 55 in Afghanistan, US \$ 61 in India. In contrast, it has high values for developed countries, for example US \$ 3598 in UK, US \$ 9146 in USA, and US \$ 9276 in Switzerland (highest). Thus healthcare is a field with huge contrasts between the ‘haves and havenots’ (WHO, 2014). This is the economic setting for the pharmaceutical industry.

Global Pharmaceutical Industry – Quantitative Dimensions

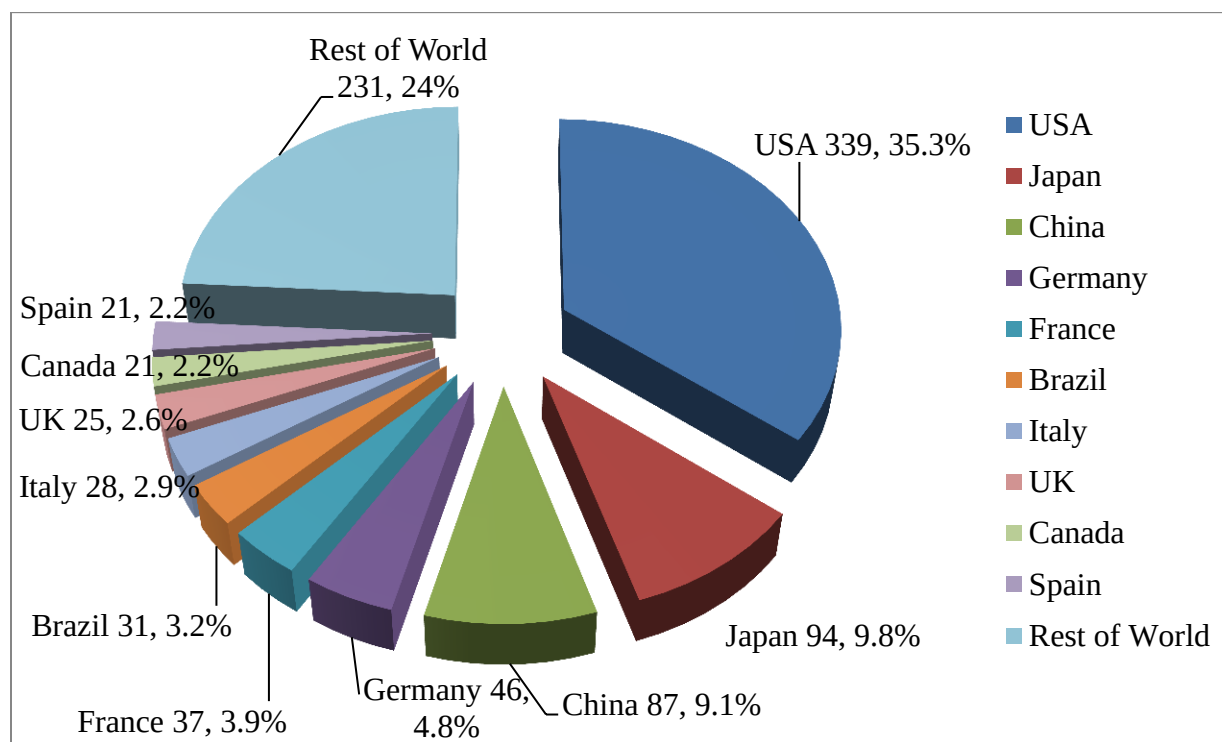
The global healthcare business has revenues of US \$ 9.59 trillion (PWC, 2015). Out of this, the pharmaceutical industry’s contribution in terms of medicines is just over 10 %, at US \$ 1 trillion. This comprises of therapeutic products, prophylactic products (vaccines) and diagnostic products. After growth peaking at 7% in 2014, growth of the global pharmaceutical industry is expected to slow down to 4% by 2020 (IMSIIH, 2014).

Therapeutic products account for nearly 90 % of the market, followed by diagnostics at 6 % and vaccines at 3 %.(Roche, 2013).

In terms of geographical distribution, North America contributes 37 % to the total market size, followed by Asia & Australia with 28 %, Europe with 24 %, Latin America with 7 %; and Africa & Middle East with 4% (IMSIHI, 2014). In Asia, Japan and China have major market salience of 9.8 % and 9.1 % respectively (ABPI, 2014).

The geographical distribution of the market is given in the following Figure 2.2

Figure 2.2: Geographical Distribution of the Global Pharmaceutical Market in 2013



Source: The Association of the British Pharmaceutical Industry, 2014

Among the developed markets, United States of America (USA) stands out. By itself, USA accounts for 35% of the global market, although it is home to only 5% of the global population. This is on account of high prices of medicines which are free of price control. All of Europe put together, where payers determine prices to a good extent, has 24 % of the global market. The emerging markets, which hold 85 % of the world population account for 28% of the market, mainly due to limited spending on account of affordability issues (Roche, 2014).

However, the emerging markets are growing twice as fast as the developed markets and thus increasing in salience. Although there are clear disparities between the different markets for pharmaceuticals, growing prosperity, better nutrition and shifting disease patterns are driving growth in emerging markets.

Spending on healthcare is growing significantly in many emerging markets. These markets include the BRIC countries – Brazil, Russia, India & China, as also 17 other developing country markets. By 2016, China is expected to move to the No 2 position in sales rankings from No 9 in 2005. Likewise, Brazil will move from the 10th position to the 4th position and India will appear in the 8th position in sales rankings. By 2016, the global pharmaceutical industry is expected to generate an estimated 30 percent of its total sales in emerging markets (IMS, 2013).

The growth drivers in the market for the global pharmaceutical industry would be (Sun Pharma, 2014):

Increase in life expectancy and ageing population: Life expectancy is expected to reach 73.7 years by 2017 from an estimated 72.6 years in 2012. This will bring more than 10% of the total global population to the group that is over 65 years of age. The global population aged 60 or above is expected to reach nearly two billion by 2050 – prompting the need for more medical care, which is a key demand driver for the pharmaceuticals industry.

Rising income of households: It is forecasted that the number of high-income households with annual income of over US\$ 25,000 will rise by about 10%, taking the count to over 500 million by 2017. Of this, almost over 50% of such growth will come from Asia. Rising income will make pharmaceuticals products more affordable.

Growing incidence of chronic diseases: Due to growing sedentary lifestyles and diet changes, chronic diseases which include cardiovascular diseases, cancer, diabetes and respiratory illnesses account for over 63% of all deaths worldwide. As a result, treatment for these diseases will contribute to the industry's growth.

Improved healthcare access reforms: More than one billion people lack access to a health care. Reforms to healthcare, increases in government funding and higher insurance coverage will spur the growth of the industry.

The distribution of the global pharmaceutical market by the top 10 therapeutic segments is as given in Table 2.1 below. These ten segment account for over half the pharmaceutical market.

Table 2.1 Top Ten Therapeutic Categories in the Global Pharmaceutical Market

S No	Therapeutic Category	2013 Sales US Bio \$	Growth % p.a	% Market Salience
1	Oncology	67.13	8.5	7.7
2	Pain	57.29	4.7	6.5
3	Diabetes	54.37	10.2	6.2
4	Hypertensive	49.61	-1.7	5.7
5	Anti-bacterials	40.25	2.6	4.6
6	Central Nervous System	39.49	-2.6	4.5
7	Respiratory	38.12	-1.8	4.4
8	Auto immune	31.08	14.4	3.6
9	Lipid regulators	28.94	-10.8	3.3
10	Dermatology	26.78	11.3	3.1

Socource: IMS Institute for Health Informatics, 2014

Advances in biotechnology in medicine and pharmaceuticals are changing the profile of the pharmaceutical market. Since biopharmaceutical products offer promise of better treatment outcomes and solutions to hitherto unmet medical needs such as in cancers and genetic diseases, it is now gaining salience in the overall pharmaceutical market. As a result, the chemical entities are reducing in significance. The biopharmaceutical industry is now estimated to have grown by 7 % p.a in this decade to a size of USD 194 billion 2014 (IMS, 2014), which is nearly 20 % of the total market size. It has thus come a long way since the introduction of the first product – recombinant insulin in 1982.

Table 2.2 presents details of the top twenty products in the global pharmaceutical market. It can be seen that only two out of the top ten and six out of the top twenty products (shaded in the

table) in the industry are chemical entities. The rest are all biopharmaceutical products. This is the reason for the biopharmaceutical products recording double the overall growth of the industry.

Table 2.2 – Top Twenty Products in the Global Pharmaceutical Industry

S No	Brand	Product	Indication	Company	Sales 2014 US \$ Bio	Growth % p.a
1	Humira	Adalimumab	Anti-Cancer	Abbott/Eisai	12.89	1
2	Enbrel	Etanercept	Anti-Cancer	Amgen/Pfizer/ Takeda	8.915	-3
3	Remicade	Infliximab	Anti-Cancer	J&J/Merck	8.807	-5
4	Lantus	Glargine Insulin	Diabetes	Sanofi	8.428	-9
5	Rituxan	Rituximab	Anti-Cancer	Roche	7.547	-6
6	Avastin	Bevacizumab	Anti-Cancer	Roche	7.018	-2
7	Herceptin	Trastuzumab	Anti-Cancer	Roche	6.863	-4
8	Januvia	Sitagliptin	Diabetes	Merck/Daewong/ Sigma	6.358	3
9	Revlimid	Lenalidomide	Immunomodulator	Celgene	4.98	12
10	Prevnar	Pneumococcal vaccine	Infection	Pfizer(Wyeth)/ Daewong	4.297	2
11	Xarelto	Rivaroxaban	Anti-coagulant	Bayer/J&J	3.366	14
12	Eylea	Aflibercept	Macular Denegeration, Anti- Cancer	Regeneron/Bayer	2.972	12
13	Tecfidera	Dimethyl Fumarate	Immunomodulator	Biogen	2.909	15
14	Botox	Botulinum Toxin	Muscle spasm, Cosmetic	Actavis/GSK	2.496	10

S No	Brand	Product	Indication	Company	Sales 2014 US \$ Bio	Growth % p.a
15	Xgeva/Prolia	Denosumab	Osteoporosis	Amgen	2.411	11
16	Victoza/Saxenda	Liraglutide	Diabetes	Novo Nordisk	2.393	9
17	Soliris	Eculizumab	Blood disorder	Alexion	2.234	16
18	Harvoni	Sofosbuvir	Anti-viral (Hep C)	Gilead	2.127	18
19	Xtandi	Enzalutamide	Anti-Cancer	Astellas	1.254	27
20	Imbruvica	Irutunib	Anti-Cancer	Pharmacyclics/J&J	0.547	47

Source: Evaluate Pharma, World Preview 2015, Outlook for 2020

The sales revenues of top ten companies in the industry are given in Table 2.3 below. It can be seen that these top ten companies account for 43 % of the total sales in the market.

Table 2.3 Sales Revenues of Top Ten Global Pharmaceutical Companies

S No	Company	Saes US \$ bio	% Market Salience
1	Johnson & Johnson	74.331	7.4
2	Novartis	57.996	5.8
3	Roche	49.860	5.0
4	Pfizer	49.605	5.0
5	Sanofi	43.070	4.3
6	Merck	42.237	4.2
7	GSK	37.960	3.8
8	Astra Zeneca	26.095	2.6
9	Bayer	25.470	2.5
10	Gilead Life Sciences	24.474	2.4

Source: Fierce Pharma, The Top 15 Pharma Companies by 2014 Revenue

The pharmaceutical industry is basically an innovation driven industry with considerable spending on research to discover new products, their further development to therapeutically useful products and clinical trials to ensure that they are safe and efficacious. The industry spent US \$ 141.6 billion in R&D, which is about 14% of the industry sales (Evaluate Pharma, 2015). Considering that 10 % of the industry sales are accounted for by generic products and about 20% by over the counter products (OTC), the research spending on prescription products, which is the focus of research, would be over 20 % of prescription sales.

Notwithstanding the high costs of research and development, the net margins of the industry are still high at about 27 %, since prices of drugs in developed countries which dominate the market, are high. This estimate by Evaluate Pharma is based on the published data of the top 20 companies (Evaluate Pharma, 2015). This places the pharmaceutical industry, especially in the developed countries, as one of the most profitable industries.

From the foregoing presentation of the quantitative dimensions of the global pharmaceutical market, it can be concluded that the market is really in the developed countries and dominated by a handful of players, who are now increasingly investing in the cutting edge of biopharmaceuticals in order to give them continued competitive advantage and to remain very profitable. However, future growth in revenues will be in emerging markets.

Global Pharmaceutical Industry – Qualitative Dimensions

It is pertinent at this stage to discuss the level of competition in the pharmaceutical industry. While it may appear that the pharmaceutical industry has a large number of players, the level of competition would therefore be high. However, it must be noted that the players in the industry derive competitive advantage from intellectual property rights (IPR) in the form of patents on the products developed; and with the brands that they assiduously build from their marketing efforts. It is also a fact that a good part of fundamental research in the developed countries is pursued in the academic institutions which are government funded, which the industry taps due to the strength of its academia linkages.

Brands have a powerful role in the pharmaceutical industry. As compared to FMCG products, where brands reflect perception about quality and there is an emotive connect with the brands,

brands in the pharmaceutical industry represent proof of quality based on scientific evidence with far less emotive connect. The image of quality is more associated with the company -its research, medical and technical capabilities.

Pharmaceutical companies are known to exploit their strong brand equity, bolstered by patents and brands, and profit from higher pricing. Patents create a huge divide between least developing countries and developed countries in terms of affordable medicines. The least developed and developing countries have little means to research or manufacture pharmaceutical products and are dependent on the developed world for answers to many health issues. On the other hand, developed countries do not find it attractive to develop medicines to address health issues of the developing countries.

Thus, the combination of patents, brands and high prices give the competitive power to pharmaceutical companies. This is therefore a unique form of oligopoly, to use an Economist's term, for the type of competition in the industry.

As mentioned earlier, the growth in sales in developed country markets is expected to decline from a peak of 7 % in 2014 to about 4 % by 2020 since the portfolio of innovative medicines is expected to reduce and the range of off patent and generic medicines are expected to rise. Also important are advances in diagnostics and the resultant 'personalized medicine' approaches which can detect and target specific diseases with custom designed medicines in different cohorts of individuals. As a result, the large pharmaceutical companies look to inorganic growth opportunities, both in conventional chemical entities and the new biological entities. This is giving rise to a large number of mergers and acquisitions in the industry (IMS Health, 2013). As a result, the big companies, which have high cash reserves for acquisition, will get bigger.

There will also be a perceptible shift to the emerging markets where the growth opportunities are higher, as explained earlier. This would lead to better geographical shift in sales in the industry. It will be more pronounced in countries like China, Brazil, India and Russia in that order (IMS, 2013).

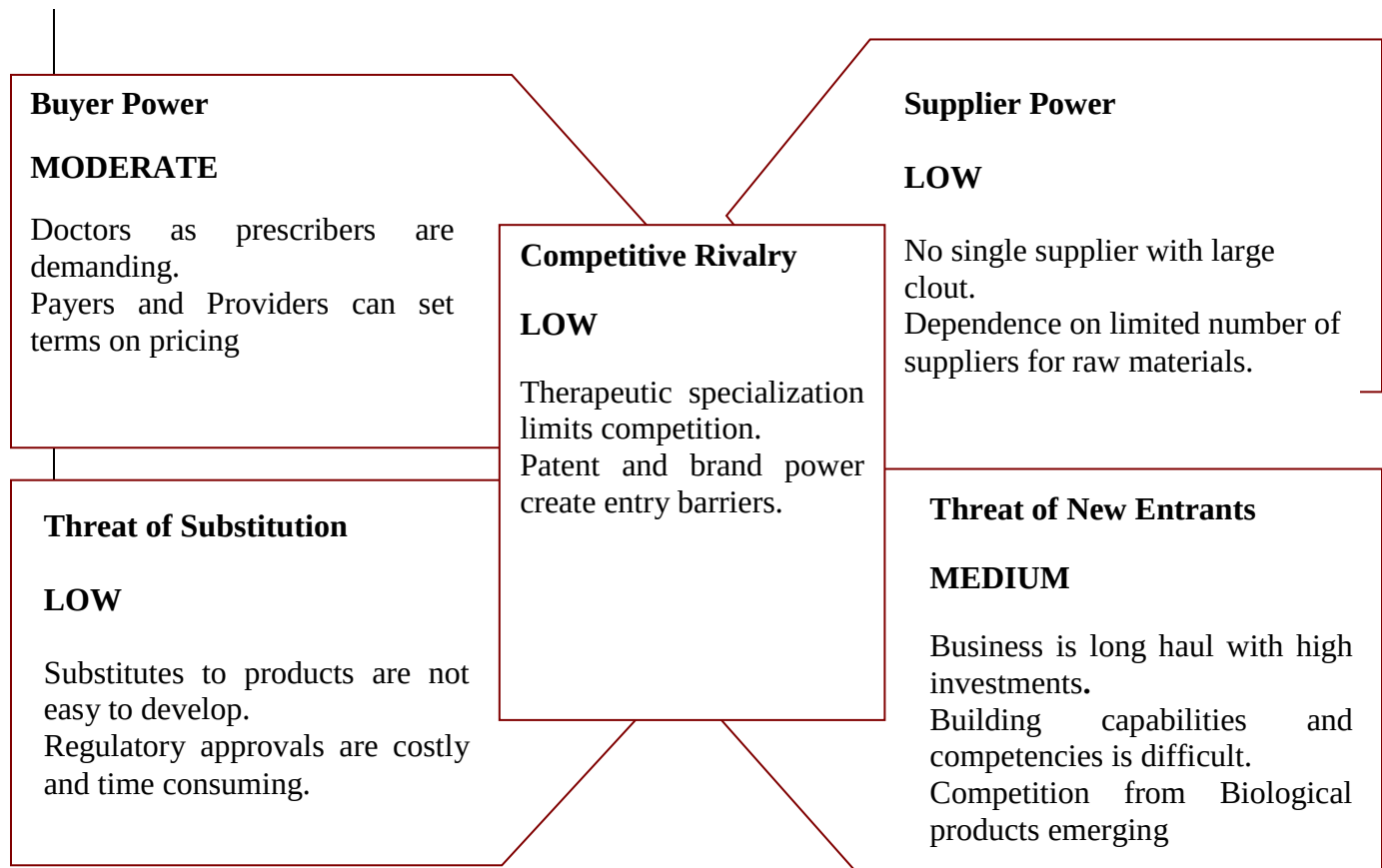
The industry is also expected to face pricing pressures both in the developed and developing country markets since modern medicine is seen to be more unaffordable and the largely government supported health care systems do not have the necessary resources to take the burden of continuous price increases (Roche, 2013).

Notwithstanding all this, the innovation potential in the industry will be undiminished, since it is innovation which brings new products and profits. Thus, while there would be market driven changes to the structure and character of the industry, the power of innovation and brands would continue to fuel the growth of the industry.

Competitiveness of the Global Pharmaceutical Industry

The Porter's Five Force analysis, which looks at the state of the competitive position in the industry with respect to buyer power, supplier power, competitive rivalry, threat of substitution, and threat of new entrants, will help obtain a picture of the competitive forces at play in the global pharmaceutical industry. Details are in Figure 2.3 below.

Figure 2.3 Porter's Five Force Analysis of the Global Pharmaceutical Industry



The inference from the Five force analysis is that once entry barriers are built in this business, it is difficult for challengers to emerge and even if they do, as with biological products, it will be time consuming and expensive. This gives advantage to the larger established players and makes competition difficult for smaller companies and startup companies.

2.2 The Indian Pharmaceutical Industry

The Indian Healthcare Industry

The healthcare industry in India is estimated to be of worth US \$ 96.3 Billion, which is about 1 % of the size world healthcare industry. Spending on health care in India was an estimated 5 % percent of gross domestic product (GDP) in 2013. In terms of local currency in rupees, the total health care spending in India is projected to rise at over 12 percent p.a from an estimated \$ 96.3 billion in 2013 to \$ 195.7 billion in 2018. This rapid growth rate reflects high inflation and along with it, increasing public and private expenditures on health (Deloitte, 2015).

India's public health care system is poor with underfunded and overcrowded hospitals, and inadequate rural coverage. The government's low spending of just 33% of total health care expenditure and the very low insurance cover in India places much burden on patients. This results in high out-of-pocket spending, which is estimated to be about 86 % of the balance private funding of 67%. This is one of the world's highest private out-of-pocket spending on health care in the world (Deloitte, 2015). It is not surprising therefore that, as earlier mentioned, the per capita expenditure on healthcare is a measly US \$ 61 in India.

The only saving grace in India is the low cost of medicines, although the same cannot be said about treatment especially in private hospitals. This is on account of the high level of price control on drugs and the ability of pharmaceutical companies to reverse engineer innovation products developed in the west, in the permissive patent and licensing regime in India.

Indian Pharmaceutical Industry – Quantitative Dimensions

The Pharmaceutical market in India was estimated to be of size of US \$ 20 billion in 2014 (Deloitte, 2015). It thus accounted for nearly 18.5% of healthcare expenditure in India, of US \$

108 billion in 2014. The Indian pharmaceuticals market is third largest in the world in terms of volume with 10% of global pharma production and thirteen largest in terms of value (IBEF, 2015). This is on account of a large population, presence of strong global and domestic players, who offer a wide variety of products, and a mature industry which has good technology and applied research capabilities.

The market size of US \$ 20 billion puts the Indian pharmaceutical market at just 2 % of the global pharmaceutical market, although India is home to nearly 20% of the world population. This is on account of the fact that healthcare is still under served in India. It can be seen from the Table 2.4 below that the major therapeutic segments in India have still to do with communicable diseases, infection, fever, respiratory and gastro-intestinal disorders, as also general health products. This is unlike in the western countries which have high salience on life style diseases in cancer, arthritis, diabetes and wellness products. It is interesting to note that India is also the diabetic capital of the world and anti-diabetic products have high salience in the Indian market.

Table 2.4 Top Ten Therapeutic Categories in the Indian Pharmaceutical Market

S No	Therapeutic Category	Market Salience %
1	Anti-Infectives	17
2	Gastro-intestinal	11
3	Cardiovascular system	11
4	Respiratory	9
5	Pain/Analgesics	9
6	Vitamins/Nutrients	8
7	Gynaecology	6
8	Central Nervous System	6
9	Dermatology	6
10	Anti-diabetic	5
11	Others	12
	Total	100

Source: KPPub, 2011, Made in India - For the World, The Pharma Review

The growth of this market, which was until now about 10-12 % p.a, is expected to accelerate to 16 % p.a by 2020, due to increasing patient pool, higher incidence of both communicable and non communicable diseases and higher spending on healthcare, thereby taking the market to a size of US \$ 55 billion by 2020 (McKinsey, 2012). By 2020, India is likely to be among the top three pharmaceutical markets by incremental growth and sixth largest market globally in absolute size (IBEF, 2015).

The growth drivers in the market for the Indian pharmaceutical industry would be (Sun Pharma, 2014):

Increasing expenditure on healthcare: Total annual healthcare spending is expected to more than double to US\$ 201.4 billion by 2020, growing at an average annual rate of 15.8%.

Increase in health insurance coverage: The Indian government plans to bring 80% of India's population under health insurance cover under its Health Insurance Vision 2020. This will lead to higher volumes for the pharmaceuticals industry.

Growing incidence of chronic diseases: Chronic therapies have grown at a faster pace than acute therapies over the past four years. Their contribution in the Indian pharmaceutical market increased from 27% in 2010 to 30% in 2013. Lifestyle changes, rapid urbanization and increasing affluence are factors which are expected to drive it further.

Rapid urbanisation: An increase in salience of urban population from 31% to 40% or more by 2030 will see better accessibility to healthcare which will in turn benefit the pharmaceutical industry.

The details of the top 20 products in the retail segment of market are given in Table 2.5 below. It can be seen that most of the products are anti-infectives, anti-diabetics, pain killers and tonics for general health. This reflects the nature of illnesses in the country, which as stated earlier is more pronounced towards communicable diseases, as also diabetes which is very prevalent in India.

Table 2.5 Top 20 Products in the Indian Pharmaceutical Retail Market

S No.	Brand	Therapeutic Category	Company	Sales MAT Jul 2015 (Rs Cr)	Growth % p.a
1	Mixtard	Anti-diabetic	Abbott	444	26.3
2	Augmentin	Anti-infective	GSK	331	29.9
3	Glycomet	Anti-diabetic	USV	312	24.1
4	Monocef	Anti-infective	Aristo	279	23.3
5	Becosules	Vitamin	Pfizer	259	13.8
6	Corex	Cough Syrup	Pfizer	253	14.2
7	Lantus	Anti-diabetic	Sanofi	240	32.0
8	Phensedyl	Cough Syrup	Abbott	228	49.5
9	Spasmo Proxyvon	Pain	Wockhardt	228	68.0
10	Janumet	Anti-diabetic	MSD	225	38.6
11	Clavam	Anti-infective	Alkem	223	3.7
12	Volini	Pain	Sun Pharma	210	-4.6
13	Dexorange	Iron Tonic	Franco	210	13.8
14	Galvus Met	Anti-diabetic	Novartis	201	33.0
15	Betadine	Anti-microbial	Win Medicare	192	13.2
16	Skinlite	Dermatology	Cadila Zydus	190	23.1
17	Shelcal	Calcium Prep.	Torrent	188	77.0
18	Taxim	Anti-infective	Alkem	187	23.8
19	Manforce	Erectile Dysfunction	Mankind	185	4.4
20	Liv 52	Liver Tonic	Himalaya	185	6.1
	Total			4770 US \$ 0.757 bio	

Source : PharmaTrac, Jul 2015. Indian Drug Manufacturer's Association

The fragmented nature of the market can also be understood by noting that the top 20 brands account for only about 4 % of the total market. It also reflects that the old brands are still dominating the market due to the very nature of the illnesses, such as infection, pain and diabetes, which are widely prevalent.

The Indian pharmaceutical market is also dominated by branded generics which constitute nearly 70 to 80 per cent of the market (McKinsey, 2012). This is the result of a patent regime, which until 2005, kept pharmaceutical products out of the patent regime and recognized only process patents and not product patents; and even later made it difficult for ‘ever-greening’ of patents by innovators (Mahajan, 2011). This regime enabled domestic manufacturers to ‘reverse engineer’ the innovator products and develop processes which do not infringe on the innovator’s process and thus could be used to produce the same product. Good organic chemistry capabilities and well developed supplier base of raw materials and drug intermediates, also contributed to this development.

Alongside this, the exit of multinational companies who flocked to the Indian market in the 50s and 60s, disappointed with the stiff price control under the Drug Price Control Order of 1979 and the restriction on foreign ownership under the Foreign Exchange Regulation Act (FERA) of 1974, created a vacuum which the Indian companies were quick to fill. Thus, a combination of price control, lack of patents and restriction on foreign ownership saw the exit of multinational companies. This led to capability development by the Indian pharmaceutical companies.

The resultant domination of home grown Indian companies and their search for new business opportunities led to India taking a strong position in exports, with exports adding about US \$ 15 billion to the size of the industry in 2014 (IDMA, 2015). Exports are mainly of finished formulations as ‘branded generics’ catering to the large developed country markets in North America and Europe; and active pharmaceutical ingredients to these markets, and to rest of the world. This was possible, thanks to the Hatch Waxman Act of 1984 in USA. Under this Act, a generic competitor can obtain 180 days’ market exclusivity if it successfully defends the challenge from the innovator company and the Court rules that the generic product does not infringe the patent of the innovator as listed in the Orange Book of patents, for which the

generics competitor seeks a para IV filing for FDA certification and approval. Many Indian companies have used this route since 1997 to enter the US market after successfully warding off the patent challenge, thus earning 180 days market exclusivity and reaping high prices for their generic products in USA (Y Srihari, et.al, 2009). Also, given the strong organic chemistry base in India, a good number of companies have turned to contract manufacture of active pharmaceutical ingredients (APIs) for the developed country manufacturers.

The strength of the Indian pharmaceutical industry can be gauged from the fact that it has over 500 US FDA and 900 European approved products/facilities, which is the largest in the world. The industry also has the largest number of WHO Prequalified Finished Pharmaceutical Products Manufacturers. The number of Drug Master Files (DMFs) filed in these countries are over 3000 with many more certified by other regulatory authorities of UK-MCA, Australia, South Africa, Japan etc., (IDMA,2015). Indian pharma companies now account for 25% of the US generics market by volume and 10% by value (Dalal and Bora, 2015).

In terms of the number of players, it is estimated that there are about 100 large and medium sized companies with sales revenues of over Rs 100 crores. They account for revenues of US \$ 27 billion (Pingle, 2015), which is about 77 % of the industry revenues of US \$ 35 billion. It is interesting to note that there are only about 10 multinational companies in the list of top 100 companies. The number of small scale companies is estimated to be about 8000, mostly serving as supporting manufacturers to the larger companies to meet the requirements in the domestic market, since the larger companies use their own facilities for exports to developed country and regulated markets.

The top 10 players in the Indian pharmaceutical market, their sales in FY 2013-14 (Apr-Mar) and major focus areas are given in the following Table 2.6.

Table 2.6 Sales of Top 10 Indian Pharmaceutical Companies and Their Focus Areas

S No	Company	Sales Rs Cr 2013-14	Sales US \$ Mio 2013-14	Export Sales % 2013-14	3 Year Sales growth % p.a	Competitive Position
1	Sun Pharma	16633	2911	73.6	39.4	World's 5 th Largest generics player. Well differentiated. Strong inorganic growth.
2	Ranbaxy	13451	2354	76.4	4.6	Early mover to N American Mkts. Wide global presence. Strong OTC portfolio. Now acquired by Sun Pharma
3	Dr Reddy's	13415	2349	86.4	21.2	Strong generics player. Good Europe presence. Moving to more complex products. Consistent performer.
4	Lupin	11087	1941	74.5	24.4	World's 10 th largest generics player. Strong anti-infectives portfolio. Focus on N America, Europe & Japan
5	Cipla	10366	1814	54.6	14.3	Less focus in N America & Europe. More in ROW. No 1 domestic player. Strong anti-retroviral range.
6	Aurobindo	8100	1418	65.8	4.7	Strong API portfolio, mainly anti-retroviral and cephalosporin player.
7	Cadila Zydus	7274	1273	54.5	16.1	Niche player, also with good OTC range.
8	Mylan	7200*	1260	82.8	31.8	World's 4 th largest generics player. Mainly in APIs in India.
9	Glenmark	6010	1052	65.9	24.5	Niche player in dermatology. Moving into biotherapeutics. Sales slowing.
10	Jubilant	5822	1019	74.3	18.8	Strong in API and intermediates. Weak outside N America.
	Total	99358	17391			

Source: Company Annual Reports. 1 US \$ = 57.13 avg for 2013-14. *Estimated.

It can be seen that the top ten players accounted for US \$ 17.4 billion revenues in 2014, which is about 55 % of the industry revenues of US \$ 32 billion in 2014. Almost all of them have high focus on the developed country markets in N America and Europe. As a result, export sales have high salience in their revenues. From Table 2.5 listing the top 20 brands in the retail market in India, we also observe that there are only 5 brands owned by the top 20 companies in the top 20 domestic brands in the country. This again reflects the export intensive nature of the industry.

The sales growth also has been strong, except for Ranbaxy, which encountered GMP compliance issues and had to stop sales to USA; and Aurobindo which rationalized its product-market portfolio to enhance margins. It is pertinent to state that as a result, Ranbaxy was bought by Sun Pharma from its Japanese owners – Daichi. Strong sales growth arise from the growing generics market in the world thanks to a number of innovator drugs going off patent in the last decade.

A separate analysis of their financial statements reveals that the top pharmaceutical companies have low debt or are almost entirely debt free and have good level of profitability. Therefore, their appetite for growth through acquisitions is very high. In fact, the top twenty companies have grown in the international markets largely through acquisitions, which in N. America have also helped the companies establish a beach head in the market to tap the Para IV certification opportunities for generics, as stated earlier. It can be expected that the high growth trajectory would continue for another decade.

From the foregoing presentation of the quantitative dimensions of the Indian pharmaceutical industry, it can be concluded that although the industry operates in a home market which is a branded generic market, it has capitalized on opportunities in the developed markets through sound capabilities and sound entrepreneurial abilities. It is set to maintain its growth trajectory in the coming years.

After providing this introduction to the global and Indian pharmaceutical industry, the next chapter presents a literature review of the concept of competitiveness, of competitiveness of firms and that of its measurement.

CHAPTER 3

LITERATURE REVIEW

3.1 Introduction

The concept of competitiveness, and how to build and sustain it, has been seen from different perspectives by different researchers. A literature scan to review some of these perspectives has been made, beginning with a brief narration of the historical evolution of the concept of competitiveness, followed by a review of literature on firm level competitiveness and of measuring competitiveness, has been presented in this chapter.

It was considered important to commence with the literature review on the history of competitiveness, since this would give a perspective to the progressive development of the concept of competitiveness in the changing socio-economic milieu, and the growing importance of firm level competitiveness with dawn of the technology era and the emergence of the modern organization.

3.2 Historical Evolution of Theory on Competitiveness

The World Competitiveness Centre of the International Institute for Management Development, Switzerland, which has been studying competitiveness of nations since 1989, states that ‘it is the result of a long history of thoughts and a vast array of research’ which has helped define the various aspects of this more modern and complex concept of competitiveness (IMD,2014). It would be therefore appropriate to look at the historical evolution of competitiveness and to understand how the theory of competitiveness evolved

According to Stephane Garelli of IMD (2013), among those who have made decisive contributions to the concept of competitiveness till the end of the last century, are:

1. Adam Smith, the father of modern economics who identified the four input factors: land, capital, natural resources and labour in his famous work and proposed the theory of free trade - *An Inquiry into the Nature and Causes of the Wealth of Nations*, 1776;
2. David Ricardo with enunciated the Law of Comparative Advantage, which explains how countries compete, in his work - *"Principles of Political Economy and Taxation"*, 1817;
3. Karl Marx, who highlighted the impact of the socio-political climate on economic development and therefore the Marxist view that changing the political system is a pre-requisite for economic performance, in his epic work - *"Capital: A Critique of Political Economy"*, 1867;
4. Max Weber, the German sociologist, who established the relationship between values, religious beliefs and the economic performance of nations, in his work - *"Ethic of Protestantism and the Spirit of Capitalism"*, 1905;
5. Joseph Schumpeter, who emphasized the role of the entrepreneur as a factor of competitiveness and underlining that progress is the result of disequilibria which favor innovation and technological improvement, in his book - *"Capitalism, Socialism and Democracy"*, 1942;
6. Alfred P. Sloan and Peter Drucker, who developed the concept of management as a key input factor for competitiveness, as set out in the book - *"My Years at General Motors"*, 1963;
7. Peter Drucker, the modern age management guru who viewed competitiveness from the angle of knowledge work and stated that only knowledge work and the new industries it creates could keep developed economies wealthy relative to their competitors. This was set out in his work - *"The Age of Discontinuity"*, 1969;

8. Robert Solow, who analyzed the factors underlying economic growth in the US between 1948 and 1982 to highlight the importance of education, technological innovation and increased know how, and presented this in his work - “Technical Change and the Aggregate Production Function”, 1957;
9. Nicholas Negroponte and other modern economists who further refined the concept of knowledge as a new factor in competitiveness - “Being Digital”, 1995; and
10. Michael Porter who aggregated the several ideas into a systemic model, called the Competitiveness Diamond, in his seminal work - “The Competitive Advantage of Nations”, 1990.

It will be useful to briefly discuss the concepts developed by these and other thought leaders and their contribution to understanding of competition and competitiveness. This is attempted in the following paragraphs.

Adam Smith is known as the father of modern economics and the free trade theory. Until his profound views were accepted, England was seized by ‘mercantilism’ which contended that to increase the wealth of the nation, England must sell more to other countries than it consumes itself and therefore reduce consumption of foreign goods. The expansion of the East India Company is an example of such mercantilism. Adam Smith stated that the main problem with mercantilism was that it wrongly viewed free trade as a zero-sum game in which trade surplus of one country offset the trade deficit of another country. However, free trade, he said was a positive sum game in which all trading nations can gain. This was due to the operation of a natural law or ‘invisible hand’ which ensured that different specializations in manufacture by different countries would make the overall costs of good cheaper if they traded based on such specializations. He criticized governments for interfering with this natural law in giving protection or granting monopolies. He said that each nation would be economically better off by concentrating on what it could do best instead of following the mercantile doctrine of economic self sufficiency (Smith, 1776).

Adam Smith thus proposed that nations must not interfere in free trade since competition was important and would add to overall wealth of nations. Therefore, the role of government was to eliminate monopolies and preserve competition. He added that the role of government was also to regulate it and could also take projects which were too large for private enterprise or if it is a matter of national defence. In many ways, Adam Smith's theories paved the way for free trade and international competitiveness (Cho, et. al., 2002).

David Ricardo made the next significant contribution to economic theory and competitiveness of nations. The problem with Adam Smith's theory was that it assumed that different countries would want goods from other countries in a manner that balanced requirements i.e one country had an advantage which could serve other countries in a harmonious manner. It could be that one country has advantage in most of the goods and therefore sees no need to trade with other equally placed countries. Ricardo stated that even in this case, the superior country should specialize in trade where it had the greatest absolute advantage. The inferior countries should specialize in those goods where it had the least competitive disadvantage. This rule came to be known as the rule of comparative advantage (Ricardo, 1817). He explained with an example that, say, although both England and Portugal may be good at producing cloth, if England could be more productive in cloth and Portugal, say in wine, it would be better for both if England focused only on producing cloth, Portugal on wine and they could mutually trade these goods. Ricardo thus brought the strength of specialization in comparative advantage, based on productivity of labour.

However, Ricardo could not explain why there should be differences in labour productivity. This was explained by two Swedish economists – Eli Heckscher and Ohler, who stated that this difference was due to the factors of production- labour or capital, that the nations are endowed with. This was termed 'factor endowments' (Howard and Lloyd, 1949). The higher intensity of the factor endowments gives advantage to one country on the factor costs. Trade and competition are thus strengthened by factor advantages which result in comparative advantage.

Karl Marx was skeptical of the trade theories which looked at labour not as human beings but as a tool which the landed and entrepreneurial classes would exploit, who he termed capitalists.

According to Marx, capitalists take advantage of the difference between the labour market and the market for whatever commodities that the capitalist can produce. Marx observed that in practically every successful industry, input unit costs are lower than output unit prices. Marx called the difference 'surplus value' and argued that this surplus value had its source in surplus labour, the difference between what it costs to keep workers alive and what they can produce (Marx, 1844).

Marx considered capitalism as most revolutionary in history since it constantly improved the means of production and brought technological progress, more so than any other class in history, and was responsible for the overthrow of feudalism. However, he was vocal in stating that the dehumanizing aspects of the capitalistic system would result in alienation, exploitation, and recurring cyclical depressions leading to mass unemployment (Wood, 1993). While this was radical, Marx's views have to be seen in the light of the marginalized role of workers in the industrial revolution in Europe. He thus highlighted the impact of the socio-political climate on economic development. Thus, Marx's theories can be seen to lend the importance required to be given to 'human capital' in the sphere of competitiveness, which modern societies have now come to reckon.

Max Weber (1905) emphasized the importance of cultural influences embedded in religion as a means for understanding the genesis of capitalism. In Weber's famous essay - The Protestant Ethic and the Spirit of Capitalism, he presented the interaction between various religious ideas and economic behaviour as part of the rationalization of the economic system. Weber put forward the thesis that Calvinist (Protestant) ethics and ideas influenced the development of capitalism. He noted the post-reformation shift of Europe's economic centre away from Catholic countries such as France, Spain and Italy, and towards Protestant countries such as the Netherlands, England, Scotland and Germany, and stated that societies having more Protestants were those with a more highly developed capitalist economy. Similarly, in societies with different religions, most successful business leaders were Protestant. Weber thus argued that Roman Catholicism impeded the development of the capitalist economy in the West, as did other religions such as Confucianism and Buddhism in the East. Whereas the Protestant ethic motivated the believers to work hard, be successful in business and reinvest their profits in further development rather than frivolous pleasures. Weber thus established the relationship

between values, religious beliefs and the economic performance of nations. The modern work ethics and values which influence competitiveness can thus be seen as having an early connection with Weber's work.

Schumpeter was probably the first scholar to propose the theory of entrepreneurship. , He argued that innovation and technological changes in a nation come from the entrepreneurs who do new things or new way of doing things, and coined the word entrepreneur spirit in the German language. Many social economists and popular authors of the day argued that contrary to the prevailing opinion that large businesses had a negative effect on the standard of living of ordinary people, they actually improved lives of people. Schumpeter argued in one of his seminal works, 'Capitalism, Socialism and Democracy', that the agents that drive innovation and the economy are large companies which have the capital to invest in research and development of new products and services and to deliver them to customers cheaper, thus raising their standard of living (Schumpeter, 1942).

While Marx predicted that capitalism would be overthrown by a violent proletarian (working class) revolution, which actually occurred in the least capitalist countries, Schumpeter believed that capitalism would gradually weaken and would lead to 'corporatism' (the socio-political organization of a society by major interest groups) and to values hostile to capitalism, especially among intellectuals. The intellectual and social climate needed for thriving entrepreneurship will be replaced by some form of 'laborism' (dominance of labour). This will restrict 'creative destruction' by entrepreneurs. Creative destruction is defined as the process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one and incessantly creating a new one. The term subsequently gained popularity within neoliberal or free-market economics as a description of processes such as 'downsizing' in order to increase the efficiency and dynamism of a company.

Schumpeter also identified innovation as the critical dimension of economic change. He argued that economic change revolves around innovation, entrepreneurial activities, and market power. He sought to prove that innovation-originated market power can provide better results than the invisible hand and price competition. He argued that technological innovation often creates

temporary monopolies, allowing abnormal profits that would soon be competed away by rivals and imitators. These temporary monopolies were necessary to provide the incentive for firms to develop new products and processes (Pol and Carroll, 2006).

Joseph Schumpeter thus emphasized the role of the entrepreneur as a factor of competitiveness and underlining that progress is the result of disequilibria which favor innovation and technological improvement.

The next phase in the history of competitiveness was Alfred Sloan's concept of management in the world of corporatism. Sloan's memoir, 'My Years with General Motors', which was written in the 1950s but withheld from publishing until an updated version was finally released in 1964, is considered one of the seminal works in the field of modern management. It exemplified Sloan's vision of the professional manager and the carefully engineered corporate structure in which he worked at General Motors (Sloan, 1964). Sloan took reins of General Motors in the first half of 1920's when it was experiencing a great downturn. The company was incurring heavy losses but within the next decade it became highly profitable. Sloan introduced a systematic strategic planning procedure for the company's divisions, the first CEO ever to do such a thing. Each GM model was changed and updated annually, and models were designed not to compete with each other. His aim was to produce a car "for every purse and purpose", unlike Ford, which stuck with its single model. Under Sloan, GM became the largest industrial enterprise the world had ever known. It became the best example of a multi-national corporation which competed across international borders. The role of management in competitiveness rather than mere entrepreneurship was thus firmly established by Alfred Sloan.

Peter Drucker, the modern age management guru viewed competitiveness from the angle of knowledge work and stated that only knowledge work and the new industries it creates could keep developed economies wealthy relative to their competitors (Drucker, 1969). He stressed that the single greatest challenge facing managers in the developed countries of the world is to raise the productivity of knowledge and service workers. This challenge, which will dominate the management agenda for the next several decades, will ultimately determine the competitive

performance of companies. Even more important, it will determine the very fabric of society and the quality of life in every industrialized nation (Drucker.1991).

Drucker coined the term "knowledge worker" to describe the growing cadre of employees who laboured with their brains rather than their hands. Drucker explained that knowledge workers require a new style of management that treats them more as volunteers or partners than as subordinates. He predicted correctly that the ability of leaders to motivate these knowledge workers - 'the most valuable asset of a 21st century institution' - would become a cornerstone of competitive advantage.

The effect of technology and knowledge on economic growth and as a factor determining competitiveness got impetus with the work of Robert Solow. Solow analyzed the factors underlying economic growth in the US between 1948 and 1982 and was able to explain that about four-fifths of the growth in US output per worker was attributable to technical progress (Solow, 1957). He was able to highlight the importance of education, technological innovation and increased know how on competitiveness and economic growth. Today, economists use Solow's sources-of-growth accounting to estimate the separate effects on economic growth of technological change, capital, and labour.

Nicholas Negroponte, a computer scientist and other modern economists further refined the concept of knowledge as a new factor in competitiveness (Negroponte, 1995; Malmberg, et.al., 1996; Maskell and Malmberg, 1995). Negroponte was the founder of MIT Media Lab and was in many ways an IT futurist. He believed that computers would make the world better for everyone and postulated way back in 1984 the good future for touch-sensitive displays, face-to-face teleconferencing and e-readers, just when personal computing was beginning to emerge and telecommunications deregulated. He forecasted in his famous book 'Being Digital' (1995) that the interactive world, the entertainment world and the information world would eventually merge. It can therefore be said that Negroponte was the futurist who brought home the understanding that the seemingly infinite power of computing and information technology as capabilities which can build competitiveness in a modern organization.

The most prolific author and influential thinker on strategy and competitiveness is Michael E. Porter, who has to his credit the highest citations in business and economics literature till date. His first publication – ‘How Competitive Forces Shape Strategy’ in the Harvard Business Review in 1979 (Porter, 1979) and the first book Competitive Strategy in 1980 (Porter, 1980) dwelled on firm level competitiveness and how companies can shape their strategy in a generic manner as differentiated players or cost leaders. Later in 1990, based on studies of the economic performance of ten nations, in his subsequent book "The Competitive Advantage of Nations" (Porter, 1990) he stated that the key to national wealth and advantage was the productivity of firms and collectively of workers, and that the national and regional environment must support this productivity. He proposed the "diamond" framework, a mutually-reinforcing system of four factors that determine competitive advantage of nations - factor conditions, demand conditions, related or supporting industries, and firm strategy, structure and rivalry, along with government support and chance events.

Porter thus effectively redefined the way that businessmen think about competition by introducing the language and concepts of economics into corporate strategy. He simplified the notion of competitive advantage and then created a new framework for companies to think about how to achieve it (Economist, 2008). Porter continues to work on competitiveness in the internet era, in the healthcare sector, the concept of competitiveness of clusters and on competitiveness of various countries. However, critics argue that Porters theories lack empirical strength and is done with selective justification (Speed, 1989). Notwithstanding this, Porter contribution has been in making a complex and multidimensional problem of competitiveness more easily understood and in suggesting practical approaches to improving competitive advantage of nations, industries and firms.

The modern concept of competitiveness has thus been considerably influenced by these thought leaders. The shift has also been away from social and political aspects to the economic aspects. A further shift has also been from just aspects of foreign trade in the macroeconomic structure to elements of microeconomic competition and to strategic interventions. There is growing belief that in the information technology age supported by free world trade, competitiveness of nations is more shaped by competitiveness of firms (Essays, 2013).

The review of literature on firm level competitiveness is next attempted in the following paragraphs.

3.3 Theories on Firm Level Competitiveness

A key concept ‘competence’ was first introduced by Philip Selznick. Selznick used the term ‘distinctive competence’ and proposed the idea of matching the organization's internal factors with the external environment (Selznick, 1957). This was developed further by Kenneth R. Andrews into what is now commonly known as SWOT analysis which assesses the strengths and weaknesses of the firm, along with the opportunities and threats in the business environment (Andrews, 1971).

Alfred Chandler brought the internal dimension and emphasized the role of leadership in shaping the future of firms and in taking a long term view of competitiveness. He posited that structure follows strategy and good leadership give firms the necessary direction and focus (Chandler, 1962).

The theories describing competitiveness of firms largely link strategic aspects to competitiveness of the firm. These aspects include definition of business of the firm, its vision and mission, its resources, its competencies and its capabilities. It must be said that unless a firm is clear about the business that it is in, its business definition, and it is clear about its business direction, it cannot build competitiveness. As Theodore Levitt stated in his famous 1960 article ‘Marketing Myopia’, using the example of the railroad industry that sustained growth depends on how a business is defined, not by its products but by how value is created for its customers (Levitt, 1960).

Since this research study about competitiveness and not about good or bad strategies leading to better firm level competitiveness, it would suffice to only look at competitiveness as a function of an organization or a firm’s resources, competencies, capabilities and its execution.

Among the major theories and approaches concerning firm level competitiveness in contemporary management literature, the prominent ones are:

1. the Competitive Advantage approach of Michael Porter,
2. the Competing on Capabilities approach of Stalk, Evans and Shulman,
3. the Core Competence model of Gary Hamel and CK Prahalad,
4. the Resource Based View of Richard Schmalensee,
5. the Competing on Resources model of Collis and Montgomery,
6. the Co-creating Value approach propounded by CK Prahalad and Venkat Ramaswamy, and
7. the Execution Aspects suggested by Robert S. Kaplan, and David P. Norton

Competitive Advantage Approach of Michael Porter

The Five Force analysis of by Michael Porter viz. intensity of competitive rivalry, threat of new entrants and threat of substitute products or services, bargaining powers of buyers/ customers and bargaining powers of suppliers, was a major step in understanding firm level competitiveness of firms (Porter, 1980).

Porter went on to suggest that as far as firms are concerned, they have to look at building “competitive advantage” using generic strategies. The generic strategies could be either by differentiating their products and services from those offered by competition, or by creating cost leadership, both in a manner which competition would find difficult to emulate. Differentiation would be worthwhile, considering the additional costs of the product and the investments made in resources to achieve this, only if there is a disproportionately higher price realized.

Porter also stated that taking a clear and sustainable competitive position involves tradeoffs. These tradeoffs are of activities which are incompatible with the generic strategies of value building. For example, a low cost airline which creates value to customers through lower fares cannot serve meals since this would add to its costs and reduce its profitability. Competitive advantage is realized in the long run by understanding how value could be created for the

customer, choosing appropriate internal activities and configuring internal activities to constantly deliver the value expectation of the customer.

The Internet and the huge computing power at our disposal have changed the fundamental basis of competition. The traditional operational advantages that firms enjoyed have weakened since competing firms are able to efficiently source inputs and deploy resources anywhere in the world. The economic benefits that the internet has created are huge. The internet has created fundamental alterations to industry structures, unprecedented in history. The question before companies is not whether the internet has to be utilized as a technology. Companies have no choice if they have to stay competitive. The question really is how the internet has to be deployed by the firm for its business.

Michael Porter said that the internet offers several opportunities for establishing distinctive strategic positioning. Gaining competitive advantage does not mean altering the core approach to the business, but building on the proven principles of effective strategy. The Internet, Porter stated, has to be viewed as a complement to traditional ways of competing (Porter, 2001).

Porter postulated that although most of the effects of the internet are negative on industries viz. reduced bargaining power of suppliers, reduced barriers to entry, increased bargaining power of buyers, reduced differences among competitors, higher level of substitution threats and more new entrants, the positive effects viz. large expansion in the markets, reduced channel costs and better procurement access appear to far outweigh the negatives.

The internet advantage would be available to most firms in the industry. Competitiveness in the internet era would therefore have to do more with competitiveness of the firm than competitiveness of the industry.

Competing on Capabilities Approach of Stalk, Evans and Shulman

Stalk, Evans and Shulman of the Boston Consulting Group proposed the Capabilities based model of competitiveness in 1992, after a study of complex systems practiced by Walmart which left its competitor Kmart far behind (Stalk et. al., 1992). They realized that Walmart had powerful capabilities of “cross docking”, which was an almost continuous receipt, selection and repacking of goods in its warehouses and dispatch to their stores, without accumulating any

inventory. Cross docking gave Walmart enormous economic advantages over competition resulting in a sustained ‘everyday low prices’ competitive position.

The capabilities model suggests that organizational behaviour and business processes must reinforce the capabilities that give the firm the maximum competitive advantage. A capability is a set of business processes strategically understood. Capabilities based competitors identify their key business processes, manage them centrally, and invest in them heavily.

Stalk, Evans and Shulman proposed four principles of capability based competitiveness:

1. The building blocks of corporate strategy are not products and markets but business processes.
2. Competitive success depends on transforming a company’s key processes into strategic capabilities that consistently provide superior value to customers.
3. Companies create these capabilities by making strategic investments in a support infrastructure that links together and transcends traditional SBUs and functions.
4. Because capabilities necessary cross function, the champion of capabilities based strategy is the CEO.

The authors pointed out that a capability is strategic only if it begins and ends with the customer, providing value to the customer.

Core Competence Model of Prahalad and Hamel

CK Prahalad and Gary Hamel, while studying the Japanese company NEC observed that NEC was in diverse business – semi-conductors, telecommunications, computing and consumer electronics - but was successful in all of them only because it had developed “core competence” i.e a collective ability in the organization in coordinating diverse production skills and technologies (Hamel and Prahalad, 1994). They posited that a core competency is a specific factor that a firm possesses as being central to the way it works.

Core competence can take various forms - technical/subject matter know-how, product development, human resources and talent management, reliable process and/or close

relationships with customers and suppliers. Core competencies are thus unique and specific strengths that a company possesses relative to others in the industry which provide the fundamental basis for competitiveness. An example of core competencies is Disney World with main core competencies in Animatronics and Show design, Storytelling and Themed attractions.

In many ways, Prahalad and Hamel's core competence model is similar to the capabilities model of Stalk, Evans and Shulman. The essential difference is that core competence, like a tree with branches as business units and leaves as products, is like the trunk which supports and nourishes the whole tree. The capabilities model looks at business processes to deliver powerful capabilities. The core competency model looks the organization's core competencies to deliver competitive advantage to "all of its business units". Thus the core competency model is a model about competitiveness of a firm in diverse product-market settings.

Once a company identifies its core competencies, it invests in them and infuses resources to strengthen them. The company thinks of new business units only if they leverage its core competencies. New business units are not sacrosanct. They have to gel with the company's core competencies.

Resource based View of Competitiveness

Richard Schmalensee (1985) empirically observed that performance of firms is not mainly associated with the industries that they are in, but with unique endowments and strategies of the firms. This led to the view that sustained business performance is a firm led phenomenon based on a firm's resources and capabilities. This was the beginning of the Resource Based View (RBV) of competitiveness.

The resource based view of competitiveness was mainly propounded by Barney and also Peteraf, who stated that a firm's competitive advantage stems more from the tangible and intangible set of resources deployed by the firm, and the capabilities that are developed by the firm. Firms exploit their valuable, rare, in-imitable and non-substitutable resources (known as VRIN) to obtain competitive advantage (Barney 1991; Peteraf, 1993).

Rumelt strengthened this resource based view further by revisiting the work of Schmalensee and empirically determining that business unit effects overshadow systematic industry effects or even corporate effects (Rumelt, 1991) This was contrary to the Porterian position of strong industry influence on firm competitiveness. Rumelt also established that industry heterogeneity is much more than what was previously observed. This strengthened the RBV theory of competitive advantage and as a result, the RBV theory became dominant in the concept of competitive advantage.

To transform competitive advantage to ‘sustainable competitive advantage’ and superior performance, Barney and Hoskisson proposed that the resources have to be heterogeneous in nature and which cannot be mobile from one firm to another. This means that the resources operated by the firm have to be unique and which cannot be easily transferred, acquired or copied by competing firms. These would include specialized knowledge, know how, intellectual property, social capital and difficult to transfer resources (Barney, and Hoskisson, 1989).

Cockburn, Henderson and Stern while studying the science driven drug discovery process in the pharmaceutical industry, found out that conscious strategic adjustment is an important determinant of competitive advantage. Poorly positioned firms can, with foresight and by adopting proactive measures, derive superior competitive advantage. This again brought to focus the strong internal element to firm competitiveness (Cockburn, 2000).

Subsequent strategy scholars worked on the ‘added value’ accruing to firms from value-based business strategies using cooperative game theory. Notable among them was Brandenburger and Stuart who explained that the key to capturing positive added value by a firm over its competitors is through creation of asymmetries between the firm and other firms (Brandenburger and Stuart, 1996). Likewise Lippman and Rumelt looked at how these unique and difficult to transfer resources could be priced using a bargaining perspective in competitive game theory (Lippman, and Rumelt, 2003).

Competing on Resources Model of Collis and Montgomery

David Collis and Cynthia Montgomery (David and Montgomery, 1995) worked on the resource based competitiveness view and explained how a company's resources drive its performance in a dynamic competitive environment. A company will succeed if it has the best and most appropriate set of resources for its business and strategy. Such resources may be an organizational capability embedded in a company's routines, processes, and culture, as for example, the skills of Japanese automobile manufacturers progressively in in low cost, lean manufacturing, high quality and then in fast product development. These capabilities transform ordinary products or services into superior products and services. Competitive advantage is achieved by ownership of the valuable resources which enables the company to perform activities better than the competitors.

For resources to qualify as the basis for an effective strategy which deliver competitiveness and competitive advantage, it must pass a number of external markets tests of its true value. These are:

1. The test of inimitability: Is the resource hard to copy? Difficulty in imitation gives an edge to the resource owner. Example: ownership of patents and copyrights.
2. The test of durability: How quickly does this resource depreciate? The longer it lasts, the better. Example: Exclusive rights to exploit natural resources.
3. The test of appropriability: Who captures the values that the resources create? Not all profits from a resource automatically flow to the company that owns the resource. An intermediary could be capturing most of the value, as with medical services in healthcare.
4. The test of substitutability: Can a unique resource be trumped by a different resource? This is similar to Porter's substitution threat.
5. The test of competitive superiority: Whose resource is really better when compared to competition?

The best of these resources are often intangible, not physical. Therefore, the emphasis in recent times is on the softer aspects of corporate assets – the culture, the technology, and even the transformational leader who runs the business.

Thus, the resource based view of competitiveness thus gives importance to the deployment of resources that an organization possesses to obtain competitive advantage. It has for this reason come to occupy a dominant position in competitiveness theory.

Co-creating Value Model of Prahalad and Ramaswamy

C K Prahalad, after working on the core competence model, took it to its futuristic application where competency is created for the future by changing the boundaries of the business or industry and positioning to seize opportunities as they emerge (Prahalad and Hamel, 1994). This was also a response to the mindless “re-engineering” approach that corporations adopted to down size or move out of unprofitable businesses. In their influential publication - “Competing for the Future”, they exhorted business leaders to transform the industry and regenerate strategy rather than reactively downsize or re-engineer their organizations. The strategic intent, according to them, was about creating new competitive space and building core competencies for the future.

Prahalad and Hamel thus brought future dimension in the theory and practice of competitiveness. They spelt out how with strategic intent and by mapping industry evolution, a blueprint for building an organization to seize competitive advantage in the future could be developed.

Prahalad and Venkat Ramaswamy later realized that in the modern world in which the customer is well informed, widely connected, of an experimenting nature and with an activist mind, it is positive customer experience, not customer satisfaction which will build competitive advantage (Prahalad and Ramaswamy, 2006). To realize this, they proposed that firms co-create value with the customer, by heightening the company-customer interactions and experiencing the products and services in the way that customers do. They posited that a company which co-creates unique value with its customers will be successful and have long term competitive advantage.

Execution Aspects On Competitiveness by Robert S. Kaplan, and David P. Norton

With competition getting more intense in many industries, proper execution of business strategy is crucial. A strategy is only as good as how it is executed. Owing to execution failures,

companies realize only just a fraction of the expected performance in their strategic plans. Building on their breakthrough works on strategy-focused organizations, Robert S. Kaplan, and David P. Norton prescribe a multistage system that enables companies to gain measurable benefits from careful execution of strategies (Kaplan and Norton, 2008). The steps in execution involve:

1. Developing an effective strategy with tools such as SWOT analysis, vision and mission formulation;
2. Planning execution of the strategy through portfolios of strategic initiatives linked to strategy maps and Balanced Scorecards;
3. Putting strategy into action by integrating operational tools such as process dashboards, rolling forecasts, and activity-based costing; and
4. Testing and updating strategy using carefully designed management meetings to review operational and strategic data.

Recent Work on Competitiveness

Ajitabh Ambastha and K Momaya reviewed models of firm level competitiveness and came to the conclusion that an ‘Assets-Process-Performance’ (APP) framework to have utility and robustness in the evaluation of a multi-dimensional concept of competitiveness of firms (Ambastha and Momaya, 2001). According to them, the APP framework integrates resources to performance through the processes and considering that this is well understood by professionals, it would be a good tool to link competitiveness with strategy.

The more recent works on competitiveness of firms (Ludwig and Pemberton, 2011), place higher emphasis on ‘dynamic capabilities’ over sustainable competitive advantage. Rapid external changes from disruptive new technologies or market environments push firms into ‘competitive survival’ mode necessitating overhaul of their resource base which turned to be inadequate.

To summarize the reviews so far, competitiveness at the firm level is determined by the strategies that the firm deploys to obtain a distinctive long term competitive advantage. Such

strategies are based the firms capabilities, core competencies and the resources that it deploys. In doing this, the firm has to take into account the market environment, customer behaviour and the forces that play on the industry such as buyer and supplier power, competition, new entrants, substitute products and product obsolescence. In the internet era, the basis for competition has changed with internet being looked at as an enabling technology which enhances competitiveness. Likewise, in the internet era, competitiveness also has to address the discerning needs of a more aware and active customer, inter alia, through co-opting the customer in co-creating value and creating superior customer experiences.

3.4 Literature on Measuring Competitiveness

Although the term competitiveness is widely used in management literature and the concept has been extensively researched, there is still no single measure of competitiveness of a firm in the literature. There is only a notion that competitiveness is linked to financial performance and market position. The exception was Peter Buckley who proposed that competitiveness is a function of Competitive performance, Competitive potential and Competitive processes of the firm (Buckley, et. al., 1988). However, Buckley did not empirically test a relationship for competitiveness and the factors expounded, but stopped at proposing a framework.

A subsequent study by Peter Buckley on competitiveness of manufacturing industries in Britain, which covered sixteen firms in five industries, was more in the nature of a qualitative assessment leading to ‘implications’ for British industry at large (Buckley et. al,1990). The implications were simply reduced to exhortations on the need for competitive organization, removal of obstacles to improved competitiveness in the British economy and the need for balance between ‘performance, potential and process’ aspects of competitiveness.

In the two decades following Buckley’s work, very little was done to establish measures of competitiveness of firms. Efforts were more towards measurement of competitiveness of nations. The work of Stephane Garelli and Klaus Schwab are noteworthy. Stephane Garelli’s work led to the International Institute for Management Development (IMD) developing the IMD World Competitiveness model of nation level competitiveness (IMD, 2012). Subsequently, the World Economic Forum (WEF) founded by Klaus Schwab engaged itself in the study of competitiveness of nations. It uses a comprehensive set of microeconomic and macroeconomic

measures in determining the Global Competitiveness Index (GCI) of countries (Schwab, K., 2012). However, this stopped at macroeconomic competitiveness of firms and the learnings from the research was not extended to the microeconomic level of firms.

More recently, the United Nations Industrial Development Organization in Vienna has developed the Competitive Industrial Performance (CIP) index which benchmarks and measures the industrial competitiveness of about 135 countries. The annual UNIDO Competitive Industrial Performance Report adopts a meso-concept of competitiveness, namely industrial competitiveness. Accordingly, industrial competitiveness is defined as the capacity of countries to increase their presence in international and domestic markets whilst developing industrial sectors and activities with higher value added and technological content. The CIP represents ability of countries to produce and export manufactured goods competitively (UNIDO, 2013).

In their paper exploring how international competitiveness can be analyzed, Donatella Depperu and Daniele Cerrato, state that the construct of international competitiveness can be split into three components - degree of internationalization, which measures the firm's presence abroad; international economic and market performance, which measures the results associated with that presence; and the nature and sources of competitive advantages, which measures information about the sustainability of competitive positions over time and, consequently, about a firm's capability to augment or preserve its performance and competitive position in the future. (Depperu and Cerrato, 2005). However, even this paper was only an exploratory work.

In their work culminating in proposing the concept of 'foundational competitiveness' of nations, Mercedes Delgado, Christian Ketels, Michael Porter and Scott Stern identified that microeconomic competitiveness of firms also determine nation level competitiveness. (Delgado et al, 2012). Among the factors of microeconomic competitiveness identified by them were strategy and operational effectiveness of firms (company sophistication), organizational practices and internationalization of firms. Their work also involved measuring the microeconomic competitiveness of firms across different nations. However, it was not an exercise in measuring firm level competitiveness per se, but an exercise in measuring nation level competitiveness and developing rankings.

3.5 Research Gaps

From the foregoing review of literature on firm level competitiveness, it is clear that competitiveness has been largely left at the conceptual level with some exploratory research on the constructs, which have also not been largely operationalized. Besides, empirical work on measuring firm level competitiveness has been scanty and has not received much attention from researchers. It is possibly on account of the multi-dimensional nature of competitiveness and the variety of approaches to understand and define the concept. Besides, this exercise has to be industry specific and is temporal and dynamic.

If an indicative measure of firm level competitiveness can be formulated, not only can it be used to assess the relative competitive position of the firm vis-a-vis other firms in the industry, it can also be used at discrete periods of time to evaluate whether a firm is improving its competitiveness or not.

If the measure can be formulated as an index, it would be useful in several ways. Firstly, this would help in assessing the strength of the competitive position of the firms based on the value of the index. The ratio of values of two firms can reveal the strength of the relative competitiveness of the firms. Progress can thus be measured in a quantitative fashion.

The conceptual framework of the study is presented in the next chapter.

CHAPTER 4

CONCEPTUAL FRAMEWORK

4.1 Developing the Framework

Since literature on measuring competitiveness of firms is scanty, an exercise in understanding the major determinants of competitiveness from extant literature was attempted. These have been grouped as broad factors determining competitiveness of firms, and were identified as:

1. Competitive performance
2. Competitive potential
3. Assets and resources
4. Competitive processes
5. Leadership and governance

Each major broad factor is discussed in this chapter, along with the key theoretical support from current literature on the subject, before a conceptual framework is developed for the research study.

Competitive Performance

The study of Peter J Buckley, Christopher L Pass & Kate Prescott (1988) resulted in creating a premise that profitable market share is a measure of competitive performance. Accordingly, competitiveness of a firm can be measured by performance parameters, inter alia, such as the ability of the firm to consistently grow in sales above the industry average and the ability of the firm to consistently grow in profitability above industry average.

This premise is also supported by Donatella Depperu and Daniele Cerrato (2005) who analyzed international competitiveness at the firm level and stated that international economic and market performance, and degree of internationalization are three components of the construct of international competitiveness.

In proposing the Assets, Process, Performance framework on competitiveness, Ajitabh Ambastha & K. Momaya (2004), took the premise that competitiveness integrates resources through performance.

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O' Farrell and Hitchens (1988) conducted a number of studies on the relationship between sources of competitiveness and performance of small firms, with focus on price, quality, design, marketing, flexibility and management. The empirical evidence provides confirmation of the conceptual framework, namely that production-related issues lie at the core of the problem of competitiveness for small companies.

Performance as one of the key determinants of competitiveness is also borne by the work of Michael Porter (1980). Porter has repeatedly emphasized the value of productivity in determining competitiveness, whether of a nation or of firms. Porter has been quoted as stating that the measure or score card of competitiveness of firms is market share and profitability, and the productivity of resources (Snowdon and Stonehouse, 2006)

Competitive Potential

Donatella Depperu and Daniele Cerrato (2005) who analyzed international competitiveness at the firm level and stated that 'ex ante' competitiveness (i.e potential) could rely on four main variables - quality of international customers, brand recognition in international markets, listing in foreign stock exchange as proxy for the ability to attract capital and number of international patents and trademarks.

P.N. Rastogi (2000) viewed that in today's volatile business environment, competitive advantages of firms can be transient and when top managements cannot have all the answers to increasingly complex and rapidly changing problem situations facing their firms, in such context, people of an organization constitute its core resource for continuing competitiveness. This effectively means that human capital is a major determinant of competitive potential and this becomes more important in a highly competitive situation.

Peter J Buckley, Christopher L Pass and Kate Prescott (1988) proposed certain parameters of competitive potential as determinants of competitiveness. According to them, technological development, labour productivity and price/competitiveness are key measures of competitive potential.

Jan Fagerberg (1996), reviewed the effect of technology and competitiveness and stated that R&D and innovation play an important role in many industries, not only for those industries that are commonly regarded as high-tech, but also for others, although the impact is perhaps more pronounced in the high tech industries. The most efficient way to enhance competitiveness in the longer term is to support innovation and diffusion of technology.

Competitive Assets and Resources

Jay Barney and Hoskisson, R (1991) and later M Peteraf (1993), were the first to posit that a firm's competitive advantage stems more from the tangible and intangible set of resources deployed by the firm and the capabilities that are developed by the firm. Firms exploit their valuable, rare, in-imitable and non-substitutable resources (known as VRIN) to obtain competitive advantage. A resource becomes valuable when it provides strategic advantage and makes it difficult for competition to imitate. This came to be viewed as the resource based view (RBV) of the firm in competitiveness literature which has held centre stage in the competitiveness literature for a long time now. Thus, resources that a firm possess and deploys have a major role in determining the competitiveness of the firm. Of significant importance would be resource heterogeneity and resource immobility which lead to sustained competitive advantage.

A company's resources drive its performance especially in a dynamic competitive environment. Such resources can be tangible resources such as physical assets in plant and machinery, finance and even human resources; and intangible resources such as brand identity, quality and patents held. This aspect has been explored in the work of Collis, David and Cynthia A. Montgomery (1995).

A similar premise is held by Ajitabh Ambastha & K. Momaya (2004), who stated in their Assets, Processes and Performance framework that resources integrate competitiveness to performance.

Among the variables suggested are brand reputation, firm reputation, culture, human resources and technology.

Of particular importance in the assets and resources space is information technology. Jeanne W. Ross, Cynthia Mathis Beath & Dale L Goodhue (1996) state that firms must build and leverage three assets – strong IT staff, a reusable technology base and a partnership between IT and business management to generate sustainable competitive advantage through information technology. In the IT driven era, these assets and resources are not only valuable but essential for competitiveness.

Thorsten Beck and Asli Demircug-Kunt (2006) state that access to finance is an important component of a competitive business environment and is essential for the development. James R. Brown, Steven M. Fazzari and Bruce C. Petersen (2007) made an empirical study of the effect of finance on aggregate R&D, the key innovative activity in most modern models of endogenous growth and concluded that finance, financial development and the institutional structure of financial markets are important factors, especially for smaller firms. Thus, a major factor affecting competitiveness would be access to finance and the ability of the firm to obtain capital, whether debt or equity.

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Michael D. Michalisin, Robert D. Smith, Douglas M. Kline (1997) state that strategic assets are crucial determinants of sustainable competitive advantage and thus firm performance. They explain why strategic assets are intangible in nature, and not all intangible resources are strategic assets. The intangible assets of company reputation, product reputation, employee knowhow, and organizational culture possess the characteristics of strategic assets.

Competitive Processes

Mercedes Delgado, Christian Ketels, Michael E. Porter and Scott Stern (2012), looked at microeconomic competitiveness as one of the determinants of national competitiveness. They suggested that quality and sophistication of company operations and strategies (COS) of firms, including production practices, marketing, organizational practices and extent of internalization differ significantly across countries and contribute to competitiveness at the firm level. These are essentially management processes which determine competitiveness.

N. Bloom and J. van Reenen (2010) studied differences in management practices of firms and industries and concluded that one important explanation for the large differences in productivity between firms and countries — differences that cannot be readily explained by other factors — is variations in management practices. They specifically point to use of performance management systems, use of modern manufacturing techniques, documentation of process problem, managing talent and human capital as important processes which determine productivity and thereby competitiveness.

Donatella Depperu and Daniele Cerrato (2005) also state that qualitative factors determine competitiveness of firms esp. for international operations, although they raise some operationalization problems since they largely respond to managers' perceptions rather than to objective parameters. They suggest variables such as capacity of attracting skilled human resources at the international level, quality of international partners and quality of management staff involved in international activities.

Again, Peter J Buckley, Christopher L Pass and Kate Prescott (1988) proposed certain parameters of competitive processes as determinants of competitiveness. According to them, the quality of (professional) management in the firm, the ability to make better strategic decisions and the ability to develop strong market focus are competitive processes which determine competitiveness. They suggested that ownership advantage, commitment to international business, marketing aptitude, management relations and closeness to customer, economies of scale and scope and can be used as variables in a measure of competitive processes.

In proposing the Assets, Process, Performance framework on competitiveness, Ajitabh Ambastha & K. Momaya (2004), took the premise that competitiveness integrates resources through management processes. They suggest a number of variables, among them strategic thinking, managing relationships, quality, flexibility and adaptability and IT applications

Stalk, Evans and Shulman (1992) concluded that competitive success depends on transforming a company's key processes into strategic capabilities that consistently provide superior value to customers. They suggest the processes must deliver scale, flexibility, speed, consistency, acuity, agility and innovativeness to the firm.

3.1.5 Leadership and Governance

Competitiveness is not a static phenomenon, but a dynamic one since the competitive space is ever changing with changing business environment, emergence of new players, technological changes which sometime is disruptive, as also changing social and political climates. To steer companies in these rapid waters calls for good leadership and proper governance. Therefore, another set of broad factors determining competitiveness is leadership and governance.

Alfred Chandler (1962) first stated that to operate efficiently and to implement strategy, a firm must have a new or refashioned structure and that leadership of the administrative framework influences the utilization of resources to achieve the strategy. Chandler (1992) explored the evolutionary theory of the firm and continued growth through the utilization and expansion of organizational learning and creation of dynamic assets. The responsibility for this growth is that of the leadership.

Philip Selznick (1997) stated that leadership goes beyond efficiency when it sets the basic mission of the organization and when it creates a social organism capable of fulfilling that mission. Leadership has the job of guiding the transition from organization to institution.

Good leadership brings foresight and vision. This aspect was examined by Iain M. Cockburn, Rebecca Henderson and Scott Stern (2000) who empirically established that the ‘origins of competitive advantage lie in the unusual foresight and ability of the firm’s managers’ ... and that ‘competitive advantage is as much about responding to unfavorable positioning as it is about exploiting opportunities which present themselves’, which late entrants normally face. Of importance was foresight, strategic intent, response to environment and ability to create advantage or imitate good strategy.

The importance of leadership element in competitiveness was also was also explored by Shaker A. Zahra (1999) who compiled thoughts of key strategy thinkers and concluded that tomorrow's global marketplace will reward companies that value entrepreneurial risk-taking, invest heavily

in developing their intellectual capital, promote individual growth, and adopt policies that are environmentally friendly. Successful competitiveness in the 21st century will demand the use of visionary and dedicated leadership, a balanced scorecard that enhances corporate accountability, and sustained investment in creating dynamic capabilities.

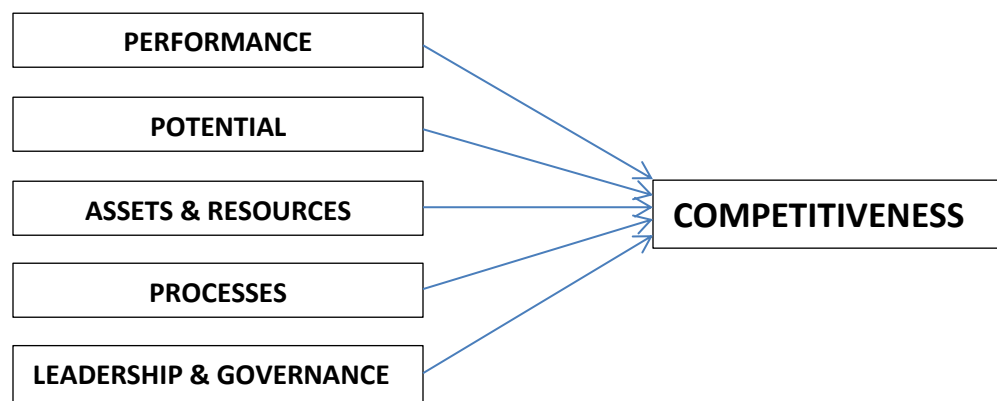
In addition, based on the pointers of microeconomic competitiveness explored in the work of Delgado, Ketels, Porter and Stern (2012), the corporate strength, quality of strategy and operational prowess could be other determinants of competitiveness.

Thus the role of leadership and governance would be an important broad factor in determining competitiveness. The quality of leadership, strategic intent, quality of strategy, strategic response and execution capabilities would be the important variables accounted by this broad factor of leadership and governance.

4.2 Conceptual Framework

From the foregoing literature on the subject, the conceptual framework for competitiveness measurement was developed as given in Figure 4.1. The broad determinants can be seen as the main broad factors – competitive performance, competitive potential, assets and resources, competitive processes and leadership and governance. This conceptual framework served as the starting point for the study.

Figure 4.1. Conceptual Framework for Measuring Competitiveness of Firms



4.3 Variables in the Framework

The independent variables that were identified which would manifest the factors proposed in the conceptual framework are provided in the following table. The dependent variable would be competitiveness.

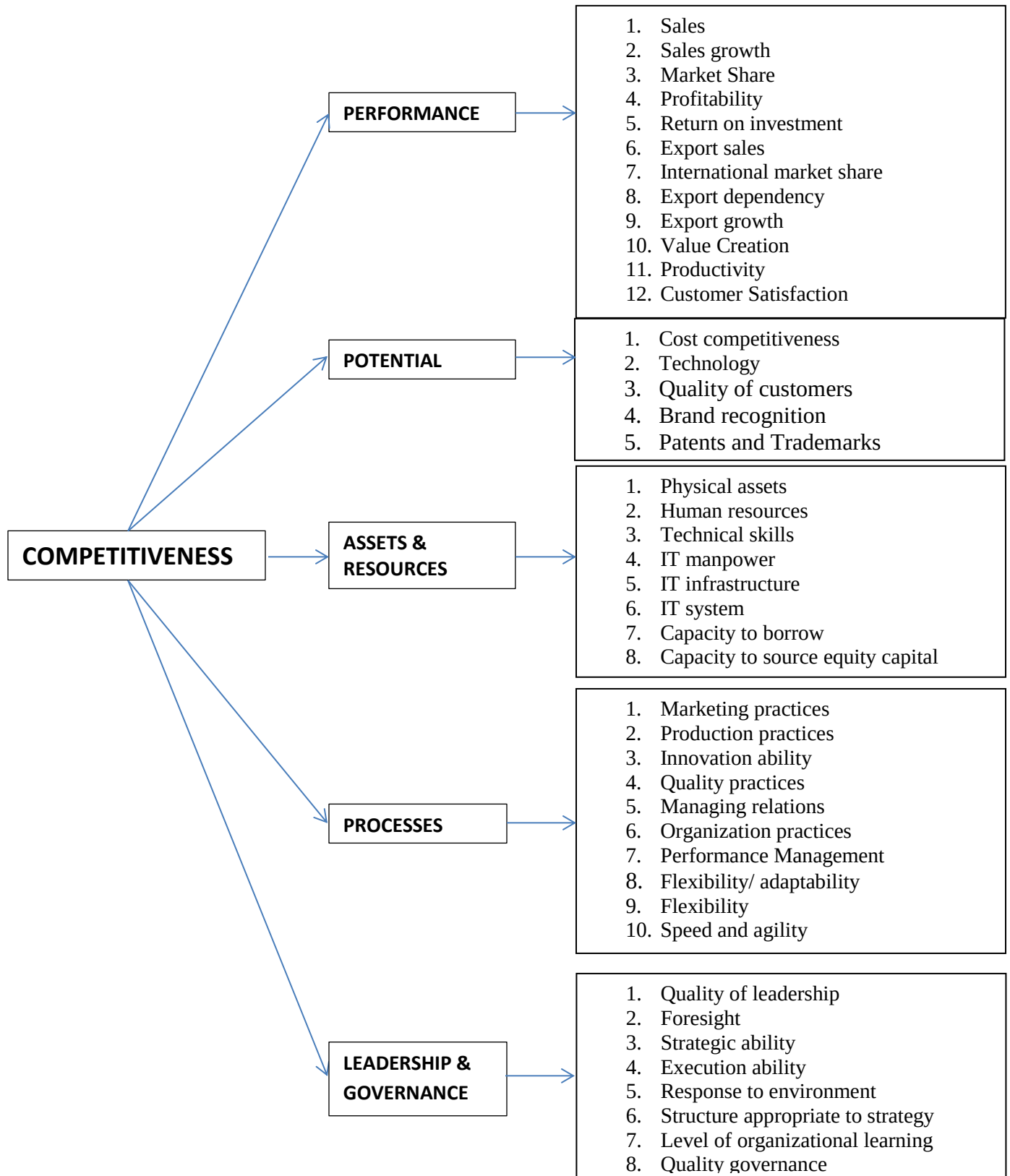
Table 4.1 Variables Identified for the Conceptual Framework

Broad Factors	Variables Identified
Competitive Performance	1. Sales 2. Sales growth 3. Market Share 4. Profitability 5. Return on investment 6. Export sales 7. International market share 8. Export dependency 9. Export growth 10. Value Creation 11. Productivity 12. Customer Satisfaction
Competitive Potential	1. Cost competitiveness 2. Technology 3. Quality of customers 4. Brand recognition 5. Patents and trademarks.
Assets and Resources	1. Physical assets 2. Human resources 3. Technical skills 4. IT manpower 5. IT infrastructure 6. IT system 7. Capacity to borrow 8. Capacity to source equity

Broad Factors	Variables Identified
Competitive Processes	1. Marketing practices 2. Production practices 3. Innovation ability 4. Quality practices 5. Managing relations 6. Organization practices 7. Performance Management 8. Flexibility/ adaptability 9. Flexibility 10. Speed and agility
Leadership and Governance	1. Quality of leadership 2. Foresight 3. Strategic ability 4. Execution ability 5. Response to environment 6. Structure appropriate to strategy 7. Level of organizational learning 8. Quality governance

The conceptual framework, along with the variables manifest in the broad factors, is presented in Figure 4.2. This is used for the operationalization and development of the measurement instrument, as described in the next chapter on Research methodology

Figure 4.2 - Conceptual Framework Showing Variables for Each Factor of Competitiveness



4.4 Research Hypotheses

The following directional hypotheses have been formulated to test the relationship proposed in the conceptual model depicted in Figure 4.1.

H1: There is a significant relationship between competitiveness of the firms and factors of competitive performance, performance potential, assets & resources, performance processes; and leadership and corporate governance.

H1A: There is a significant relationship between competitiveness and performance factors of the firms in the industry.

H1B: There is a significant relationship between competitiveness and performance potential of the firms in the industry.

H1C: There is a significant relationship between competitiveness and the assets and resources of the firms in the industry.

H1D: There is a significant relationship between competitiveness and performance processes of the firms in the industry.

H1E: There is a significant relationship between competitiveness and the leadership and governance parameters of the firms in the industry.

4.5 Summary

The proposed conceptual model of competitiveness of firms, as determined by five broad factors and the possible variables which constitute these factors, have been presented based on a review of extant literature on competitiveness. Based on this, six relationships have been hypothesized , which when empirically tested would confirm the influence of these factors, both individually and collectively, on the concept of competitiveness of firms. The next chapter will pose the research questions, frame the research objectives and enumerate the research methodology adopted for the study.

CHAPTER 5

RESEARCH METHODOLOGY

5.1 Introduction

The primary objective of the study is to determine the key factors that influence and impact the competitiveness of firms and to determine whether firm level competitiveness can be measured. The pharmaceutical industry in India has been chosen for the empirical study.

This chapter presents the research methodology adopted, more specifically, the research questions, the objectives of the study, the scope and coverage, methods of data collection, instrument development and operationalization, reliability and validity of the measuring instruments and data analysis plan.

5.2 Research Questions

The main research questions for the study are:

1. What are the key factors that influence and impact the competitiveness of firms?
2. What is the relative importance of these factors?
3. Are these factors different between groups of firms at the top rung and the others?
4. What is the relationship between competitiveness and the variables represented by these factors?
5. Would there be intervening variables influencing competitiveness?
6. Can an index of competitiveness be developed for the firms in the industry?

The conceptual framework presented in the previous chapter would provide the starting point of conceptual guidance in exploring and addressing these research questions.

5.3 Research Objectives

To help address the research questions of the study, the following objectives were framed. They are:

1. To investigate the possible relationships between competitiveness of firms and the various factors influencing competitiveness.
2. To determine which factors are important and the relative importance of the factors of competitiveness.
3. To determine if these factors are different for the top rung firms, as compared to firms outside the top rung.
4. To establish a quantitative relationship between competitiveness and the variables represented by these factors.
5. To identify the intervening variables that could influence competitiveness and their influence.
6. To develop an index of competitiveness for the firms in the industry.

5.4 Scope of the Study

Competitiveness of firms can be measured only in the context of the industry that they are part of. For the purpose of this study, the pharmaceutical industry in India has been selected since it has several features of a very competitive industry.

The pharmaceutical market is dispersed among several players, both in terms of therapeutic segments and in geographies. Competition is intense in the domestic market. The global presence of many firms is very significant. Besides, the industry has strong innovation base, being driven by research leading to patents and intellectual property rights; and various levels of sophistication in technology are applied by the players. The role of marketing is also significant since market position is achieved by the power of brands built through sustained marketing efforts. It is also a highly regulated industry, which poses certain barriers of entry to new players. In short it has all the ingredients of a vibrant and competitive industry. The pharmaceutical industry in India therefore lends itself well to a study of competitiveness of firms.

5.5 Research Design

The research design adopted is exploratory and cross sectional research, since the attempt is to understand the determinants of firm level competitiveness through a survey of key players in the Indian pharmaceutical industry.

5.6 Sample Unit and Sampling Method

A sampling unit is a single element or group of elements that are subject to selection in the sample (Zikmund, 2003). If the sampling unit is defined as competitive companies from the population of pharmaceutical companies in India, the challenge is in identifying the most competitive companies in the industry.

Step 1: The pharmaceutical industry in India is reported to have over 20000 registered companies (Corporate Catalyst 2012). This includes all companies, large and small, in India. Out of these, the numerous small scale units are only involved as supporting manufacturers for large units or as suppliers to the non branded generic market. A list of most competitive companies is not available since industry rankings are based on sales revenues or market capitalization. Moneycontrol.com (2013) lists about listed 100 companies with just more than a bare Rs 0.70 Cr as market capitalization. It is estimated that about 50 companies are in the competitive space involved in research, manufacture and marketing of products (Industry sources).

Therefore for the purpose of this research the sampling unit has been taken as the top 50 firms in the industry by sales revenues, which are assumed to be competitive by virtue of the market positions that they have reached. Thus the criterion for choosing the sampling unit of 50 is the sales revenues of the firms. This is a purposive sampling approach, based on the appropriateness of the sample unit and the respondents therein (Zikmund, 2003).

Step 2: *To determine the factors of competitiveness, both the CEOs and functional heads of the top 50 companies were covered. The functional heads were covered since coverage of CEOs and data from them would be limited. Besides, the functional heads in professional companies are also involved with the CEOs on strategic aspects of the firms. The population size here was estimated to be about 600 i.e 50 firms and 12 CEOs and functional heads in each company.*

Step 3: Since one of the objectives of the research is to develop an index of competitiveness of firms, the approach taken was to identify the most competitive companies through a rigorous survey of CEOs of firms from the industry. The CEOs are best placed to understand competitiveness of their firms vis-à-vis other players in the industry based on their understanding and insights of the industry and the market, and the competitive strategies adopted by the players.

To ask a CEO to rank all the top 50 companies would be difficult because the CEO's understanding of competitive play would be restricted to his/her company and the companies who are immediate competitors in the specific product-market segment that the companies operate. However, the CEOs would, by virtue of their understanding of the competitive arena in the entire industry, be able to rank the top 5 players very well, the top 10 players to a better extent and possibly with some stretch, the top 20 as well, though not to an incisive level.

Therefore, from the sampling unit of top 50 firms, a sub group of the top 20 firms was used for the purpose of ranking of competitiveness of firms by the CEOs. The rankings were also performed also by CEOs of companies outside the top 20 and the functional heads of all companies in the sampling unit of top 50 companies i.e the next 30 companies. However, for the purpose of development of the competitiveness index, the scores of the CEOs alone were taken.

The top 20 companies were selected from the Fortune 2013 ranking of pharmaceutical companies in India. Details are given in Table 5.1 below:

Table 5.1 Top 20 Pharmaceutical Companies Chosen for the Survey

Rank	Company	Sales Revenue 2012-13 (Rs Cr)
1	Ranbaxy Laboratories Ltd	12637
2	Dr Reddy's Laboratories Ltd	12214
3	Sun Pharmaceuticals Ltd	11916
4	Lupin Ltd	9861
5	Cipla Ltd	8831

Rank	Company	Sales Revenue 2012-13 (Rs Cr)
6	Wockhardt Ltd	7058
7	Cadila Healthcare Ltd	6484
8	Aurobindo Pharma Ltd	6154
9	Mylan Laboratories Ltd	5862
10	Jubilant Lifesciences Ltd	5254
11	Glenmark Pharma Ltd	5039
12	Piramal Enterprises Ltd	3800
13	Torrent Pharmaceuticals Ltd	3468
14	Strides Arcolabs Ltd	3134
15	IPCA laboratories td	2889
16	Biocon Ltd	2779
17	GSK Pharma Ltd	2771
18	Divi's Laboratories Ltd	2291
19	Nectar Lifesciences Ltd	1707
20	Sanofi India Ltd	1706

Source: Fortune India, Special Issue Dec 2013

The distribution of the respondents by functions is given in Table 5.2 below:

Table 5.2 Distribution of Respondents to the Survey

Group	CEO	Marketing/ Business Development	Manufacturing	Finance/ Commercial	Research	Support Function	Total
Top 20	13	17	3	4	4	16	57
Outside Top 20	8	15	9	2	7	10	51
Total	21	32	12	6	11	26	108

Given that the population size of the CEOs and functional heads in the competitive pharmaceutical companies as defined, number about 600, the number of respondents of 108 was considered adequate. This is also considering the difficulties in accessing them, especially the CEOs and the considerable time spent - about 10 months, in acquiring the responses from about 250 respondents approached.

The response rate was therefore 43.2% (108 out of 250), which is 16% of the population.

5.6 Method of Data Collection

The technique that is most often used by researchers to collect primary data is the use of surveys (Zikmund, 2003). A survey is defined as a research technique where information is collected from a sample by means of a questionnaire. The measuring instrument for this study to obtain responses was therefore a structured questionnaire.

The CEOs were contacted personally with a structured questionnaire, which was administered in person. The functional heads were contacted both personally and through industry contacts and responses were obtained through an online survey provider – Survey Monkey, with the link <https://www.surveymonkey.com/s/Q8VGTK7> for the top 20 company respondents and <https://www.surveymonkey.com/r/phcomp> for respondents outside the top 20 companies.

5.7 Instrument Development

The measuring instrument was divided into two main parts. The first part provided a brief introduction to the study, its objectives and how the study would be useful to the researchers and the practitioners. The second part carried the questions posed to the respondents. Annexure 1 presents the measuring instrument used for the study.

The first question asked the respondents to rate 42 statements concerning firm level competitiveness on what they perceived as the level importance. A five point Likert scale (Likert, 1961) ranging from ‘most important’ to ‘not at all important’ was used to score the responses, with score of 5 for ‘most important’, 4 for ‘important’, 3 for ‘somewhat important’, 2 for ‘does not matter’, and 1 for ‘not at all important’.

The second question asked the respondents to rank each of the top 20 companies by sales revenues, for their competitiveness. Rank of 1 was to be assigned for the most competitive company and rank of 20 was for the least competitive company in this list of 20 companies. The responses, when aggregated would help in assigning a competitiveness score for the 20 companies.

The third question asked the respondents to list their top five considerations in choosing the top 20 companies for their competitiveness. This was in order to obtain an idea of the qualitative considerations and to test whether the factors extracted are in consonance with these considerations.

The fourth question was introduced to recheck where they placed their company in the list of the top twenty companies. Although this would be obtained from the response to the third question, it was essentially to check whether there was a bias to their own company in the rankings. This question was also not provided in the instrument for respondents outside the top twenty companies since it was not relevant.

The fifth question asked the respondents to list three things which they would do to improve competitiveness of their company. This was in order to understand the gap in competitiveness that is perceived by the firms in the industry.

The sixth question was meant to obtain information about the firms. However, since the response to this was not forthcoming as realized in the pilot survey, and considering that much of the information was available in public domain, this part was dropped.

5.8 Scale Development and Operationalization

Hair et. al. (2015) mention that the operational definition should state the particular features of the object being defined, as well as how the features are to be observed. The various operational definitions of the variables used in this study are presented in Table 5.3 below. These definitions are based on an interpretation of the secondary sources as enumerated in Chapter 4 when proposing the Conceptual Model.

Table 5.3 Operationalization of the Variables in the Study

Variable	Operational Definition	Features/Indicators	Source
Firm Competitiveness (Dependent variable)	The ability to consistently and profitably deliver products and services of superior quality which customers are willing to purchase in preference to those of competitors.	1. Long term sales performance 2. Long term profit performance 3. New product success 4. Customer satisfaction	Buckley, et. al. 1988; D'Cruz and Rugman, 1992; Porter, 1990.
Competitive Performance (Independent Variable)	Achievement of results against planned targets in relation to the similar achievement of competitors.	1. Sales growth 2. Sales growth above industry 3. Market Share 4. Export focus 5. Export growth 6. Foreign market presence 7. Presence in N America & Europe 8. Profitability 9. Profitability above industry	Depperu and Cerrato, 2005; Buckley, et. al.1988; Snowden and Stonehouse, 2006.
Competitive Potential (Independent Variable)	Ability to achieve future performance based on current capabilities being built.	1. New product success 2. Market innovation 3. Customer retention	P.N. Rastogi, 2000; Buckley, et. al.1988; Depperu and Cerrato, 2005.

Variable	Operational Definition	Features/Indicators	Source
		4. Research spending 5. Patents filed/granted	
Assets (Independent Variable)	An item of economic value which could be converted to cash.	1. Manufacturing assets on international scales 2. Superior Technology 3. Technology collaborations 4. Human resources 5. Work culture	Barney and Hoskisson, 1991; Peteraf 1993; Ajitabh Ambastha and Momaya; Michael D. Michalisin et. al. 1997.
Resources (Independent Variable)	A source or supply from which benefit result in terms of products or services and/or at lower cost.	1. Raw material access/sourcing 2. Cost effective procurement 3. Access to funds 4. Government support 5. High owners' stake 6. Foreign holding	Barney and Hoskisson, 1991; Peteraf 1993; Ajitabh Ambastha and Momaya; Collis and Montgomery, 1995.
Competitive Processes (Independent Variable)	A set of structured activities or tasks that produce a desired outcome or a specific service or product.	1. Quality assurance system 2. Advanced quality management 3. Customer relations	Bloom and van Reenen, 2010; Delgado, et. al. 2012, Stalk, et. al, Evans and Shulman 1992.

Variable	Operational Definition	Features/Indicators	Source
		management 4. Best IT practices 5. Risk management 6. Creativity	
Leadership (Independent Variable)	The art of motivating a group of people to act towards achieving a common goal and the ability to make sound decisions.	1. Intent for industry leadership 2. Professional CEO 3. Management stability 4. Strategy ability and execution 5. Decision capabilities	Cockburn, et. al., 2000; Philip Selznick, 1997; Zahra, 1999.
Governance (Independent Variable)	The set of processes, customs, policies, laws and institutions affecting the way people direct, administer or control a firm.	1. Defined vision/mission 2. Corporate governance 3. Clear policies 4. Market focus	Delgado, et. al., 2012; Philip Selznick, 1997; Bloom and van Reenen, 2010.

It is to be noted that assets and resources are being taken as separate constructs instead of a combined one as identified in the conceptual model in order to bring better construct validity to the study.

5.9 Measurement – Validity

Validity is the extent to which an instrument measures what it is supposed to measure and performs as it is designed to perform. It is rare, if nearly impossible, that an instrument be 100% valid, so validity is generally measured in degrees. As a process, validation involves collecting and analyzing data to assess the accuracy of an instrument. Validity is the extent to which a scale or set of measures accurately represent the concepts of interest.

Content validity refers to the appropriateness of the content of an instrument. In other words, do the measures accurately assess what the researcher wants to know? Content validity is a qualitative means of ensuring that indicators tap the meaning of a concept as defined by the researcher (Drost, 2011). The domain of firm level competitiveness has been extensively explored and the conceptual model developed adequately. This establishes the content validity for this study.

Construct validity refers to the extent to which the constructs of the concept are transformed or translated into a functioning and operating reality, the operationalization (Trochim 2006). Construct validity can be basically of two types – Translation validity and Criterion related validity. Translation validity centres on whether the operationalization reflects the true meaning of the construct. Translation validity attempts to assess the degree to which constructs are accurately translated into the operationalization, using subjective judgment. Criterion related validity is the degree of correspondence between a test measure and one or more external criteria to verify the test measure (Drost, 2011).

A measuring instrument is considered to display construct validity if the scale has both convergent and discriminant validity. Convergent validity assesses the degree to which two measures of the same concept are correlated. Discriminant validity is the degree to which two conceptually similar concepts are distinct and unique (Hair et. al. 2015).

In this study, there is no scope for convergent validity estimation as the variables chosen were measured with single measures. To establish discriminant validity, the multivariate technique of factor analysis has been used in this study.

5.10 Measurement - Reliability

Reliability can be thought of as consistency. Does the instrument consistently measure what it is intended to measure if applied repeatedly or if applied by different people? The commonly used measure of reliability is internal consistency among the variables in a summated scale (Hair, et. al., 2015).

The commonly used measure – Cronbach's alpha was used in this study to measure reliability of the instrument. Table 5.4 gives the Cronbach alpha values for the variables used in this study for

the constructs identified – Competitive Performance, Competitive Potential, Assets, Resources, Competitive Processes and Leadership/Governance.

Table 5.4 Values of Cronbach Alpha as Reliability Scores for the Constructs Identified

Construct	Variables	Variable Count	Cronbach Alpha
Competitive Performance	1. Sales growth 2. Sales growth above industry 3. Market Share 4. Export focus 5. Export growth 6. Foreign market presence 7. Presence in N America& Europe 8. Profitability 9. Profitability above industry	9	0.850
Competitive Potential	1. New product success 2. Market innovation 3. Customer retention 4. Research spending 5. Patents filed/granted	5	0.701
Assets	1. Manufacturing assets on international scales 2. Superior Technology 3. Technology collaborations 4. Human resources 5. Work culture	5	0.599
Resources	1. Raw material access/sourcing 2. Cost effective procurement 3. Access to funds 4. Government support	6	0.481

Construct	Variables	Variable Count	Cronbach Alpha
	5. High owners' stake 6. Foreign holding		
Competitive Processes	1. Quality assurance system 2. Advanced quality management 3. Customer relations management 4. Best IT practices 5. Risk management 6. Creativity	6	0.754
Leadership/Governance	1. Define vision/mission 2. Intent for industry leadership 3. Corporate governance 4. Professional CEO 5. Management stability 6. Clear policies 7. Strategy ability and execution 8. Decision capabilities 9. Market focus	11	0.671

The generally agreed lower limit of Cronbach alpha is 0.60 for exploratory research (Hair, et. al, 2015). It can be observed that for this research study, the Cronbach alpha has been above 0.60 for all constructs, except for the resources construct. As mentioned earlier, the 'assets and resources' factor is being taken separately instead of as one and therefore the lower Cronbach alpha value of 0.481 for assets alone can be accepted. Inclusion of more variables would have increased the Cronbach alpha coefficient for this construct. However, there had to be balance between the number of variables and the difficulty in administering the instrument should the variables increase. Besides, parsimony in operationalization is always an approach taken in

research methods. The average Cronbach alpha for all the constructs was 0.676 therefore represents good measurement reliability.

5.11 Data Analysis

The data obtained from the survey was analyzed using appropriate statistical techniques in order to address the research objectives that were set. These are highlighted below.

1. Descriptive statistics such as frequency distribution of the data obtained from the responses to the survey, using means and standard deviations. This would help in a preliminary assessment of the relative importance of the variables and the broad factors as determinants of competitiveness.
2. Rank correlation was calculated for rank order of the items using Spearman's coefficient of correlation.
3. Concordance test was done on the data using the nonparametric test of Kendall's Coefficient W (Legendre, 2006) to check if there was internal concordance in the data from responses in the different groups of respondents, from the top 20 companies and outside the top 20 companies. This was necessary since the determination of index of competitiveness is very much dependent on concordance of the evaluators.
4. Exploratory Factor Analysis of the variables using Varimax Rotation and Kaiser Normalization in order to extract factors from the variables. Factor analyzability of data was tested with Barlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. The closer KMO is to 1.0, the more the factor analyzability of the data. Factors with Eigen values of over 1.0 are retained based on the Kaiser criterion and reviewed for percentage of total variance explained in order to determine the goodness of fit (Kaiser, 1958; Hair, et.al, 2015).
5. The revised model of competitiveness was then established based on the output of the factor analysis. The relative importance of the factors and their contribution to determination of overall competitiveness was established using the factor analysis data.

6. In order to check if there was difference between the understanding regarding competitiveness on the factors determined, of the two main groups of top 20 companies and companies outside the top 20, the factor scores of the two groups of CEOs and the functional heads were subjected to the T test for equality of means.
7. The hypotheses for testing the relationships in the revised model were framed. Using multivariate regression, the hypotheses related to the relationship of individual factors determining competitiveness of firms was tested, also using the three year operating data of the top 20 companies obtained through secondary research.
8. Again, using multivariate regression, the overall relationship of competitiveness index and the variables manifest in factors determining competitiveness was tested using the three year operating data of the top 20 companies obtained through secondary research.
9. The role of mediating factors and moderating factors on competitiveness were also established with the operating data of the top 20 companies obtained from secondary research. For the mediation test, the Sobel Test of mediation using the Baron and Kenny approach was chosen (Sobel, 1982; Baron and Kenny, 1986). For moderation, the approach by Baron and Kenny was used. Competitiveness as independent variable was taken as the value of the index generated from the rating of CEOs of the top 20 companies; and the value of variables from secondary data of the top 20 companies were used for the dependent and moderating/mediating variables.
10. Finally, the quantitative relationship between competitiveness index of top 20 companies as dependent variable and the independent variables determining competitiveness from operating data of the firms, was established using multivariate regression. Effort to make the regression equation with a parsimonious set of variables was fruitful. This relationship will help determine a competitiveness index with only secondary data and thus be useful for practitioners.

In addition, the survey questionnaire also elicited qualitative responses about the main considerations that the CEOs had in their minds when they ranked the companies, as also responses on what specific aspects that they think are required to improve their own competitiveness. These qualitative responses were content analyzed to validate the revised conceptual model and whether the factors extracted had any bearing on the qualitative aspects that the CEOs are seized with.

5.12 Summary

This chapter outlined the research design and the methodology adopted in this research study. A description of the sampling unit and sampling was presented. Each of the constructs comprising the conceptual model was operationalized with clear definitions, and the manifest variables identified and validated. The development of the measuring instrument and the scaling adopted were discussed. Method of data collection and the different statistical techniques used in data analysis were also presented. The following Chapter presents the empirical results of the study.

CHAPTER 6

EMPIRICAL RESULTS

6.1 Introduction

The primary objective of this study is to determine the key factors that influence and impact the competitiveness of firms and to determine whether firm level competitiveness can be measured. Since it is an industry specific aspect, the pharmaceutical industry in India which has a very competitive profile, has been chosen for the exploratory study.

This chapter presents the analysis of data obtained from the responses to the structured measuring instrument, as also secondary data of operating parameters of the firms. As outlined in the previous Chapter, the data was analyzed using several statistical techniques in order to find answers to the research objectives that were set. The empirical results are presented in the different sections that follow in this chapter.

Section 1 presents the descriptive statistics of the survey. The respondents are grouped into four groups – CEOs and functional heads, of the Top 20 companies and companies outside the Top 20 positions. The mean scores accorded by the respondents to the variables being tested in the measuring instrument are used to arrive at the ranking of the factors in the conceptual model by the four respondent groups. Likewise, the mean scores of the ranking of companies by the same respondent groups are used to arrive at the overall rankings of companies for competitiveness. The ratings by the respondents in each group are tested for internal concordance. The rankings are tested for rank correlation. This step of validation was considered important since the rankings were used to test the conceptual model and for computation of the competitiveness index.

Section 2 presents the exploratory factor analysis (EFA) of the variables manifest in the constructs of competitiveness in the conceptual model. Since the conceptual model had scanty empirical support in the literature, the extraction of factors in the factor analysis was reviewed to check if the same factors in the conceptual model are in fact supported by empirical results. Based on this, the initial hypothesis was tested.

Since different constructs of competitiveness emerged based on the results of the exploratory factor analysis, a new conceptual model is being proposed in Section 3.

Section 4 uses the scores accorded to the variables manifest in the new factors in the revised conceptual model to arrive at rankings of the new factors and to assess the relative importance of the new factors. The ratings by the respondents in each group are tested for internal concordance. The rankings are tested for rank correlation.

Section 5 presents the results of the T test for equality of means to confirm that the perception of factors in the new conceptual model is the same for the different groups of respondents – CEOs and functional heads.

The revised conceptual model can be validated only if there is statistically significant relationship between competitiveness and the factors determining competitiveness. Section 6 presents the hypotheses to be tested and the results of the multivariate regression analysis used to test the hypothesis.

This Section also presents statistical tests of the revised model with actual secondary data of the variables as they apply to the firms in the pharmaceutical industry. This is the operating data for the firms for a three year period. If an adequate number of variables of the firms surveyed correlate to competitiveness, then the construct of competitiveness can be said to also have validity with the secondary data of the firms and not just primary data.

Section 7 explores the mediating and moderating roles of the variables in the revised conceptual model. This would provide more insights into the empirical basis of firm level competitiveness and the measurement of the same.

Section 8 presents the final results of the hypotheses testing of the relationships in the revised conceptual model.

The final objective of this research study is to develop an index of competitiveness for the firms in the industry. A quantitative relationship between competitiveness indices of firms as dependent variable, with data for independent variables manifest in the factors from only secondary operating data, would be useful in determining a competitiveness index of firms.

Section 9 presents the multivariate regression analysis to arrive at the predictor equation of competitiveness of firms. The equation is made parsimonious in order to make it practically useful to practitioners and validated with forward data for the subsequent period of operations of the firms.

Section 1

6.2 Descriptive Statistics

Distribution of Respondents

Data was collected from four main groups of respondents in the pharmaceutical industry. These are the CEOs of the top 20 companies and CEOs of companies outside the Top 20 positions; and likewise the functional heads of companies in the Top 20 positions and functional heads of companies outside the Top 20 companies. The analysis of variables, extraction of factors and testing of hypotheses are made using these four groups in order to provide analytic rigour and to establish the strength of the conceptual model developed.

Table 6.1 below presents the distribution of counts of the respondents to the survey.

Table 6.1 Distribution of Respondents to the Survey

Group	CEO	Functional Heads						Total
		Marketing/ Business Development	Manufacturing	Finance/ Commercial	Research	Support Function	Total Functional Heads	
Top 20	13	17	3	4	4	16	44	57
Outside Top 20	8	15	9	2	7	10	43	51
Total	21	32	12	6	11	26	87	108

For the purpose of analysis, the study thus has four groups of respondents- CEOs of Top 20 companies and CEOs of companies outside the top 20 companies; and functional heads of Top 20 companies and functional heads of companies outside the top 20 companies;

Distribution of Values of Variables

Table 6.2 presents the summary, in terms of means and standard deviations, of the frequency distribution of the data obtained from the responses to Question 1 on the 42 variables manifest in the six constructs of firm level competitiveness viz. Competitive Performance, Competitive Potential, Assets, Resources, Competitive Processes and Leadership/Governance for the responses of CEOs for two groups - those from the top 20 companies and those from companies outside top 20.

Table 6.2 Summary of Descriptive Statistics of Values of Variables – Top 20 Company CEOs and CEOs of Companies Outside Top 20

Group	Statistic	Competitiveness Constructs					
		Competitive Performance	Competitive Potential	Assets	Resources	Competitive Processes	Leadership/ Governance
Top 20 CEOs	Mean	3.75	3.98	3.88	3.24	4.06	4.30
	Std Dev	0.45	0.43	0.36	0.36	0.43	0.20
	Rank	5	3	4	6	2	1
CEOs outside Top 20	Mean	3.83	4.30	4.10	3.63	4.06	4.33
	Std Dev	0.37	0.35	0.41	0.40	0.50	0.28
	Rank	5	2	3	6	4	1
CEOs Combined	Mean	3.78	4.10	3.96	3.39	4.06	4.31
	Std Dev	0.41	0.42	0.39	0.41	0.49	0.23
	Rank	5	2	4	6	3	1

Table 6.3 presents the results of the Spearman's rank correlation test for the rankings of the two groups – CEOs of Top 20 companies and CEOs of companies outside the Top 20- for the initial constructs of competitiveness.

Table 6.3 Spearman's Rank Correlation of the Rankings of Factors by CEOs

		CEOTop20	CEONonTop 20
Spearman's rho	CEOTop20		
	Correlation Coefficient	1.000	.829*
	Sig. (2-tailed)	.	.042
	N	6	6
	CEONonTop20		
	Correlation Coefficient	.829*	1.000
	Sig. (2-tailed)	.042	.
	N	6	6

*. Correlation is significant at the 0.05 level (2-tailed).

The Spearman's rank correlation, for the rankings of CEOs of the Top 20 companies and companies outside the Top 20 companies, is high at 0.829 with significance of 0.042. This shows good correlation in the rankings.

Perception of CEOs on Competitiveness

The following observations can be made from Table 6.2 above.

Leadership/Governance is placed as the most important factor by all the CEOs. The standard deviation is also low for this factor, signifying a more cohesive perception that this is the most important factor affecting firm level competitiveness. The variables here - intent for industry leadership, strategy ability and execution, professional management, clear policies, decision capabilities and management stability are therefore seen to be most important to competitiveness of firms. *This means that for the pharmaceutical industry in India, which is a very competitive industry, it is leadership which makes a distinct difference to competitiveness of firms.*

Although there is difference in the rankings by the two groups for the next three factors, when the combined ranking of CEOs is reckoned, the Competitive Potential and Competitive

Processes are given the next level of importance as factors affecting firm level competitiveness. The variables here relate to new product success, market innovation, customer relations management, research spending, patents filed/granted, quality management, IT practices and risk management.

Assets, both tangible and intangible, are reckoned as the next important factor of firm level competitiveness. Assets here relate to manufacturing assets, superior technology deployed, technology collaborations, human resources and work culture, which build the strength for competitiveness.

Competitive Performance factors are placed lower in the order at # 5 by all CEOs. This is a significant finding since performance in terms of sales revenues, market share, exports and profitability are normally perceived as a major factor in firm level competitiveness. The reason could well be that they are outcomes of competitive strategies of firms, rather than drivers of competitiveness.

Resources available to the firm are placed last in the rankings, signifying that aspects of raw material access and sourcing, access to funds, government support, as well as owners' holding or foreign entity holding in the firms are relatively less important.

Thus, in the perception of CEOs, competitiveness of firms in the pharmaceutical industry is derived first from the quality of leadership and governance, followed by factors governing competitive potential, competitive processes, assets of the firms, competitive performance and resources of the firms, in that order. This is significant and is also supported by 'clinical' evidence in the industry which point to the successful companies being led from the front by leaders with foresight, ability to envision a future, develop appropriate strategies and execute the strategies well.

Perception of Functional Heads on Competitiveness

A reading of Table 6.4 which gives statistics for the responses of the functional heads, again for the two groups- those from top 20 companies and those from companies outside the top 20, gives more interesting findings.

Table 6.4 Summary of Descriptive Statistics of Values of Variables – Top 20 Company
Functional Heads and Functional Heads of Companies Outside Top 20

Group	Statistic	Competitiveness Constructs					
		Competitive Performance	Competitive Potential	Assets	Resources	Competitive Processes	Leadership/ Governance
Top 20 Functional Heads	Mean	4.05	4.43	4.24	3.78	4.19	4.48
	Std Dev	0.58	0.49	0.46	0.44	0.46	0.34
	Rank	5	2	3	6	4	1
Functional Heads outside Top 20	Mean	3.93	4.35	4.18	3.72	4.16	4.44
	Std Dev	0.54	0.44	0.44	0.44	0.42	0.37
	Rank	5	2	3	6	4	1
All Functional Heads Combined	Mean	3.99	4.34	4.21	3.75	4.17	4.46
	Std Dev	0.56	0.46	0.45	0.44	0.44	0.33
	Rank	5	2	3	6	4	1

Table 6.5 presents the results of the Spearman's rank correlation test for the rankings of the two groups of functional heads – of Top 20 companies and of companies outside the Top 20- for the initial constructs of competitiveness.

Table 6.5 Spearman's Rank Correlation of the rankings of Factors by Functional Heads

		FnHeadTop20	FnHeadNonTop 20
Spearman's rho	Correlation Coefficient	1.000	1.000**
	Sig. (2-tailed)	.	.
	N	6	6
	Correlation Coefficient	1.000**	1.000
	Sig. (2-tailed)	.	.
	N	6	6

**. Correlation is significant at the 0.01 level (2-tailed).

What is most striking is that the fact that not only are the rankings for the six factors the same by both the groups of functional heads, the means and standard deviations are also have similar values. The Spearman rank correlation is high at 1.000 with significance of 0.000, showing perfect correlation in the rankings.

Like the CEOs, the functional heads of all the companies also rate Leadership/Governance as the most important factor of competitiveness. The standard deviation is also low for this factor, which like the observation of the CEO scores, signifies a more cohesive perception that this is the most important factor affecting firm level competitiveness.

Unlike the difference in the rankings by the two groups of CEOs on Competitive Potential and Competitive Processes, the functional heads of the two groups give categorical rankings, with Competitive Potential ranked higher than Competitive Processes. They also prefer to look at Assets a notch over Competitive Processes.

Like the CEOs, Competitive Performance factors are placed lower in the order at # 5 by all functional heads of both groups. This supports the significant finding mentioned earlier of the contrary position with respect to the common perception that performance is a major factor in firm level competitiveness.

Again, like the CEOs, Resource factor is placed last in the rankings, strengthening the finding that resource aspects are less important than the other factors.

The Concordance Test with Kendall's Coefficient of Concordance M, for the four groups – CEOs and functional heads of the top 20 companies and for the companies outside top 20 – was performed. Kendall's coefficient of concordance indicates the degree of association of ordinal assessments made by multiple appraisers when assessing the same samples. Kendall's coefficient values can range from 0 to 1. A high or significant Kendall's coefficient means that the appraisers are applying essentially the same standard when assessing the samples.

Table 6.6 Kendall's Coefficient of Concordance for the Four Groups of Evaluators for Construct Rankings

Ranks		Test Statistics	
	Mean Rank	N	4
Comp Performance	5.00	Kendall's W ^a	.936
Comp Potential	2.25	Chi-Square	18.714
Assets	3.25	df	5
Resources	6.00	Asymp. Sig.	.002
Competitive Processes	3.50	a. Kendall's Coefficient of Concordance	
Leadership Governance	1.00		

The Kendall's M value of 0.936 is obtained with a significance level p of 0.002. This shows that there is a high degree of concordance of the ratings by these groups of evaluators.

From the foregoing discussions, it can be concluded that, in the perception of both CEOs and the functional heads, competitiveness of firms in the pharmaceutical industry is derived foremost from the quality of leadership and governance, followed by factors governing competitive potential, competitive processes, assets and only then by competitive performance of the firms. Resources available to the firms are found to have the least importance. Thus, it is leadership

and governance which determines the degree of competitiveness manifest in a firm in the competitive pharmaceutical industry.

Rankings of Top 20 Companies on Competitiveness

The core question in the measuring instrument in the survey is about the rankings of the CEOs and functional heads of the pharmaceutical companies that were surveyed, on how they perceive the companies in the Indian pharmaceutical industry on firm level competitiveness.

Table 6.7 presents the summary, in terms of means and standard deviations, of the frequency distribution of the data (ranks) obtained from the responses to Question 2 asking the respondents to rank the top 20 companies (by sales revenues) on their competitiveness. This has been done for two groups, from the CEOs of the Top 20 companies and from the CEOs of companies outside the Top 20 positions. Based on the mean scores, the competitiveness rankings for the top 20 companies have been assigned, as depicted in the same Table.

Table 6.7 Ranking of Top 20 Companies by CEOs

	By Top 20 CEOs			By CEOs outside Top 20			By All CEOs		
Company	Mean	Std Dev	Rank	Mean	Std Dev	Rank	Mean	Std Dev	Rank
Ranbaxy	13.00	4.76	14	11.00	7.98	9	11.85	5.88	12
Dr Reddys	4.08	1.44	3	3.75	1.49	3	3.69	1.42	3
Sun Pharma	1.31	0.85	1	1.13	0.35	1	1.25	0.70	1
Lupin	2.62	1.50	2	3.38	1.41	2	2.82	1.48	2
Cipla	4.54	2.70	4	3.88	1.81	4	4.25	2.37	4
Wockhardt	13.62	5.11	16	12.50	2.56	14	12.89	4.62	15
Cadila	6.85	3.31	5	7.00	4.00	6	6.86	3.52	5
Aurobindo	9.85	3.85	9	10.00	4.93	7	9.37	4.27	9
Mylan	8.46	5.64	8	10.63	4.90	8	8.81	5.17	7
Jubilant	15.31	2.75	18	13.38	3.20	16	14.34	3.72	18
Glenmark	7.85	3.63	6	6.50	2.45	5	7.45	3.11	6
Piramal	15.69	2.63	19	17.13	2.59	19	15.44	3.93	19
Torrent	12.46	3.60	13	11.75	3.24	10	12.00	3.83	13

	By Top 20 CEOs			By CEOs outside Top 20			By All CEOs		
Company	Mean	Std Dev	Rank	Mean	Std Dev	Rank	Mean	Std Dev	Rank
Strides	14.00	4.64	17	12.25	3.92	12	13.17	4.71	17
IPCA	11.85	3.74	12	13.75	5.42	17	12.69	4.31	14
Biocon	13.15	2.79	15	14.25	3.45	18	13.00	3.81	16
GSK	10.00	5.34	10	11.88	3.80	11	10.16	4.62	10
Divis	8.15	4.63	7	12.75	5.01	15	9.09	4.85	8
Nectar	16.00	4.30	20	18.00	3.78	20	15.87	4.82	20
Sanofi	10.54	4.74	11	12.38	2.72	13	10.63	4.23	11

Table 6.8 presents the Spearman's rank correlation for the ranking of the 20 companies by the two groups of CEOs – of the Top 20 companies and of companies outside the Top 20.

Table 6.8 Spearman's Rank Correlation of Rankings of Companies by the CEOs

		CEOTop20	CEONonTop 20
CEO Top20	Pearson Correlation	1	.868**
	Sig. (2-tailed)		.000
	N	20	20
CEO NonTop20	Pearson Correlation	.868**	1
	Sig. (2-tailed)	.000	
	N	20	20

**. Correlation is significant at the 0.01 level (2-tailed).

The Spearman's Rank correlation of the ranks by CEOs of Top 20 companies and companies outside the Top 20 is 0.868 with significance of 0.010. This shows a high level of correlation between the rankings given by the two groups of CEOs.

The results of rankings on competitiveness clearly establish the fact that the companies which are top revenue grossers need not be on the top of the list of competitive companies. The prime example here is of Ranbaxy which ranks # 1 on sales revenues but ranks a low of 12 on competitiveness. In fact, this has been corroborated by industry sources. Ranbaxy has lost ground due to poor leadership, compromise on quality in manufacturing and poor new product pipeline. It must also be mentioned that the standard deviation for Ranbaxy's ranking is high, which means that there is some discordance among the raters about Ranbaxy's rating.

Likewise, the other companies – Wockhardt, Jubilant, Piramal and Torrent fare poorly on their competitiveness as compared to their position on sales revenues. According to industry sources, this has been largely due to lack of focus and strategic directions.

In contrast, companies which are lower on sales – Glenmark, Divis, Mylan occupy higher competitive position as compared to their sales revenue rankings. This is on account of strategic focus and the ability to carve market niches.

The striking note of the results in Table 6.7 is that Sun Pharma has been uniformly rated high by all CEOs as it scores a mean close to 1 with a low standard deviation. This shows a high concordance among raters about Sun Pharma. This concordance among the raters is also present for the next five positions for the companies – Lupin Labs, Dr Reddy's, Cipla, Cadila and Glenmark. There is small difference in rankings for positions 7 to 10.

It is interesting to note that there is general agreement about the ratings of competitiveness of the last five players – Biocon, Strides, Piramal, Jubilant and Nectar.

It is also interesting to note that while only two multinational companies –, GSK and Sanofi figure in the top 20 companies (Mylan excluded as it was a recent acquisition of by Mylan of the Indian company Matrix Labs) by sales, they have creditable 10th and 11th position on competitiveness. This has been attributed by industry sources to their strong new product pipelines and good marketing abilities. Their lower overall sales are due to low focus on exports, as mandated by their parent companies which actually deal with markets outside India, leaving the subsidiary company to deal with the domestic market.

The Indian companies dominate the list of top 10 competitive companies in this list. Almost invariably, all of them have achieved this position due to strong focus on the profitable North American and European markets with generic products, backed by strong organic chemistry prowess and the ability to successfully challenge patent holders in the US market to gain market exclusivity, as mentioned in Chapter 2 which presented the profile of the pharmaceutical industry.

Table 6.9 presents the summary, in terms of means and standard deviations, of the frequency distribution of the data (ranks) obtained from the responses to Question 2 asking the functional heads respondents to rank the top 20 companies (by sales revenues) on their competitiveness. This has been done for two groups, from the functional heads of the Top 20 companies and from the functional heads of companies outside the Top 20 positions. Based on the mean scores, the competitiveness rankings for the top 20 companies have been assigned, as depicted in the same Table.

Table 6.9 Ranking of Top 20 Companies by Functional Heads

	Top 20 Functional Heads			Function Heads non Top 20 Cos			All Functional Heads		
Company	Mean	Std Dev	Rank	Mean	Std Dev	Rank	Mean	Std Dev	Rank
Ranbaxy	9.59	6.11	9	11.48	6.42	12	10.44	6.11	10
Dr Reddys	4.55	2.94	3	4.03	3.06	2	4.14	2.93	2
Sun Pharma	1.70	1.39	1	1.75	1.33	1	1.67	1.27	1
Lupin	4.36	2.78	2	6.70	4.56	4	5.29	3.89	4
Cipla	4.68	2.49	4	4.68	2.90	3	4.63	2.63	3
Wockhardt	12.00	4.38	15	10.68	4.14	11	11.42	4.29	13
Cadila	9.52	4.66	8	9.93	4.11	8	9.48	4.41	8
Aurobindo	11.59	4.51	12	11.88	3.99	13	11.51	4.34	14
Mylan	10.45	5.56	10	10.13	4.68	9	10.04	5.08	9
Jubilant	14.33	4.30	18	13.95	3.49	16	13.86	4.17	18
Glenmark	8.00	3.51	5	7.53	3.94	5	7.61	3.67	5
Piramal	11.95	4.45	14	12.78	4.17	15	12.24	4.50	15

	Top 20 Functional Heads			Function Heads non Top 20 Cos			All Functional Heads		
Company	Mean	Std Dev	Rank	Mean	Std Dev	Rank	Mean	Std Dev	Rank
Torrent	10.95	3.34	11	12.08	3.88	14	11.21	3.78	12
Strides	14.12	4.26	17	14.35	3.70	17	13.85	4.20	17
IPCA	13.05	3.79	16	14.50	3.41	18	13.46	3.86	16
Biocon	11.74	3.99	13	10.68	5.30	10	11.30	4.61	11
GSK	8.67	5.53	6	8.23	4.70	6	8.52	5.05	6
Divis	15.09	5.03	19	16.25	4.01	19	15.26	4.81	19
Nectar	17.67	4.00	20	18.28	3.05	20	17.56	4.13	20
Sanofi	9.33	5.28	7	9.15	4.96	7	9.29	5.07	7

Table 6.10 presents the Spearman's rank correlation for the ranking of the 20 companies by the two groups of functional heads – of the Top 20 companies and of companies outside the Top 20.

Table 6.10 Spearman's Rank Correlation of Rankings of Companies by the Functional Heads

		FnHeadTop20	FnHeadNonTop20
Fn Head Top20	Pearson Correlation	1	.955**
	Sig. (2-tailed)		.000
	N	20	20
Fn Head NonTop20	Pearson Correlation	.955**	1
	Sig. (2-tailed)	.000	
	N	20	20

**. Correlation is significant at the 0.01 level (2-tailed).

The Spearman's Rank correlation of the ranks by functional heads of Top 20 companies and of companies outside the Top 20 is 0.955 with significance of 0.000. This shows a high level of correlation between the rankings given by the two groups of functional heads.

As with the two groups of CEOs, there is total agreement on the ranking of the # 1 company on competitiveness i.e of Sun Pharma, with mean and standard deviation very similar. However, the standard deviation is much more than that in the rankings by the CEOs.

When the rankings of functional heads of the two groups are compared, it can be inferred that the ranks 1, 5, 6, 7, 8, are the same for the two groups; and there is some marginal difference in the ranks for 2, 3, 4, 9 and 10. The same phenomenon was not observed in the rankings made by CEOs where the two groups had more uniform rankings.

Likewise, there is a big difference in the rankings given to companies – Aurobindo, Biocon and Divis. While the functional heads ranked them at the 14th, 11th and 19th positions, the CEOs had ranked them at 9th, 16th and 8th positions respectively. For these companies, there is also not much inter group differences among the two groups of functional heads.

The two MNC companies in the top 20 are rated better by the functional heads than by the CEOs. GSK takes the 6th position and Sanofi takes the 7th position, as compared to their position of 10th and 11th respectively by the CEOs. The same applies for Biocon which is placed at the 11th position compared to the 16th position by the CEOs.

The companies –Strides, Jubilant and Nectar have been ranked at the last three positions, which is the same as with the CEO's rankings.

Thus, it can be inferred that while the inter group differences between the two groups of functional heads is low, the differences with the CEOs is somewhat significant.

Concordance Test of Ratings

The ranking of companies by the respondents is intended to be used for estimating a competitive index for the companies as a dependent variable and factors of competitiveness as independent variables. In order to assess the appropriateness of this approach and whether ranking of companies would be to an acceptable level of significance, the non parametric test on ordinal variables (ranking) – Kendall's Concordance test was also performed.

Kendall's coefficient of concordance indicates the degree of association of ordinal assessments made by multiple appraisers when assessing the same samples. Kendall's coefficient values can

range from 0 to 1. A high or significant Kendall's coefficient means that the appraisers are applying essentially the same standard when assessing the samples.

Table 6.11 presents the Kendall's M values of concordance and the level of significance at which the null hypotheses that there is no difference in the ratings will be rejected by different groups of appraisers. These groups in this study are the four groups - CEOs of Top 20 companies, CEOs of companies outside the top 20, functional heads of the top 20 companies and functional heads of companies outside the top 20 companies; and the combination of groups - combined CEO group, combined functional heads group, CEOs and functional heads of top 20 companies, and CEOs and functional heads of companies outside top 20. With an additional group of all respondents, there are in all 9 groups which were tested for the concordance values. Results are presented in Table 6.11 below:

Table 6.11 Kendall's M values of Concordance for Different Groups

Group	Respondents	Kendall's K Value	Level of Significance
CEOs of Top 20 companies	13	0.604	0.000
CEOs of companies outside the top 20 companies	8	0.618	0.000
All CEOs	21	0.590	0.000
Functional heads of the top 20 companies	44	0.476	0.000
Functional heads of companies outside the top 20 companies	43	0.498	0.000
All functional heads	87	0.480	0.000
CEOs and functional heads of the top 20 companies	57	0.474	0.000
CEOs and functional heads of companies outside top 20 companies	51	0.496	0.000
All CEOs and all functional heads i.e all respondents	108	0.478	0.000

It can be seen from the above table that the concordance of ratings by the CEOs of 0.6 and above, indicate a good level of agreement on the ratings of the companies. These Kendall's M values are also generally higher than that of the functional heads.

It is important to note that the level of significance or p value is 0.000. The null hypotheses that the ratings are done with different standards and that there is no agreement among raters, is uniformly rejected for all groups with 0.000 level of significance for the M values obtained.

This means that there is value in obtaining the CEOs rating of competitiveness and would be useful in creating an index of competitiveness.

Competitiveness Indices from Ratings

The method adopted to convert the rankings of companies to an index is to reduce the mean value of the ranks of the companies from 20, this being the total number of companies, and divide the difference by 20. It is important to use the mean ranks instead of absolute rank since otherwise the lowest ranked firm with a rank of 20 would have an index value of 0, which would not be appropriate.

The rankings of all CEOs in Table 6.7 are converted to an index as given in the following table.

Table 6.12 Ranking Converted to Index of Competitiveness

S. No	Company	Mean Value of Ranks by all CEOs	Competitive Index
1	Ranbaxy	11.85	0.408
2	Dr Reddys	3.69	0.815
3	Sun Pharma	1.25	0.938
4	Lupin	2.82	0.859
5	Cipla	4.25	0.788
6	Wockhardt	12.89	0.355
7	Cadila	6.86	0.657
8	Aurobindo	9.37	0.532

S. No	Company	Mean Value of Ranks by all CEOs	Competitive Index
9	Mylan	8.81	0.559
10	Jubilant	14.34	0.283
11	Glenmark	7.45	0.627
12	Piramal	15.44	0.228
13	Torrent	12.00	0.400
14	Strides	13.17	0.341
15	IPCA	12.69	0.365
16	Biocon	13.00	0.350
17	GSK	10.16	0.492
18	Divis	9.09	0.546
19	Nectar	15.87	0.206
20	Sanofi	10.63	0.468

These indices will be used in assessing the relationship between competitiveness as dependent variable and the factors and variables affecting competitiveness as independent variables.

Annexure 2 presents a one page summary of the key operating data for each of the Top 20 pharmaceutical companies in India. The operating data presented is illustrative. The data used for the empirical analysis in the subsequent sections of this chapter was more extensive than what is presented here in Annexure 2.

Section 2

6.3 Factor Measurements

The Exploratory factor analysis (EFA) of the variables manifest in the constructs of competitiveness in the conceptual model was performed to evaluate the discriminant validity of the constructs. Since the conceptual model had scanty empirical support in the literature, the

extraction of factors in the factor analysis was reviewed to identify, both for agreement with the initial constructs and also to determine whether there are different constructs possible. Based on this assessment, a revision of the original conceptual model was made.

The exploratory factor analysis was performed with using the Principal Component Analysis and Varimax Rotation approach with Kaiser normalization using SPSS 20.0 software.

The factor analyzability of data was tested with Barlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. The closer KMO is to 1.0, the more the factor analyzability of the data. Details are presented in Table 6.13 below.

Table 6.13 KMO and Barlett's Test of Factor Analyzability of Data
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.730
	Approx. Chi-Square	1464.787
Bartlett's Test of Sphericity	Df	465
	Sig.	.000

The KMO value of 0.73 with Chi-Square of 1464.78 and Bartlett's Test of Sphericity at significance level 0.000 represent good factor analyzability of the data.

From the 42 variables taken initially, 11 variables were removed for low communality i.e less than 0.4 and for cross loading. The resultant table of communality scores for the remaining 31 variables is given in Table 6.14 below:

Table 6.14 Communalities Scores for the Variables in EFA

	Initial	Extraction
High stake by owners	1.000	.584
Vision & Mission defined	1.000	.654
Good Corporate Governance	1.000	.585
Professional Management	1.000	.633
Clear policies	1.000	.625
Ability to strategize	1.000	.501
Ability to take hard decisions	1.000	.614
Clear market focus	1.000	.605
Ability to leadership position	1.000	.554
Consistent sales growth	1.000	.756
Sales growth Above Ind. Average	1.000	.504
Commitment to International business	1.000	.697
Consistent export growth	1.000	.713
Consistent profit growth	1.000	.560
Increase foreign presence	1.000	.723
No of foreign markets	1.000	.523
Presence in N America & Europe	1.000	.604
International Scales in operation	1.000	.589
Superior technology	1.000	.562
Better RM access	1.000	.737
Cost effective RM proc.	1.000	.766
Better QA systems	1.000	.509
Quality advance TQM. 6 sigma	1.000	.465
Best IT practices	1.000	.523
Absence of IR discord	1.000	.485
No. of Technology collaborations	1.000	.566
Research spending	1.000	.616
No of patents filed	1.000	.647
Ability to foster creativity	1.000	.632
Ability to manage risks	1.000	.781
Ability to access funds	1.000	.589

Extraction Method: Principal Component Analysis.

It can be observed that the communality scores for the 31 variables have been generally good thus signifying good explanatory power of the variables shortlisted.

Table 6.15 below presents details of the total variance explained by the factors extracted for the 31 variables.

Table 6.15 Total Variance Explained by the Factors Extracted

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.189	23.189	23.189	7.189	23.189	23.189	4.273	13.785	13.785
2	3.284	10.595	33.784	3.284	10.595	33.784	3.514	11.336	25.120
3	2.199	7.094	40.878	2.199	7.094	40.878	2.437	7.860	32.980
4	1.945	6.275	47.153	1.945	6.275	47.153	2.348	7.574	40.554
5	1.588	5.122	52.275	1.588	5.122	52.275	2.221	7.163	47.717
6	1.485	4.791	57.066	1.485	4.791	57.066	2.202	7.102	54.819
7	1.213	3.914	60.980	1.213	3.914	60.980	1.910	6.160	60.980
8	1.029	3.320	64.300						
9	.971	3.132	67.432						
10	.900	2.904	70.337						
11	.878	2.833	73.170						
12	.810	2.612	75.782						
13	.760	2.450	78.232						
14	.702	2.263	80.495						
15	.660	2.128	82.623						
16	.652	2.103	84.726						
17	.514	1.657	86.383						
18	.497	1.603	87.986						
19	.469	1.511	89.497						
20	.456	1.472	90.969						
21	.423	1.364	92.333						
22	.392	1.265	93.598						
23	.334	1.076	94.674						
24	.317	1.023	95.697						
25	.282	.911	96.608						
26	.255	.824	97.432						
27	.221	.714	98.146						
28	.210	.678	98.823						
29	.156	.504	99.327						
30	.111	.357	99.685						
31	.098	.315	100.000						

For exploratory factor analysis, generally Eigen values of over 1.0 are considered adequate and good. A higher number of factors represent better extraction. It can be observed from Table 6.9 that there are 8 factors with Eigen values of over 1.0 explaining 64.3 % of the total variance.

However, only 7 factors were chosen since the review of the factors to determine the constructs that they explain resulted in only 7 meaningful constructs with three variables per construct. These 7 constructs explain 61 % of the total variance. This is considered good in the social sciences field.

Table 6.16 summarizes the Eigen values and percentage variance represented by each of the seven factor components extracted and selected from the exploratory factor analysis.

Table 6.16 Eigen Values and Percentage Explained by the Factors Selected

Factor Component	Eigen Value	% Variance Explained	% Cum Variance Explained
1	7.189	23.189	23.189
2	3.284	10.595	33.784
3	2.199	7.094	40.878
4	1.945	6.275	47.153
5	1.588	5.122	52.275
6	1.485	4.791	57.066
7	1.213	3.914	60.980

The variables manifest in the seven factors number 29 and details of the same is presented in Table 6.17 below, which gives the coefficients of the variables in the components (factors).

Table 6.17 Coefficients of Variables Extracted by the Seven Factors

Rotated Component Matrix

	Component						
	1	2	3	4	5	6	7
Increase foreign presence	.817						
Consistent export growth	.812						
Commitment to Inter business	.806						
Presence in N America & Europe	.728						
International Scales in operation	.631						
No of foreign markets	.587						
Ability to manage risks		.792					
Ability to access funds		.745					
Better QA systems		.645					
Ability to foster creativity		.569					
Superior technology		.515					
Best IT practices		.513					
Absence of IR discord							
No of patents filed			.685				
No. of Tech collaborations			.625				
Research spending			.613				
Consistent sales growth				.839			
Ability to leadership position				.608			
Sales growth above industry average				.519			
Consistent profit growth				.517			
Ability to take hard decisions					.755		
Ability to strategize					.669		
Clear market focus					.577		
Professional Management					.570		
Cost effective RM procurement.						.793	
Better RM access						.722	
Clear policies						.573	
Quality advance TQM. 6 sigma							
Good Corp Governance							.694
Vision & Mission defined							.644
High stake by owners							.532

Extraction Method: Principal Component Analysis. Rotation Method: Quartimax with Kaiser Normalization. Rotation converged in 9 iterations.

The Cronbach alpha values of the seven factors extracted is presented in Table 6.18 below. This is a test of the reliability of the factors.

Table 6.18 Cronbach Values of Factors Extracted

Factor Component	Cronbach Alpha Value of Factor	Variables	Cronbach Alpha Value of Variables
1	0.846	1. Increase foreign presence 2. Consistent export growth 3. Commitment to Inter business 4. Presence in N America & Europe 5. International Scales in operation 6. No of foreign markets	0.807 0.801 0.804 0.837 0.831 0.842
2	0.767	1. Ability to manage risks 2. Ability to access funds 3. Better QA systems 4. Ability to foster creativity 5. Superior technology 6. Best IT practices	0.698 0.715 0.751 0.729 0.754 0.748
3	0.686	1. No of patents filed 2. No. of Tech collaborations 3. Research spending	0.486 0.646 0.629
4	0.680	1. Consistent sales growth 2. Ability to leadership position 3. Sales growth above industry average 4. Consistent profit growth	0.570 0.631 0.568 0.694
5	0.646	1. Ability to take hard decisions 2. Ability to strategize 3. Clear market focus 4. Professional Management for Results	0.553 0.566 0.588 0.602
6	0.762	1. Cost effective RM procurement. 2. Better RM access 3. Clear policies	0.522 0.572 0.872
7	0.419	1. Good Corp Governance 2. Vision & Mission defined 3. High stake by owners	0.194 0.304 0.554

From the values of Cronbach Alpha in the above table it can be seen six out of the seven that the factors have good reliability as constructs with values above 0.65. In the case of the seventh factor, the Cronbach alpha score is 0.419. It has been still retained as it brings in additional elements of the construct of Leadership.

These seven factors from the exploratory factor analysis are next examined if they represent in some manner the broad factors or construct in the initial conceptual model. This has been attempted in the Table 6.19 below, along with justification for the same.

Table 6.19 Extracted Components and the Original Constructs – A Comparison

Variables	Related Factors in Conceptual Model
1. Increase foreign presence 2. Consistent export growth 3. Commitment to Inter business 4. Presence in N America & Europe 5. International Scales in operation 6. No of foreign markets	1. Competitive Performance 2. Assets & Resources
1. Ability to manage risks 2. Ability to access funds 3. Better QA systems 4. Ability to foster creativity 5. Superior technology 6. Best IT practices	1. Competitive Processes 2. Assets & Resources
1. No of patents filed 2. No. of Tech collaborations 3. Research spending	1. Competitive Potential 2. Assets & Resources
1. Consistent sales growth 2. Ability to leadership position 3. Sales growth above industry average 4. Consistent profit growth	1. Competitive Performance

Variables	Related Factors in Conceptual Model
1. Ability to take hard decisions 2. Ability to strategize 3. Clear market focus 4. Professional Management for Results	1. Leadership and Governance
1. Cost effective RM procurement. 2. Better RM access 3. Clear policies	1. Assets & Resources 2. Leadership and Governance
1. Good Corp Governance 2. Vision & Mission defined 3. High stake by owners	1. Leadership and Governance 2. Assets & Resources

In Table 6.19 above, the major factors in the conceptual model extracted from the EFA is identified as 1. and the minor factor extracted is identified as 2. *An examination of the above table tells us that all the basic factors of the original conceptual model have come to occupy as major factor and are manifest in the new factors extracted.* However, in a relative sense, Competitive Performance, Leadership and Governance and Assets & Resources have spread out in the new factors.

From the foregoing, it can be stated that the original hypotheses framed about the conceptual framework can be prima facie accepted since the exploratory factor analysis has factors in which the same variables are manifest. However, considering that the new factors extracted are not categorical and unique with the same factors as in the conceptual model, it has to be reviewed to see if it actually represents modified constructs of competitiveness. *In this situation, the conceptual model can be inferred to be valid only for the generalized model of competitiveness.*

Section 3

6.3 Revised Conceptual Model

Although the factor measurement broadly helped a prima facie acceptance of the hypotheses about the relationship between competitiveness and the individual factors, it was noted that it would be valid only for a general framework. It is also observed that in a relative sense, Competitive Performance, Leadership and Governance, and Assets and Resources have a dispersed presence in the new factors extracted. This is in slight contrast to the preliminary results on relative importance of the factors discussed in Section 6.2 from the descriptive statistics, where Competitive Performance and Resources were placed lower in relative importance, based on the mean scores. Besides, the new factors are a mixture of the factors in the original conceptual model.

Thus, there is need to look at a modified conceptual model which retains the basic elements of the original conceptual model, but is more refined and representing the situation concerning the pharmaceutical industry in India. In one sense, the refined model can be seen as the industry specific model.

From the foregoing discussions, the revised conceptual model of firm level competitiveness has been arrived at as given in the Table 6.20 below. *This model is specific to the pharmaceutical industry in India based on the empirical analysis of this study. This model presents more specific constructs of competitiveness manifest in the variables that were taken in the exploratory factor analysis.*

Table 6.20 Variables in Revised Conceptual Model and the Constructs Obtained

Variables	Revised Construct
1. Increase foreign presence 2. Consistent export growth 3. Commitment to Inter business 4. Presence in N America & Europe 5. International Scales in operation	Export Capabilities

Variables	Revised Construct
6. No of foreign markets	
1. Ability to manage risks 2. Ability to access funds 3. Better QA systems 4. Ability to foster creativity 5. Superior technology 6. Best IT practices	Process Capabilities
1. No of patents filed 2. No. of Tech collaborations 3. Research spending	Technology Capabilities
1. Consistent sales growth 2. Ability to leadership position 3. Sales growth above industry average 4. Consistent profit growth	Market Capabilities
1. Ability to take hard decisions 2. Ability to strategize 3. Clear market focus 4. Professional Management for Results	Management Capabilities
1. Cost effective RM procurement. 2. Better RM access 3. Clear policies	Resource Capabilities
1. Good Corp Governance 2. Vision & Mission defined 3. High stake by owners	Leadership Capabilities

It is to be noted that the factor components are now stated in terms of ‘capabilities’ relating to exports, process, technology, market, management, resources and leadership. This term has been chosen in order to reflect the essence of the variables that these factors come to represent – about converting competencies to outcomes or results for the firms and about strengths that are both the tangible and intangible.

Dave Ulrich and Norm Smallwood (2004) define capabilities as “the collective skills, abilities and expertise of an organization – as the outcomes of investments in staffing, training, compensation, communication, and other human resources areas. They represent the ways that people and resources are brought together to accomplish work. They form the identity and personality of the organization by defining what it is good at doing and, in the end, what *it is*”.

Stalk, Evans and Shulman (1992) in proposing the capabilities based model of competitiveness defined capability as ‘a set of business processes strategically understood; and capabilities based competitors identify their key business processes, manage them centrally, and invest in them heavily’.

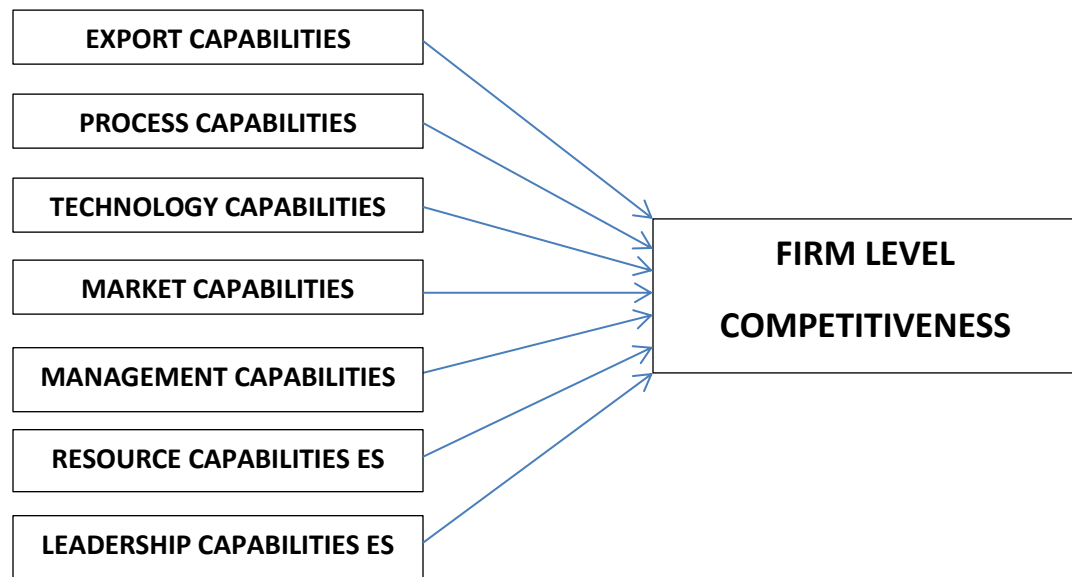
Support to this can be found also in the resource based view of competitiveness mainly propounded by Barney (1991) and also Peteraf (1993), who stated that a firm’s competitive advantage stems more from the tangible and intangible set of resources deployed by the firm, and the capabilities that are developed by the firm. Firms exploit their valuable, rare, in-imitable and non-substitutable resources (known as VRIN) to obtain competitive advantage.

Barney and Hoskisson (1989) proposed that the resources have to be heterogenous in nature and which cannot be mobile from one firm to another. This means that the resources operated by the firm have to be unique and which cannot be easily transferred, acquired or copied by competing firms. These would include specialized knowledge, know how, intellectual property, social capital and difficult to transfer resources (Barney, J. B., and Hoskisson R, 1989).

The capability view of competitiveness in the proposed new conceptual model thus stresses on unique and heterogenous resources, both tangible and intangible, supported by unique processes in order to deliver strong outcomes.

Based on these premises and the empirical study, the following revised conceptual model of competitiveness is proposed.

Figure 6.1 Revised Conceptual Framework for Measuring Competitiveness of Firms



This revised model of competitiveness, specific to the pharmaceutical industry, will now be subjected to rigorous empirical analysis to establish its relevance and usefulness.

The revised set of hypotheses to be tested in the new conceptual model of competitiveness as applicable to the pharmaceutical industry in India is:

H2: There is a significant relationship between competitiveness and capabilities of firms in export capabilities, process capabilities, technology capabilities, market capabilities, management capabilities, resource capabilities and leadership capabilities.

H2A: There is a significant relationship between competitiveness and export capabilities of the firms in the industry.

H2B: There is a significant relationship between competitiveness and process capabilities of the firms in the industry.

H2C: There is a significant relationship between competitiveness and technology capabilities of the firms in the industry.

H2D: There is a significant relationship between competitiveness and market capabilities of the firms in the industry.

H2E: There is a significant relationship between competitiveness and management capabilities of the firms in the industry.

H2F: There is a significant relationship between competitiveness and resource capabilities of the firms in the industry.

H2G: There is a significant relationship between competitiveness and leadership capabilities of the firms in the industry.

Section 4

6.5 Relative Importance of Factors

One of the objectives of this study was to look at the relative importance of the factors affecting firm level competitiveness.

The relative importance of the seven factors identified can be obtained by once again looking at the descriptive statistics of the data obtained from the responses for the 29 variables manifest in the 7 factors in the new conceptual model.

Table 6.21 and Table 6.23 present the summary, in terms of means and standard deviations, of the frequency distribution of the data obtained from the responses to Question 1 on the 42 variables manifest in the seven new constructs of firm level competitiveness viz. Export capabilities, Process capabilities, Technology capabilities, Market capabilities, Management capabilities, Resource capabilities and Leadership capabilities, for the following groups:

1. CEOs from Top 20 companies and from companies outside top 20.
2. Functional heads – from Top 20 companies and from companies outside top 20.

Table 6.21 presents the statistics for the responses of CEOs for two groups - those from the top 20 companies and those from companies outside top 20.

Table 6.21 Summary of Descriptive Statistics of Values of Capability Factors Assessed by CEOs

Group	Statistic	Competitiveness Constructs on Capabilities						
		Export	Process	Technology	Market	Management	Resource	Leadership
Top 20 CEOs	Mean	3.55	4.18	3.15	4.19	4.50	3.77	3.90
	Std Dev	0.78	0.34	0.81	0.32	0.38	0.83	0.63
	Rank	6	3	7	2	1	5	4
CEOs outside Top 20	Mean	3.75	4.23	3.50	3.87	4.47	4.13	4.21
	Std Dev	0.50	0.54	0.50	0.40	0.25	0.47	0.47
	Rank	6	2	7	5	1	4	3
CEOs Combined	Mean	3.63	4.20	3.28	4.07	4.48	3.90	4.01
	Std Dev	0.68	0.42	0.72	0.38	0.33	0.72	0.58
	Rank	6	2	7	3	1	5	4

Table 6.22 presents the results of the Spearman's rank correlation test for the rankings of the two groups – CEOs of Top 20 companies and CEOs of companies outside the Top 20- for the initial constructs of competitiveness.

Table 6.22 Spearman's Rank Correlation of the Rankings of Capability Factors by CEOs

		CEOTop20	CEONonTop20
Spearman's rho	Correlation Coefficient	1.000	.786*
	Sig. (2-tailed)	.	.036
	N	7	7
	Correlation Coefficient	.786*	1.000
	Sig. (2-tailed)	.036	.
	N	7	7

*. Correlation is significant at the 0.05 level (2-tailed).

It can be seen that there is good correlation in the rankings of the capability factors by the two groups of CEOs with the Spearman's rank correlation coefficient at 0.786 with significance of 0.036.

It can be seen from the Table 6.21 that relative positions 1, 6 and 7 i.e of Management, Export and Technology capabilities are uniform for both groups even though the standard deviations are higher. The differences are for the 2, 3, 4 and 5 positions i.e of Process, Market, Leadership and Resource capabilities.

If we rule out the effect of small sample size of the mean scores of each individual group and therefore consider only the means of the combined group, the ranks of the seven capability factors by the CEOs would be:

1. Management capabilities
2. Process capabilities
3. Market capabilities
4. Leadership capabilities
5. Resource capabilities
6. Export capabilities
7. Technology capabilities

Table 6.23 gives similar data of rankings by functional heads – of Top 20 companies and companies outside Top 20.

Table 6.23 Summary of Descriptive Statistics of Values of Capability Factors – Function Heads

Group	Statistic	Competitiveness Constructs on Capabilities						
		Export	Process	Technology	Market	Management	Resource	Leadership
Top 20 Companies	Mean	3.91	4.25	3.89	4.32	4.57	4.36	4.23
	Std Dev	0.64	0.45	0.61	0.44	0.46	0.46	0.57
	Rank	6	4	7	3	1	2	5
Outside Top 20 Companies	Mean	3.81	4.25	3.87	4.22	4.53	4.22	4.19
	Std Dev	0.60	0.43	0.61	0.59	0.36	0.52	0.48
	Rank	7	2	6	4	1	3	5
All Companies	Mean	3.86	4.25	3.88	4.27	4.55	4.29	4.21
	Std Dev	0.62	0.44	0.61	0.52	0.41	0.49	0.53
	Rank	7	4	6	3	1	2	5

Table 6.24 presents the results of the Spearman's rank correlation test for the rankings of the two groups – Functional Heads of Top 20 companies and Functional Heads of companies outside the Top 20- for the initial constructs of competitiveness.

Table 6.24 Spearman's Rank Correlation of the Rankings of Capability Factors by Functional Heads

		Top20FnHeads	OutsideTop 20FnHeads
Spearman's rho	Top20FnHeads		
	Correlation Coefficient	1.000	.857*
	Sig. (2-tailed)	.	.014
	N	7	7
	OutsideTop20FnHeads		
	Correlation Coefficient	.857*	1.000
	Sig. (2-tailed)	.014	.
	N	7	7

*. Correlation is significant at the 0.05 level (2-tailed).

It can be seen that there is good correlation in the rankings of the capability factors by the two groups of Functional heads with the Spearman's rank correlation coefficient at 0.857 with significance of 0.014.

From Table 6.23 it can be seen that there is variation in the rankings except for the ranks 1 and 5 of Management and Leadership. However, the order appears to be somewhat similar.

From both the Tables, it can be seen that as with the initial evaluation of descriptives in Section 6.2, where Management was placed as the most important factor in the original conceptual framework. *Even here, Management Capabilities are placed as the most important factor in the revised framework.* However, in order to determine the relative importance of the factors, the concordance test was performed on all the four groups and if the concordance was found to be good, then the mean ranks of all four groups could be used for the relative rankings.

Table 6.25 below gives the results of the Kendall's coefficient for the concordance test of the rankings by the four groups – CEOs and functional heads, of the Top 20 firms and firms outside Top 20.

Table 6.25 Kendall's Coefficient of Concordance for the Four Groups of Evaluators for the Rankings of Capabilities

Ranks		Test Statistics	
	Mean Rank		
Export Cap	6.25	N	4
Process Cap	2.75	Kendall's W ^a	.848
Technology Cap	6.75	Chi-Square	20.357
Market Cap	3.50	Df	6
Management Cap	1.00	Asymp. Sig.	.002
Resource Cap	3.50		
Leadership Cap	4.25		

a. Kendall's Coefficient of Concordance

The concordance test done on the four groups - CEOs and the functional heads, of the two groups of companies, gives a Kendall's M value of 0.848 with significance value p as 0.002. This shows a high level of concordance of the ratings by the four groups.

Since the concordance among the four groups of ratings is high, although the relative rankings are one level up or down among the raters, the relative ranking was finally determined based on the combined rankings of all respondents – CEOs and functional heads of all companies, from the mean ranks in the Kendall's ranking in Table 6.25 above.

Accordingly, the relative importance of the seven factors of capabilities determining competitiveness of firms in the pharmaceutical industry in India is in the order of:

1. Management Capabilities
2. Process Capabilities

3. Market Capabilities
4. Resource Capabilities
5. Leadership Capabilities
6. Export Capabilities
7. Technology Capabilities

Qualitative Statements

The respondents were also asked to state three criteria that they had in mind while ranking the top 20 companies on their competitiveness. These open ended qualitative statements were classified into the seven capabilities listed in the revised conceptual model and weights of 3, 2 and 1 assigned. The total weights would indicate the relative importance of the seven capabilities of competitiveness. Based on this, ranks were assigned. The results are tabulated in Table 6.26.

Table 6.26 Ranks Based on Total Scores for the Seven Capabilities for Qualitative Statements on Competitiveness

Group	Capabilities						
	Export	Process	Technology	Market	Management	Resources	Leadership
Top 20 Company CEOs	6	5	4	1	2	6	3
CEOs Outside Top 20	4	5	4	1	1	6	1
All CEOs	5	5	4	1	2	6	3
Top 20 Functional Heads	5	6	3	2	1	7	4
Functional Heads outside Top 20	6	5	3	2	1	7	4

Group	Capabilities						
	Export	Process	Technology	Market	Management	Resources	Leadership
20							
All Functional Heads	6	5	3	2	1	7	4
All Respondents	6	5	4	2	1	7	3

The concordance test was done on the four groups - CEOs and the combined CEO-functional heads, of the two groups of companies, as presented in Table 6.27 below.

Table 6.27 Concordance Test on Ranking of Qualitative Statements Concerning Competitiveness Capabilities

Ranks		Test Statistics	
	Mean Rank	N	4
Export Cap	5.50	Kendall's W ^a	.909
Process Cap	5.50	Chi-Square	21.826
Technology Cap	3.63	df	6
Market Cap	1.75	Asymp. Sig.	.001
Management Cap	1.50	a. Kendall's Coefficient of Concordance	
Resource Cap	6.88		
Leadership Cap	3.25		

It can be seen that the Kendall's coefficient is high at 0.909 with significance of 0.001. This also validates the ratings based on qualitative statements and conversion to ranks. However, the relative rankings are different, except for the first capability – Management. In this situation, reliance is placed more on the rankings based on the quantitative responses of scoring of the variables in the measuring instrument, rather than on qualitative statements.

Resultantly, and in conclusion, based on the quantitative and qualitative scoring of variables, it can be stated that the relative importance of the seven factors determining competitiveness of firms in the pharmaceutical companies in India are in the order of:

- 1. Management Capabilities*
- 2. Process Capabilities*
- 3. Market Capabilities*
- 4. Resource Capabilities*
- 5. Leadership Capabilities*
- 6. Export Capabilities*
- 7. Technology Capabilities*

Section 5

6.6 Comparison of Perceptions on Competitiveness

Before taking up the testing of hypotheses of the relationship of the new factors of capabilities as determining competitiveness of firms, it is necessary to understand if there is uniformity in perception among the respondents on the these factors, or that there is no difference in perception. *Then, the findings can be generalized to the firms in the pharmaceutical industry.*

In order to check if there is difference in the perceptions regarding competitiveness on the 7 factors measured and used as constructs in the revised conceptual model, between:

- 1) the two main groups - of both CEOs and functional heads - of the top 20 companies and companies outside the top 20
- 2) the two main groups of only the CEOs and not the functional heads,

the T Test for equality of means was performed, using the factor scores of the seven factors. The individual factor scores were taken as the average of the values of the variables extracted by the factors.

The hypothesis framed is that there is no significant difference between each of the 7 different capabilities determining competitiveness between these groups of companies. These are given below

H3 There is no significant difference between the all capabilities factors as determining competitiveness, between top 20 companies and companies outside top 20.

H3A There is no significant difference between export capabilities as determining competitiveness, between top 20 companies and companies outside top 20.

H3B There is no significant difference between process capabilities as determining competitiveness, between top 20 companies and companies outside top 20.

H3C There is no significant difference between technology capabilities as determining competitiveness, between top 20 companies and companies outside top 20.

H3D There is no significant difference between market capabilities as determining competitiveness, between top 20 companies and companies outside top 20.

H3E There is no significant difference between management capabilities as determining competitiveness, between top 20 companies and companies outside top 20.

H3F There is no significant difference between resource capabilities as determining competitiveness, between top 20 companies and companies outside top 20.

H3G There is no significant difference between leadership capabilities as determining competitiveness, between top 20 companies and companies outside top 20.

Table 6.28 provides the details of the T Test on equality of means for the distribution all the factors of on competitiveness, between top 20 companies and companies outside top 20.

Table 6.28 T Test on Distribution of Factor Scores of All Respondents from Two Groups of Companies

Capability Factor	T value	D.F	Significance Two Tailed
Export	-0.498	106	0.620
Process	-0.141	106	0.888
Technology	-0.666	106	0.507
Market	-0.317	106	0.752
Management	1.167	106	0.246
Resource	-0.568	106	0.571
Leadership	0.461	106	0.646

It was observed that since the significance values are more than 0.05, the null hypotheses that there is no significant difference between the two groups of companies on the seven factors determining competitiveness are accepted. The alternate hypotheses that there are differences between the two groups of companies are rejected. *This means that there is similar perception about the factors determining competitiveness in the top 20 companies and the companies outside the top 20.*

A similar T Test was done on the equality of means for the distribution of factor scores of only the CEOs of the two groups of companies. Details are in Table 6.14 below.

Table 6.29 T Test on Distribution of Factor Scores of CEOs of Two Groups of Companies

Capability Factor	T value	D.F	Significance Two Tailed
Export	-0.630	19	0.536
Process	-0.253	19	0.803
Technology	-1.079	19	0.294
Market	1.989	19	0.061
Management	0.205	19	0.840

Capability Factor	T value	D.F	Significance Two Tailed
Resource	-1.108	19	0.282
Leadership	-1.198	19	0.245

It was also observed since the significance values are more than 0.05, that the null hypotheses that there is no significant difference between the two groups of CEOs on the seven factors determining competitiveness are therefore accepted. The alternate hypotheses that there are differences between the two groups of CEOs are rejected. This also shows that there is similar perception about the factors determining competitiveness among the CEOs in the top 20 companies and the CEOs of companies outside the top 20.

From the foregoing analysis, it can be concluded that there is similar perception among all respondents of the two groups of companies on the factors that affect competitiveness which were extracted from the factor measurements.

The results of the Hypotheses testing are given in Table 6.30 below:

Table 6.30 Results of Hypotheses Testing of Differences in Perception of Competitiveness on the Seven Capabilities

Hypothesis	Result
H3 There is no significant difference between the capabilities factors as determining competitiveness, between top 20 companies and companies outside top 20.	Accepted
H3A There is no significant difference between export capabilities as determining competitiveness, between top 20 companies and companies outside top 20.	Accepted
H3B There is no significant difference between process capabilities as determining competitiveness, between top 20 companies and companies outside top 20.	Accepted
H3C There is no significant difference between technology capabilities as determining competitiveness, between top 20 companies and companies outside top 20.	Accepted
H3D There is no significant difference between market capabilities as determining competitiveness, between top 20 companies and companies outside top 20.	Accepted

Hypothesis	Result
H3E There is no significant difference between management capabilities as determining competitiveness, between top 20 companies and companies outside top 20.	Accepted
H3F There is no significant difference between resource capabilities as determining competitiveness, between top 20 companies and companies outside top 20.	Accepted
H3G There is no significant difference between leadership capabilities as determining competitiveness, between top 20 companies and companies outside top 20.	Accepted

Form the foregoing, since there is no difference in perception of CEOs and functional heads of the two groups of companies – the Top 20 companies and companies outside the Top 20 positions, the revised conceptual framework can be viewed as applicable to competitiveness of firms in the entire pharmaceutical industry. It can now be taken up for empirical testing of the relationships.

Section 6

6.7 Testing of the Relationship of Competitiveness with Individual Factors of Capabilities

The revised conceptual model of competitiveness with specific reference to competitiveness of the Indian pharmaceutical industry, as developed in Section 3 can be validated only if there is a statistically significant relationship between the seven factors of competitiveness and competitiveness. The hypotheses to be tested were earlier framed as under:

H2: There is a significant relationship between competitiveness and capabilities of firms in export capabilities, process capabilities, technology capabilities, market capabilities, management capabilities, resource capabilities and leadership capabilities.

H2A: There is a significant relationship between competitiveness and export capabilities of the firms in the industry.

H2B: There is a significant relationship between competitiveness and process capabilities of the firms in the industry.

H2C: There is a significant relationship between competitiveness and technology capabilities of the firms in the industry.

H2D: There is a significant relationship between competitiveness and market capabilities of the firms in the industry.

H2E: There is a significant relationship between competitiveness and management capabilities of the firms in the industry.

H2F: There is a significant relationship between competitiveness and resource capabilities of the firms in the industry.

H2G: There is a significant relationship between competitiveness and leadership capabilities of the firms in the industry.

For the conceptual model to have practical utility, it has to be statistically tested with actual values of the variables extracted by the individual factors, as they apply to the firms being studied. This would be based on operations data of the firms (some of which is presented in Annexure 2) from secondary research. If an adequate number of variables of the companies surveyed correlate to competitiveness, then the construct of competitiveness can be said also to have validity with the actual operations data i.e secondary data of the companies.

To achieve this, a linear regression was performed with the competitiveness index score of 20 companies as scored by the CEOs of Top 20 companies (Table 6.7 in Section 6.3) as dependent variable and the values from secondary research, of 33 different variables represented in the factors of the revised model of competitiveness for the Top 20 companies, as independent variables. This was also tested for data converted to the logarithmic base, but the R^2 values did not improve and the linear data was found to be simpler and more appropriate.

The summary of results is in Table 6.31 below.

Table 6.31 Results of Regression of Competitiveness Index on Factors from Secondary Data of Top 20 Companies

S No	Variable	R ² Value	Adj R ²	Significance	Factor Represented
1	Export Sales	0.474	0.444	0.001	Export Capability
2	Cum Abbreviated New Drug Appln	0.219	0.173	0.043	Export Capability
3	Quality Practices	0.237	0.194	0.030	Process Capability
4	Research Expenditure	0.615	0.594	0.000	Technology Capability
5	No of Research Centres	0.334	0.297	0.008	Technology Capability
6	Sales Revenues	0.561	0.537	0.000	Market Capability
7	Sales Growth	0.194	0.150	0.052	Market Capability
8	Domestic Market Share	0.475	0.446	0.001	Market Capability
9	3 Year Average PAT	0.260	0.219	0.022	Management Capability
10	Market Capitalization	0.619	0.598	0.000	Management Capability
11	No of Manufacturing Locations	0.143	0.095	0.100*	Resource Capability
12	Employees	0.495	0.467	0.001	Resource Capability
13	Debt Equity Ratio	0.143	0.095	0.100*	Resource Capability

*Although significant at 10%, was retained since it is construct examination.

From the above Table, it can be observed that from the 13 variables out of 33 examined, six out of the seven factors are covered. The individual factor Leadership is not covered since choice of variables available from published data such as Professional CEO, Good Corp Governance, Defined Vision & Mission, Board stability, No. of Committees for Corporate Governance, and Promoter holding, Foreign Entity Holding, were possibly not adequate nor possibly discriminative enough between companies.

However, it can be said that the variables that have come to represent the six factors are the key variables representing these factors, and for which there would be sufficient secondary data available in public domain.

From the foregoing, the hypotheses framed on the relationships between firm level competitiveness and the individual capability factors in the revised model viz.

H2A: There is a significant relationship between competitiveness and export capabilities of the firms in the industry.

H2B: There is a significant relationship between competitiveness and process capabilities of the firms in the industry.

H2C: There is a significant relationship between competitiveness and technology capabilities of the firms in the industry.

H2D: There is a significant relationship between competitiveness and market capabilities of the firms in the industry.

H2E: There is a significant relationship between competitiveness and management capabilities of the firms in the industry.

H2F: There is a significant relationship between competitiveness and resource capabilities of the firms in the industry.

are accepted based on secondary data.

As regards the seventh hypotheses, viz.

H2G: There is a significant relationship between competitiveness and leadership capabilities of the firms in the industry,

it could not be accepted or rejected with secondary data for reasons mentioned i.e data were possibly not adequate nor discriminative enough between companies.

6.8 Testing of the Relationship of Competitiveness with Combined Factors of Capabilities

The main hypothesis about the combined contribution of all the factors stated as:

H2: There is a significant relationship between competitiveness and capabilities of firms in export capabilities, process capabilities, technology capabilities, market capabilities, management capabilities and resource capabilities,

was also tested with a linear multivariate regression using secondary data of the 13 variables of the Top 20 companies which manifested in the six out of seven capability factors (Table 6.31). Results are presented in Table 6.32 below.

Table 6.32 Results of Multivariate Regression of Competitiveness Index on 13 Identified Variables from Secondary Data of Top 20 Companies

R² = 0.977 Adjusted R² 0.932				
Variables Included	Constant	Coefficient B	F Value	Significance
Export Sales	-0.3651	-0.00012	21.459	0.001
Cum ANDA		-0.01959		
Quality Practices		0.21320		
Research Expenditure		0.000354		
No of Research Centres		0.01543		
Sales Revenues		0.00015		
Sales Growth		0.00179		
Domestic Market Share		-0.00114		
Average PAT to Sales		0.00682		
Market Capitalization		-0.000007		
Employees Nos		-0.00027		
Debt Equity Ratio		-1.0096		

Variable - No of Mfg Locations excluded

It can be seen that the above Table that 12 out of the 13 variables with secondary data covering the six factors out of seven, enter the regression equation with R² value of 0.977 and level of significance of 0.001. These factors are export capabilities, process capabilities, technology capabilities, market capabilities, management capabilities and resource capabilities.

While this should be sufficient to accept the hypothesis of the combined effect of the six out of seven capability factors (i.e except the leadership capability factor as mentioned in the preceding discussion), the relationship would be more robust if all the coefficients have positive values, instead of some with negative values.

Therefore, noting that some factors are represented by more than one operating variable, the regression was performed with just one operating variable for each factor. The result is presented in Table 6.33 below.

Table 6.33 Results of Multivariate Regression of Competitiveness Index on 6 Identified Variables from Secondary Data of Top 20 Companies

R² = 0.948 Adjusted R² 0.899				
Variables Included	Constant	Coefficient B	F Value	Significance
Export Sales	-0.16474	0.00003	19.372	0.000
Quality Practices		0.15692		
Research Expenditure		0.0011		
Domestic Market Share		0.02938		
Average PAT to Sales		0.00318		
Debt Equity Ratio		0.02584		

It can be observed that the six variables represent the six out of seven factors of capabilities, except the leadership capability; and the regression equation has all positive values of the coefficients. Besides, the R² value is also good at 0.948.

Thus, at this stage, the Hypothesis **H2** of the combined relationship, stated as:

H2: There is a relationship between competitiveness and capabilities of firms in export capabilities, process capabilities, technology capabilities, market capabilities, management capabilities and resource capabilities,

can be accepted only for the six factors based on the secondary data, leaving out the Leadership capability factor. *This aspect is addressed subsequently when the moderating variables are tested, where it emerges that leadership variables are moderating variables.*

It is also pertinent to mention that the high R² value of 0.948 when all the variables are combined signifies that the combined effect that all the capabilities can build to achieve strong competitiveness for the firms.

From the foregoing statistical evaluations, the revised model of competitiveness of firms in the Indian pharmaceutical industry has been tested to be valid in both its construct and contents. This model is based on the capabilities framework which emerged from the exploratory factor analysis of the primary data. The six capability factors are – export capabilities, process capabilities, technology capabilities, market capabilities, management capabilities and resource capabilities

Section 7

6.9 Intervening Variables

The regression equation set out in Table 6.33 can be considered for estimation of an index of competitiveness of firms in the Indian pharmaceutical industry based on secondary data. However, before a conclusion can be made on the specific variables in the equation, the intervening variables, viz. mediating and moderating variables have to be assessed so that the role of the variables which were included and the variables which were excluded could be understood. This would provide more insights into the empirical basis of firm level competitiveness and the measurement of the same.

6.10 Mediation Tests

The mediation test was performed with competitiveness index of 21 CEOs as independent variable with:

1. Export sales mediating on Sales revenues
2. Domestic market share mediating on Sales revenues
3. Research Expenditure mediating on Sales revenues
4. Countries exported mediating on Export sales
5. Cumulative ANDA filed mediating on Export sales
6. Cumulative DMF filed mediating on Export sales
7. Export Sales mediating on Market capitalization
8. Export Sales mediating on Profit after tax
9. Export sales growth mediating on Sales growth

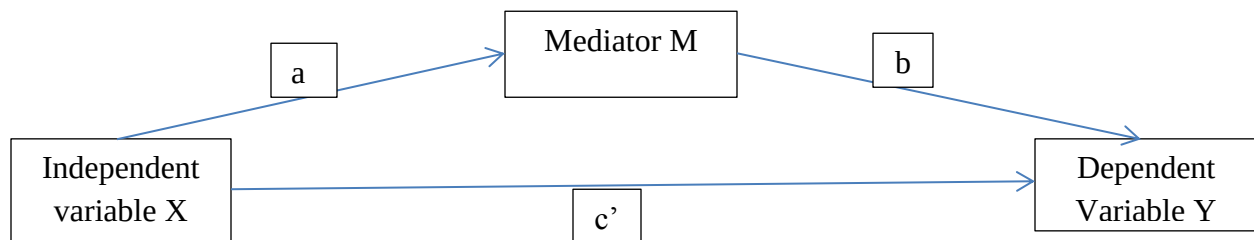
10. Patents filed mediating on Research expenditure

For the mediation test, the Sobel Test of mediation using the Baron and Kenny approach was chosen (Sobel, 1982; Baron and Kenny, 1986). When the mediator is included in a regression analysis model with the independent variable, the effect of the independent variable is reduced and the effect of the mediator remains significant. Here, competitiveness as independent variable was taken as the value of the competitiveness index generated from the rating of CEOs of the top 20 companies (Table 6.12). The competitiveness index has been taken as the independent variable since the effect of the mediator has to be seen on competitiveness as affecting the outcome.

The values of variables taken from secondary data of the top 20 companies were used for the dependent and mediating variables (some of which is presented in Annexure 2).

The conceptual diagram of mediation by variable M on the effect of independent variable X on the dependent variable Y is given in Figure 6.2 below.

Figure 6.2 The Mediation Concept



The steps involved in determining the effect of mediator M on the effect of X on Y are briefly presented below:

Estimate 'a' which is the standardized coefficient Beta of Mediator M in the regression of Mediator M on the independent variable X. Likewise, estimates b and c' are the standardized coefficients Beta of the regression of Dependent variable Y on both X and M. Compute $c = c' +$

(a x b). The mediation by M on X on Y is (c-c')/c. The level of significance is estimated by the Sobel Factor, which is the standardized Z value of the indirect effect (a x b) i.e $Z = (a \times b) / SE \text{ of } (a \times b)$. (Baron and Kenny, 1986).

The results of mediation test of the 10 possible mediation effects listed are given in Table 6.34.

Table 6.34 Results of Mediation Effect of Competitiveness on the Different Variables Tested.

S No	Independent Variable	Mediator Variable	Dependent Variable	Mediation Effect %	Z Value	Significance
1	Competitiveness Index	Export Sales	Sales Revenues	80	3.844	0.000
2		Domestic Market Share	Sales Revenues	25.3	1.236	0.217
3		Research Expenditure	Sales Revenues	78.3	3.229	0.001
4		Countries Exported	Export Sales	-3.0	-0.224	0.823
5		Cum ANDA Filed	Export Sales	24.3	1.640	0.101
6		Cum DMF Filed	Export Sales	-19.4	0.891	0.373
7		Export Sales	Market Capitalization	29.3	1.617	0.106
8		Export Sales	Profit After Tax	-82.5	-1.791	0.073
9		Export Sales Growth	Sales Growth	19.8	0.592	0.554
10		Patents Filed	Research Expenditure	-0.7	-0.287	0.774

From the above Table, it can be observed that export sales with 80 % mediation and 0.000 significance level, has a very strong effect on competitiveness and the resultant sales revenues. As compared to this, the domestic market share effect on competitiveness leading to sales is very

low at 25.3 % with poor significance. Another aspect revealed is that exports sales have 29.3 % mediation in market capitalization although with 0.106 significance level.

Thus, it can be said that in the pharmaceutical industry competitiveness is largely mediated by export sales. Focus on export markets not only results in higher sales and profitability, but also helps improve competitiveness.

Research expenditure with 78.3 % mediation and 0.001 significance level, also has a strong mediation on competitiveness and the resultant sales revenues. However, looking at the importance of patents in the pharmaceutical industry one would have thought that patents are important and mediate competitiveness on research expenditure. This is not found to be true. This possibly corroborates the generic nature of the Indian pharmaceutical industry where basic discovery research is not the focus and reverse engineering of innovator's products is the route to revenues and profitability.

With the industry led by exports, and with major focus on the regulated markets in North America and Europe, it would appear that the number of countries exported to, the volume of regulatory approvals for Abbreviated New Drug Applications (ANDA) and Drug Master Files (DMF) would assume importance. However, these are not seen to be mediating much, save for ANDA with 24.3 % effect, albeit with 10 % significance. The mediation effect of the number of countries that products are exported to is also low. It can be hypothesized that this is possibly on account of the fact that export sales are realized not on the number of regulatory approvals for the products or even the number of countries operated, but by the value of each that each product approval brings and the total value of business in each country.

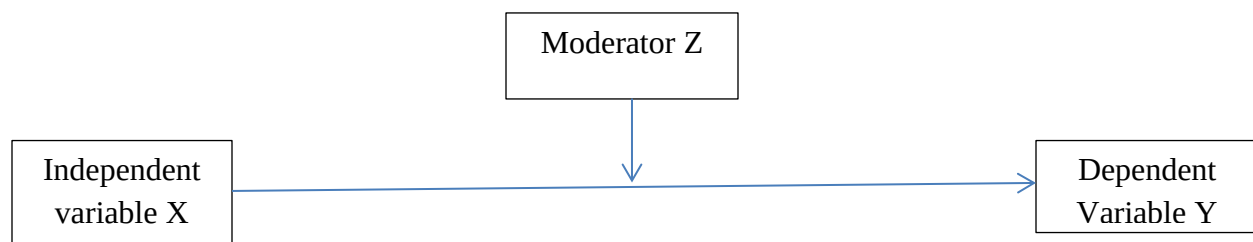
The foregoing analysis clearly reveals the strong mediating effect of exports and research on competitiveness in the industry in realizing sales revenues and in sales growth. This is also borne out by the results of the multivariate regression of competitiveness index on the 13 variables with secondary data in Table 6.18, where export sales and research expenditure are prominent. This further means that export sales and research expenditure have to be chosen as important variables in a multivariate analysis to establish the quantitative relationship between competitiveness and the factors (variables) affecting competitiveness.

6.11 Moderation Tests

The variables used in the competitiveness model were also tested for their moderation effect. A moderator variable affects the strength and/or direction of the relationship between an independent and dependent variable (Baron and Kenny, 1986). If X is the independent variable and Y is the dependent variable, the moderator variable Z affects the casual relationship between X and Y.

The conceptual diagram of moderation by variable Z on the relationship between the independent variable X on the dependent variable Y is given in Figure 6.3 below.

Figure 6.3 The Moderation Concept



The statistical test measures the differential effect of the independent variable X on the dependent variable Y as a function of the moderator Z. The steps involved in determining the effect of moderator M on the effect of X on Y described by Aiken and West (1986) are briefly presented below:

The variables X, Z and XZ are first centralized (i.e the values are reduced from their means) and the dependent variable regressed on the centralized values of X, Z and XZ. The effect of changes in X on the dependent variable Y and likewise that of the moderator are computed from the regression equation

$$Y = a + b \cdot X + c \cdot Z + d \cdot ZX.$$

The regression equation is tested for significance levels. The regression values of this equation with different groups of in values of X, from low to medium to high is measured and plotted. The

change in R^2 values of the regression equation for different values of moderator variable will determine the moderation effect.

Test on the effect of moderating variables was performed on the relationship between competitiveness index and the variables affecting competitiveness, which were identified from the factors in the revised conceptual model of competitiveness. Data used was from the operating data of companies from secondary research. The relationships evaluated for moderation were:

1. Countries exported as moderator of competitiveness on export sales
2. Patents filed as moderator of competitiveness on sales
3. Quality practices as moderator of competitiveness on export sales
4. CRM practices as moderator of competitiveness on sales
5. Independent director strength as moderator of competitiveness on sales
6. Board corporate governance committees as moderator of competitiveness on sales
7. Promoter holding as moderator of competitiveness on sales
8. Foreign holding as moderator of competitiveness on sales
9. Years in business as moderator of competitiveness on sales

Here, competitiveness as independent variable was taken as the value of the competitiveness index generated from the rating of CEOs of the top 20 companies (Table 6.12). The values of dependent and moderating variables were taken from secondary data of the top 20 companies (Annexure 2). The results are graphically presented along with comments on the moderating effects.

1. Countries Exported as Moderator of competitiveness on Export Sales

Table 6.35 presents the regression coefficients and significance for moderation of countries exported on export sales. The regression equation of centered independent variable – competitiveness index and the centered moderator variable – countries exported, with dependent variable – export sales, had R^2 value of 0.593 with 0.002 significance.

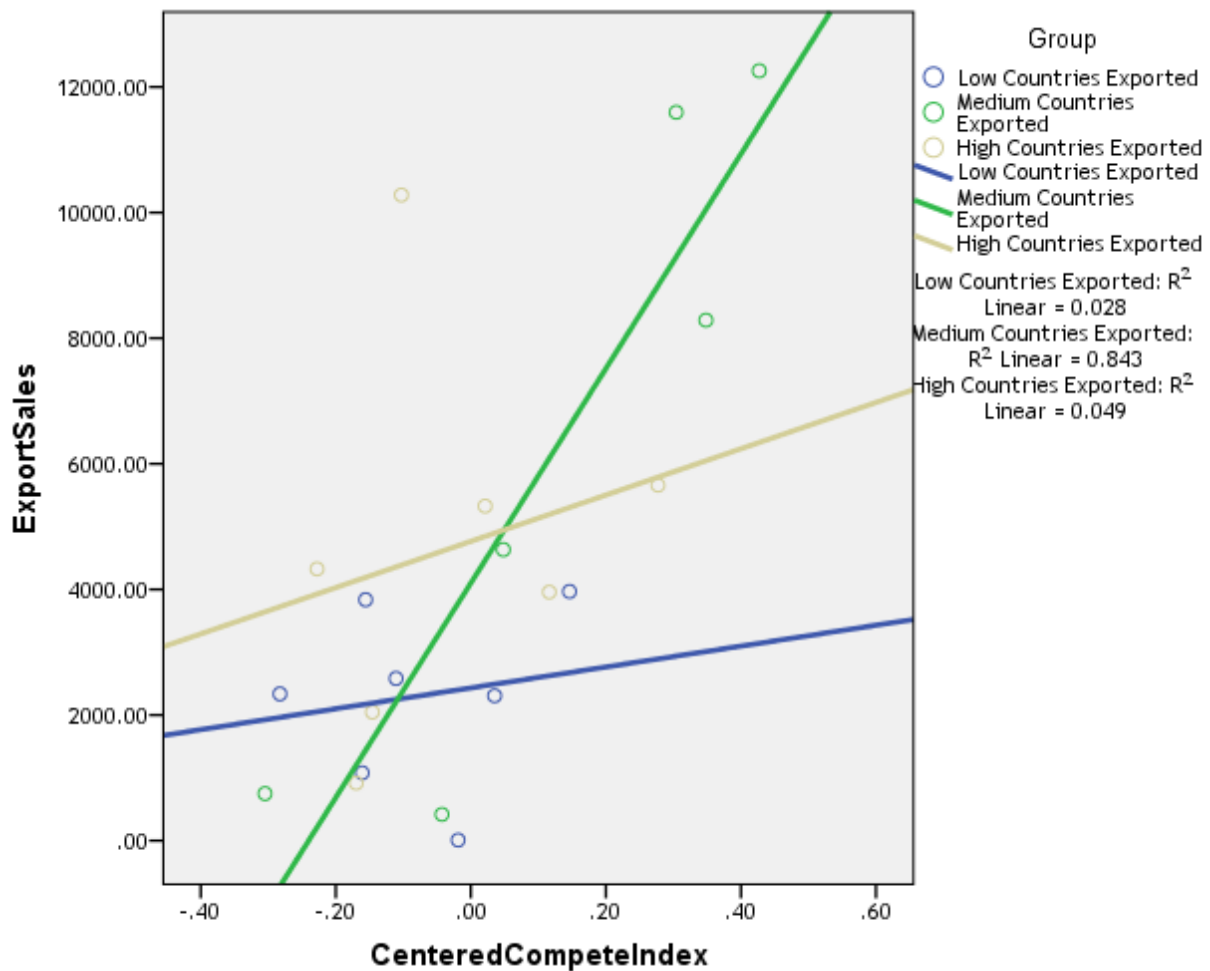
Table 6.35 Regression Coefficients and Significance for Moderation of Countries Exported on Export Sales

Model R² 0.593, Adj R² 0.516, Sig 0.002		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	5886.122	973.738		6.045	.000
	Centered Compete Index	17092.045	4534.544	.993	3.769	.002
	Centered Countries Exported	63.081	31.976	.944	1.973	.066
	Centered Comp Index X Countries Exported	-90.881	58.219	-.840	-1.561	.138

a. Dependent Variable: Export Sales

The graph was plotted for three levels of the moderator variable – low, medium and high in order to test the effect of the moderator variable. This is presented in Figure 6.4 below.

Figure 6.4 - Countries Exported as Moderator of Competitiveness on Export Sales



It can be seen that the R^2 values for the moderator- countries exported – rises from 0.029 for low range to 0.543 for medium range and drops again to 0.049 for the higher range of countries exported.

From the foregoing, it can be concluded that the ‘number of countries exported’ moderates competitiveness on export sales significantly for firms with presence in a moderate number of countries, less for firms with high number of country presence and much less for firms at with low number of country presence. This is plausible since, for the firms already with a moderate number of country presence, expansion of export markets can improve competitiveness and help increase export sales. For firms already present in a number of countries, there would not be significant benefits from adding countries and improving competitiveness, but more by

intensification in the countries operated. For firms with small country presence, the benefits in competitiveness and increased sales cannot match those of firms with high country presence in exports.

2. Patents Filed as Moderator of Competitiveness on Sales

Table 6.36 presents the regression coefficients and significance for moderation of patents filed on sales. The regression equation of centered independent variable – competitiveness index and the centered moderator variable – patents filed, with dependent variable – sales, had R^2 value of 0.580 and 0.003 significance. The independent variable and moderator variables did not have good significance levels. Therefore, it can be concluded that patents filed do not moderate competitiveness of firms with sales. Most Indian pharmaceutical companies are in the branded generics business with diverse portfolio of products, of which only some are really discovery research products. This could be the reason for no moderation of patents filed on sales.

Table 6.36 Regression Coefficients and Significance for Moderation of Patents Filed on Sales

Model R²0.580, Adj R²0.501, Sig 0.003	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	6255.550	717.412	8.720	.000
	Centered Compete Index	17259.385	5213.357	.810	.004
	Centered Patents	1.666	48.906	.023	.973
	Centered Compete Strength X Patents	-22.432	95.819	-.171	.818

a. Dependent Variable: Sales

3. Quality Practices as Moderator of Competitiveness on Export Sales

Table 6.37 presents the regression coefficients and significance for moderation of quality practices export sales. The regression equation of centered independent variable – competitiveness index and the centered moderator variable – quality practices, with dependent variable – export sales, had R^2 value of 0.807 with 0.000 significance. The independent variable and moderator variables did not have good significance levels. The product of independent and

moderator variable also had poor significance of 0.612. Therefore, it can be concluded that quality practices do not moderate competitiveness of firms with sales. This is possibly on account of the fact that almost all the 20 companies have good quality practices and therefore the data is not dispersed in order to make a significant estimation of moderation.

Table 6.37 Regression Coefficients and Significance for Moderation of Quality Practices on Export Sales

Model R²0.807, Adj. R²0.770, Sig 0.000		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4328.925	392.874		11.019	.000
	Centered Compete Index	7548.074	19087.694	.438	.395	.698
	Centered Quality Practices	-5455.764	2728.700	-.874	-1.999	.063
	Centered Compete Index X Quality Practices	3444.946	6665.330	.703	.517	.612

a. Dependent Variable: Export Sales

4. CRM Practices as Moderator of Competitiveness on Sales

Table 6.38 presents the regression coefficients and significance for moderation of customer relationship management (CRM) practices on sales. The regression equation of centered independent variable – competitiveness index and the centered moderator variable – CRM practices, with dependent variable – sales, had R^2 value of 0.881 with 0.000 significance. The independent variable and moderator variables did not have good significance levels. Therefore, it can be concluded that CRM practices do not moderate competitiveness of firms with sales. This is possibly on account of the fact that almost all the 20 companies have good CRM practices and therefore the data is not well dispersed in order to make a significant estimation of moderation.

Table 6.38 Regression Coefficients and Significance for Moderation of CRM Practices on Sales

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	6255.550	381.233		16.409	.000
	Centered Compete Index	16153.647	18522.107	.758	.872	.396
	Centered CRM	-5901.416	2647.846	-.763	-2.229	.041
	Centered Compete Index X CRM	2291.900	6467.830	.378	.354	.728

a. Dependent Variable: Sales

5. Independent Director Strength as Moderator of Competitiveness on Sales

Table 6.39 presents the regression coefficients and significance for moderation of independent Director strength on sales. The regression equation of centered independent variable – competitiveness index and the centered moderator variable – independent director strength practices, with dependent variable – sales, had R^2 value of 0.592 with 0.002 significance. The independent variable and moderator variables did not have good significance levels. Therefore, it can be concluded that the strength of the independent directors does not moderate competitiveness of firms with sales.

Table 6.39 Regression Coefficients and Significance for Moderation of Strength of Independent Directors on Sales

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	4662.956	3571.961		1.305	.210
	Centered Compete Index	3242.811	16602.739	.152	.195	.848
	Centered Indep Director Strength	-75.633	142.933	-.339	-.529	.604
	Centered Compete Strength X Indep Director Stg	205.053	270.730	.807	.757	.460

a. Dependent Variable: Sales

6. Board Corporate Governance Committees as Moderator of Competitiveness on Sales

Table 6.40 presents the regression coefficients and significance for moderation of corporate governance committees on sales. The regression equation of centered independent variable – competitiveness index and the centered moderator variable – number of corporate governance committees, with dependent variable – Sales, had R^2 value of 0.693 with 0.000 significance. The independent variable and moderator variables had good significance levels.

Table 6.40 Regression Coefficients and Significance for Moderation of Corporate Governance Committees Sales

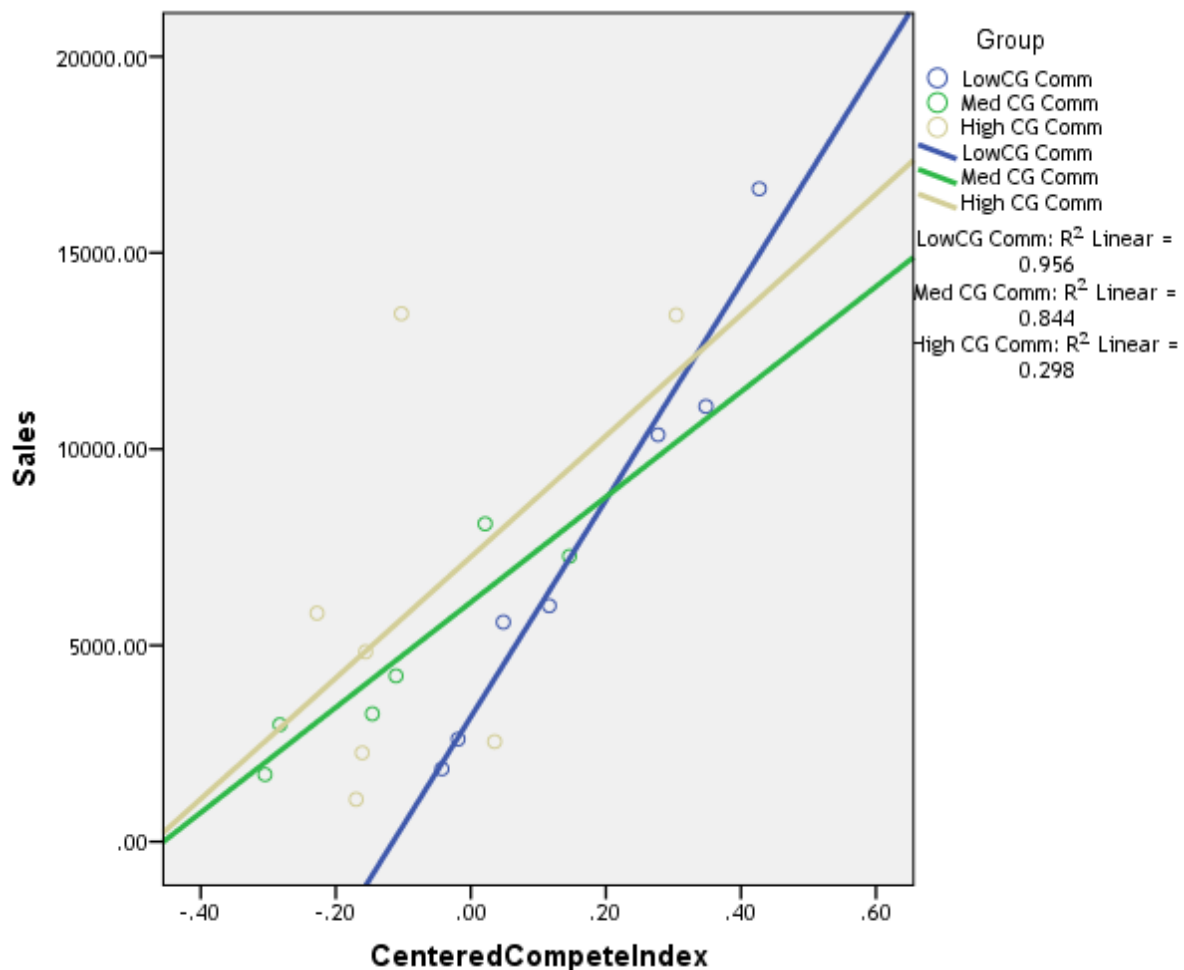
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6255.550	613.531		10.196	.000
	Centered Compete Index	23754.267	7613.955	1.114	3.120	.007
	Centered Indep Board CG Committees	1561.237	918.342	.725	1.700	.108

Centered Compete Strength X Board CG Committees	-1558.278	1638.395	-.474	-.951	.356
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a. Dependent Variable: Sales

The graph was plotted for three levels of the moderator variable – low, medium and high in order to test the effect of the moderator variable. This is presented in Figure 6.5 below.

Figure 6.5 – Corporate Governance Committees as Moderator of Competitiveness on Sales



It can be seen that the R^2 of the regression equation of sales as dependent variable and centered competitiveness index along with the moderator variable – number of corporate governance committees, falls from 0.956 for the group of firms with low number of committees, to 0.844 for

the group of firms with medium number of committees and 0.298 for firms with high number of committees, signifying the effect of the moderator.

From the foregoing, it can be concluded that the ‘number of corporate governance committees’ moderates competitiveness on sales significantly for firms. The higher number of committees does seem to moderate competitiveness to a lower level. This is counter intuitive to the notion that the more the number of governance committees, the better it is for the firms. Listed public companies have to meet listing requirements and compliance with the Company law which mandates setting up of different committees. This is not a ‘burden’ on unlisted or private companies. Therefore, it could be that more governance committees may be affecting competitiveness.

7. Promoter Holding as Moderator of Competitiveness on Sales

Table 6.41 presents the regression coefficients and significance for moderation of promoter holding on sales. The regression equation of centered independent variable – competitiveness index and the centered moderator variable – promoter holding, with dependent variable – sales, had R^2 value of 0.590 with 0.002 significance.

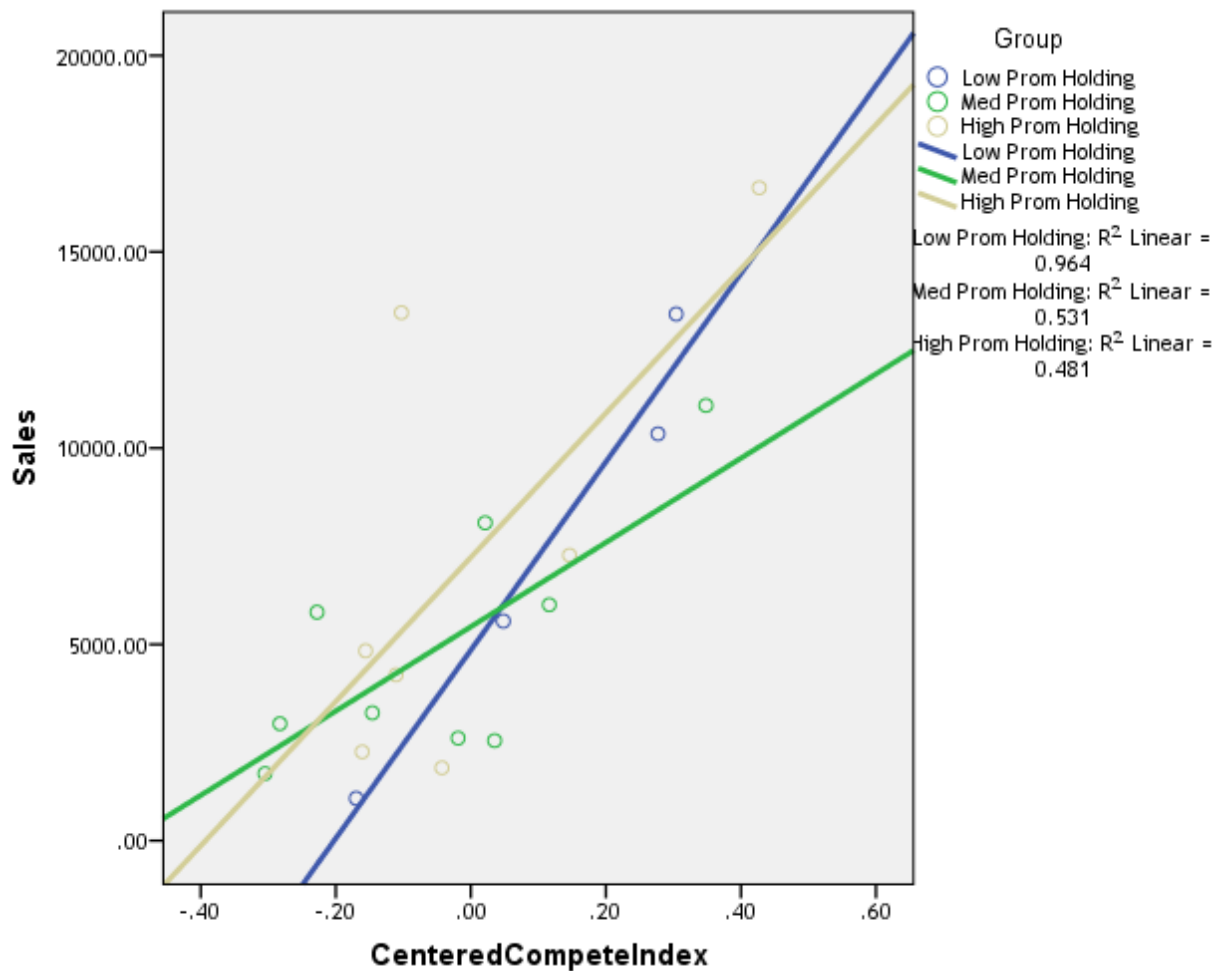
Table 6.41. Regression Coefficients and Significance for Moderation of Promoter Holding on Sales

Model R²0.590, Adj R²0.513, Sig 0.002	Unstandardized Coefficients		Standardize d Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6255.550	708.689		8.827	.000
Centered Compete Index	25439.401	13298.716	1.193	1.913	.074
Centered Promoter Holding	131.744	146.586	.523	.899	.382
Centered Comp Index X Promoter Holding	-180.937	256.117	-.548	-.706	.490

a. Dependent Variable: y

The graph was plotted for three levels of the moderator variable – low, medium and high in order to test the effect of the moderator variable. This is presented in Figure 6.6 below.

Figure 6.6 – Promoter Holding as Moderator of Competitiveness on Sales



It can be seen that the R^2 of the regression equation of sales as dependent variable and centered competitiveness index along with the moderator variable – promoter group falls from 0.964 for the group of firms with low promoter holding, to 0.531 for the group of firms with medium number of committees and 0.481 for firms with high number of committees, signifying the effect of the moderator.

From the foregoing, it can be concluded that promoter holding moderates competitiveness on sales significantly for firms. The lower promoter holding moderates better on competitiveness than higher promoter holding. Low promoter holding would mean relative higher holding of other entities – public shareholders and domestic FIIs. It will be seen subsequently that higher levels of foreign entity holding i.e of individual investors and FIIs moderated better on competitiveness. Therefore, put together, it can be reasonably argued that lower promoter holding does moderate well on competitiveness of firms.

8. Foreign Entity Holding as Moderator of Competitiveness on Sales

Table 6.42 presents the regression coefficients and significance for moderation of foreign entity holding (FIIs and other entities) holding on sales. The regression equation of centered independent variable – competitiveness index and the centered moderator variable – Foreign entity holding, with dependent variable – sales, had R^2 value of 0.599 with 0.002 significance.

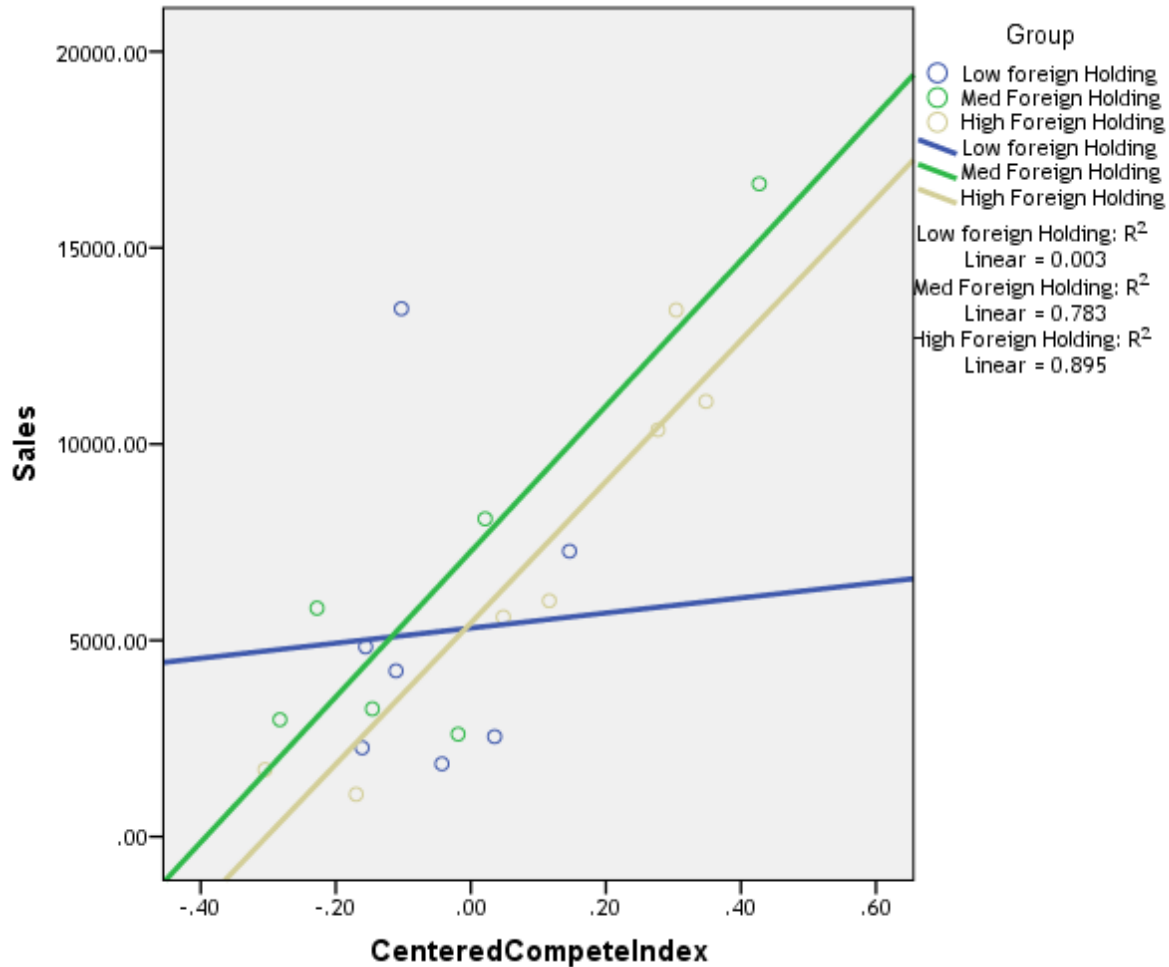
Table 6.42. Regression Coefficients and Significance for Moderation of Foreign Entity Holding on Sales

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6255.550	701.022		8.923	.000
	Centered Compete Index	7460.385	8551.206	.350	.872	.396
	Centered Foreign Holding	-182.812	151.806	-.867	-1.204	.246
	Centered Compete Strength X Foreign Holding	301.186	268.142	.968	1.123	.278

a. Dependent Variable: Sales

The graph was plotted for three levels of the moderator variable – low, medium and high in order to test the effect of the moderator variable. This is presented in Figure 6.7 below.

Figure 6.7 – Foreign Entity Holding as Moderator of Competitiveness on Sales



It can be seen that the R^2 of the regression equation of sales as dependent variable and centered competitiveness index along with the moderator variable – foreign entity holding, increases drastically from 0.003 for the group of firms with low foreign holding, to 0.783 for the group of firms with medium foreign holding and 0.895 for firms with high foreign holding, thus signifying the effect of the moderator.

From the foregoing, it can be concluded that foreign holding moderates competitiveness on sales significantly for firms. The higher foreign holding moderates better on competitiveness than lower foreign promoter holding. This positive effect signifies that foreign shareholding of FIIs

and other foreign entities bodes well for competitiveness, since this would make firms feel more accountable for their actions..

9. Years in Business as Moderator of Competitiveness on Sales

Table 6.43 presents the regression coefficients and significance for moderation of years in business of the firms on sales. The regression equation of centered independent variable – competitiveness index and the centered moderator variable – years in business, with dependent variable – sales, had R^2 value of 0.578 with 0.003 significance. The independent variable and moderator variable did not have good significance levels. Therefore, it can be concluded that Years in Business does not moderate on competitiveness of firms on sales. This means that the competitiveness is not influenced by the age of the firms in the business and it would rather be on the strategic actions of firms, whether young or old.

Table 6.43. Regression Coefficients and Significance for Moderation of Years in Business on Sales

Model	R²0.578, Adj R²0.498, Sig 0.003	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6255.550	719.138		8.699	.000
	Centered Compete Index	20412.521	9090.683	.958	2.245	.039
	Centered Yrs in Business	32.606	125.086	.139	.261	.798
	Centered Compete Strength X Yrs in Business	-105.403	219.099	-.344	-.481	.637

a. Dependent Variable: Sales

Summary of Moderator Effects

The foregoing empirical data and analysis can be summarized as in Table 6.44 below.

Table 6.44 Summary of the Moderator Effect on Competitiveness

Moderator	Independent Variable	Dependent Variable	Effect
Countries exported	Competitiveness	Export sales	Yes
Patents		Sales	No
Quality practices		Export sales	No
CRM practices		Sales	No
Independent director strength		Sales	No
Board corporate governance committees		Sales	Yes
Promoter holding		Sales	Yes
Foreign holding		Sales	Yes
Years in business		Sales	No

It was observed earlier that Export sales' highly mediates competitiveness to Sales revenues. Abbreviated New Drug Applications (ANDA) for the developed markets in N. America and Europe was seen to mediate export sales more than the filings Drug Master Files (DMFs). For export sales, presence in a number of countries moderates competitiveness. *Thus competitiveness of pharmaceutical companies in India can be said to be driven by regulatory filings and approvals in developed markets and geographical presence in the number of countries operated positively moderates exports.*

Promoter holding, Foreign holding, Board committees for corporate governance moderate sales are variables related to Leadership and Management. This means that Management and Leadership have good moderating role in competitiveness of firms. In Section 6.10, while evaluating the relationship between competitiveness and the individual factors in the revised model of competitiveness, the variables representing Leadership (Professional CEO, Good Corp Governance, Defined Vision & Mission, Board stability, Promoter holding, Foreign holding) were not found to be significant. It was mentioned that this was possibly because the variables were possibly not adequate or discriminative enough between firms.

However, the moderator analysis has brought out the fact that Leadership indeed plays a good moderating role in competitiveness, more than a direct role in enhancing competitiveness. The finding here supports the finding in the primary survey where Leadership and Governance was given the highest rank by both CEOs and the functional heads, among all the competitiveness factors in the starting conceptual framework. Important among the Leadership variables are good corporate governance, modest number of corporate governance committees, positive effect of promoter holding and positive effect of foreign entity holding.

Section 8

6.12 Hypotheses Tested

The foregoing analysis, from Section 4 through Section 7, put the new conceptual model of competitiveness for the Indian pharmaceutical industry using the capabilities framework to rigorous statistical analysis. To summarize the same:

The relative importance of the different constructs were tested for the ranks accorded to the constructs by the four groups of respondents and it was statistically proved that there was good correlation between pairs of evaluators, as also concordance among the four groups.(Section 4).

There is no significant difference in the perception of the four groups on the capability factors of competitiveness as determined by the T Test of equality of means (Section 5).

There is a relationship established by multivariate regression analysis, between competitiveness, as an index as the dependent variable, and the combined factors of capabilities values of which were drawn from the operating data of 13 variables of the top 20 companies.(Section6).

There is a relationship established by multivariate regression analysis, between competitiveness, measured as an index as the dependent variable, and each of the 6 factors as independent variables values of which were drawn from the operating data of 13 variables of the top 20 companies. These 6 variables in the regression equation had positive coefficients (Section 6).

There is a relationship between competitiveness measured as an index and the factor of Leadership as the moderating factor from the moderator analysis, for which 4 variables manifest in the factor of Leadership showed moderating effect (Section 7).

Accordingly, the main hypothesis of this research study and all the supporting hypotheses are accepted. These are summarized in Table 6.45 below:

Table 6.45 Results of Hypotheses Testing of the Relationship of Competitiveness and the Capability Factors in the Revised Framework

Hypotheses	Result
H2: There is a significant relationship between competitiveness and capabilities of firms in export capabilities, process capabilities, technology capabilities, market capabilities, management capabilities, resource capabilities and leadership capabilities.	Accepted
H2A: There is a significant relationship between competitiveness and export capabilities of the firms in the industry.	Accepted
H2B: There is a significant relationship between competitiveness and process capabilities of the firms in the industry.	Accepted
H2C: There is a significant relationship between competitiveness and technology capabilities of the firms in the industry.	Accepted
H2D: There is a significant relationship between competitiveness and market capabilities of the firms in the industry.	Accepted
H2E: There is a significant relationship between competitiveness and management capabilities of the firms in the industry.	Accepted
H2F: There is a significant relationship between competitiveness and resource capabilities of the firms in the industry.	Accepted
H2G: There is a significant relationship between competitiveness and leadership capabilities of the firms in the industry.	Accepted

Section 9

6.13 Developing the Index of Competitiveness of Firms

The final objective of this research study was to develop an index of competitiveness for the firms in the industry. A quantitative relationship between competitiveness index of firms as dependent variable, and with independent variables determining competitiveness from only secondary data, was stated to be useful in determining a competitiveness index of firms, especially for practitioners.

The revised model of competitiveness had seven new constructs of firm level competitiveness viz. Export capabilities, Process capabilities, Technology capabilities, Market capabilities, Management capabilities, Resource capabilities and Leadership capabilities, Thirteen variables manifest in these construct factors were identified as (Table 6.32) – Export Sales, Cum ANDA, Quality practices, Research expenditure, No of research centres, Sales revenues, Sales growth, Domestic market share, Average PAT to sales, Market capitalization, No. of manufacturing locations, Employee numbers and Debt equity ratios.

A regression equation was also obtained with the dependent variable - competitiveness index and the 12 out of the 13 variables, with R^2 of 0.977 and significance of 0.001. Since this had certain coefficients with negative signs, a regression equation with just 6 variables was obtained where all the coefficients had positive signs, as in Table 6.33, which is reproduced in Table below.

Table 6.46 Results of Multivariate Regression of Competitiveness Index on 6 Identified Variables from Secondary Data of Top 20 Companies

R² = 0.948 Adjusted R² 0.899				
Variables Included	Constant	Coefficient B	F Value	Significance
Export Sales	-0.16474	0.00003	19.372	0.000
Quality Practices		0.15692		
Research Expenditure		0.0011		
Domestic Market Share		0.02938		
Average PAT to Sales		0.00318		
Debt Equity Ratio		0.02584		

However, for practical purposes, the variables have to be even more parsimonious, data readily available and not have subjective values. Therefore, in the equation above, the variable quality practices was removed as data is subjective and based on industry expert opinion. Likewise, the variable of domestic market share was removed as data on this would not be readily available and has to be sourced from professional market research agencies for a price. It was also felt that one moderator variable has to be included.

Resultantly, the regression run was performed keeping in mind the need for parsimony and for a simple relation between the dependent variable – competitiveness index and the operating variables of firms.

The final table of regression coefficients and the level of significance is given in Table 6.47 below:

Table 6.47 Final Regression Equation For Parsimonious Expression of Competitiveness

R ² 0.840 Adj R ² 0.797	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	18.343	5.781		3.173	.006
Sales Revenues	.002	.001	.443	1.943	.071
Research Expenditure	.019	.014	.327	1.388	.185
Average PAT to Sales	.946	.215	.463	4.399	.001
Foreign Entity Holding	.084	.112	.085	.756	.461

a. Dependent Variable: Competitiveness Index

It can be seen from the above table that the regression equation has a high R² value, with good significance of 0.0000. All the coefficients have positive signs in line with the relationships tested.

The final regression equation has the following form:

Competitiveness Index (on scale of 0-100) = 18.343 (constant) + 0.002 x Sales Revenues (Rs Cr) + 0.946 x Avg 3 year PAT/Sales (%) + 0.019 x Research expenditure (Rs Cr) + 0.084 Foreign Entity Holding.

This simplified equation has R² value of 0.840 with significance of 0.000 and therefore has good predictive ability. It can thus be used as an equation for measuring competitiveness of firms in the pharmaceutical industry in India.

This equation uses only 4 variables – Sales revenues, Average of three year PAT and Research expenditure and the Foreign entity holding. Data on these are all available in public domain for most companies and can be computed with minimum effort. This should therefore be useful to practitioners in computing competitiveness index of firms in the pharmaceutical industry.

The usefulness of the computed index can be seen by application of the equation for the data of the same companies for the forward period till FY 2014-15 (latest) with the operating data of the Top 20 companies. Details are in Table 6.48 below.

Table 6.48 Regression Equation For Parsimonious Expression of Competitiveness with Data till FY 2014-15

R ² 0.787 Adj R ² 0.721, Sig 0.000	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	12.837	11.211		1.145	.273
Sales Revenues	.002	.001	.629	2.035	.063
Avg PAT Sales	1.373	.586	.376	2.342	.036
Research Expenditure	.001	.013	.008	.023	.982
Foreign Entity Holding	.294	.253	.181	1.161	.267

a. Dependent Variable: Competitiveness Index

It can be seen that the regression still yields R² value of 0.787 with significance of 0.000 for the operating period till FY 2014-15, as compared to the regression R² value of 0.840 for the operating data on the 4 variables for the period till FY 2013-14

Using the same regression equation computed with data for the period till FY 2013-14, now with the data for the period till FY 2014-15, and comparison of the computed competitiveness index for FY 2014-15 will reveal changes in competitiveness. In this test case, it will be determined if there is corroborative evidence to justify any change in the competitiveness index. Details are given in Table 6.49 below.

Table 6.49 Comparison of Computed Competitiveness Index with Previous Index and Evidence of Change

Company	Computed Index of Competitiveness for New Period till FY 2014-15	Previous Index of Competitiveness for Period till FY 2013-14	Improvement in Competitiveness (%)	Corroborative Evidence
Ranbaxy		40.8		Company acquired by Sun Pharma. Excluded.
Dr Reddy's	98.3	81.5	20.6	Posted 15% growth and profitability improved by 29%. Made more investments in US market.
Sun Pharma	131.5	93.8	40.2	Acquired Ranbaxy, resulting in steep sales growth of 65% and profit growth of 48%. Continues acquisition spree.
Lupin	83.1	85.9	-3.2	Sales growth slowed to 14%, from 24% of the past. Made more acquisitions
Cipla	73.1	78.8	-7.2	Sales grew by 12% but profitability declined. Entering US market where it missed action in the past.
Wockhardt	54.8	35.5	54.3	Sales declined but profitability improved. Has addressed all past issues with US FDA action on quality.
Cadila	57.5	65.7	-12.5	Sales grew by 19% and profitability improved. No major new initiatives.
Aurobindo	61.7	53.2	16.0	Sales grew by steep 50%, along with profit improvement of 34%. Moving from APIs to generics to US market.
Mylan		55.9		Excluded as it was privatized and data

Company	Computed Index of Competitiveness for New Period till FY 2014-15	Previous Index of Competitiveness for Period till FY 2013-14	Improvement in Competitiveness (%)	Corroborative Evidence
				was not available
Jubilant	34.4	28.3	21.5	Sales were flat and losses continued. Increased research expenditure. Rationalizing business.
Glenmark	44.4	62.7	-29.1	Sales improved by 10% and profitability declined. Research Expenditure slashed.
Piramal	26.0	22.8	14.0*	Sales increased by 5%. Losses increased by 145%
Torrent	46.0	40	15.0	Sales improved by 10%. Profits by 13%.
Strides	33.8	34.1	-0.8	Sales declined by 33%. Profits flat. In acquisition mode. Cut back research expenditure.
IPCA	40.7	36.5	11.5	Sales flat. Profit declined. Increased research expenditure significantly.
Biocon	39.8	35	13.7	Sales grew by 6%. Profit by 11%. Focusing on monoclonal antibodies.
GSK	42.4	49.2	-13.8	Sales were flat. Profit declined. Confined to domestic market. No research spending.
Divis	37.1	54.6	-32.0	Sales improved by 21%. Profit only by 9.5%. Margin pressure. Flat research expenditure.
Nectar	29.2	20.6	41.7	Sales flat. Profitability declined. Made

Company	Computed Index of Competitiveness for New Period till FY 2014-15	Previous Index of Competitiveness for Period till FY 2013-14	Improvement in Competitiveness (%)	Corroborative Evidence
				investments in the US market, which will improve position in coming years
Sanofi	36.1	46.8	-22.9	Sales improved by 6.5 %. Profits declined. Hardly any research expenditure.

It can be seen that the new competitiveness index for the subsequent financial year predicted by the regression equation has by and large been supported by the evidence from the industry. The case of Sun Pharma which acquired Ranbaxy is very illustrative. It's competitiveness index surged ahead by 40% after the acquisition. Likewise the case of Glenmark, Strides and Divis which performed lower on competitiveness as they reduced their research expenditure in the face of margin pressure. The case of the two multinational companies - GSK and Sanofi, which had relatively lower sales and did not spend much on research, hit the speed breakers on competitiveness. However, there was just one case of Piramal for which the index improved despite poorer performance. This can be considered normal in statistical estimation and prediction. *The caveat in using the index therefore would be that the values of the predicted index have to verified with qualitative evidence to see if they make intuitive sense and only then confirm the predictions.*

It should also be mentioned that the regression equation to be used to compute the competitive index for the companies is relevant only for a short time frame, say about 3 years. In the present case it would be at best for FY 2013-14 till FY 2015-16 for the 20 firms. It cannot be used with the same constants and coefficients with the data of the subsequent years. This is on account of the fact that the market dynamics would have changed, the competitive positioning of some firms being assessed could have changed, or there could be acquisitions which significantly alter

the values of the variables. As it has been seen here, the acquisition of Ranbaxy by Sun Pharma has changed the picture in 2014-15.

It would therefore be a good practice if the new regression equation is worked out anew for the subsequent years. This will ensure better estimation of the competitiveness index. The approach could be through a survey of the CEOs and then using the secondary data to work out the predictive equation.

6.14 Summary

The empirical results first presented the descriptives of the primary research survey which was used to test the concordance in the rankings of the factors identified in the conceptual model, by the groups of CEOs and functional heads. The Kendall's Coefficient of Concordance M , of 0.936 with significance level 0.002 represented good concordance among four groups for the factors. The Spearman's rank correlations on the rankings based on the scores were also good.

From this it was concluded that in the perception of both CEOs and the functional heads, competitiveness of firms in the pharmaceutical industry is based foremost from the quality of leadership and governance, followed by factors governing competitive potential, competitive processes, assets and only then by competitive performance of the firms. Resources available to the firms are found to have the least importance.

Next, the ranking of companies by the respondents was used for estimating a competitive index for the companies as a dependent variable and factors of competitiveness as independent variables. The Spearman's rank correlations on the rankings of the companies by the four groups were also good. The concordance of ratings by the CEOs of 0.6 and above, with good significance, indicated a good level of agreement on the ratings of the companies thereby meaning that there is value in using the CEOs rating of competitiveness in creating an index of competitiveness.

Since the conceptual model had scanty empirical support in the literature, the extraction of factors in the factor analysis was reviewed to identify both for agreement with the initial factor constructs in the conceptual model and also to determine whether there are different constructs

possible. The KMO value of 0.73 and Bartlett's Test of Sphericity with Chi-Square of 1464.78 at significance level 0.000 represent good factor analyzability of the data.

The exploratory factor analysis was performed which resulted in 8 factors with Eigen values of over 1.0 explaining 64.3% of the total variance. However, only 7 factors were chosen since the review of the factors to determine the constructs that they explain, resulted in only 7 meaningful constructs. These 7 constructs explained 61 % of the total variance. This was considered good in the social sciences field for exploratory factor analysis. The values of Cronbach Alpha of over 0.65 indicated that the factors have good reliability as constructs.

All the basic factors of the original conceptual model came to occupy and manifested in the new factors extracted. Although the factor measurement broadly helped accept the hypotheses about the relationship between competitiveness and the individual factors, it was noted that the new factors were a mixture of the factors in the original conceptual model.

The new factor components were therefore now stated in terms of 'capabilities' relating to exports, process, technology, market, management, resources and leadership. This term was chosen in order to reflect the essence of the variables that these factors come to represent – about converting competencies to outcomes or results, and about strengths that are both the tangible and intangible. Accordingly, the conceptual model was revised with the factors affecting competitiveness now constructed with capabilities - Management capabilities, Process capabilities, Market capabilities, Leadership capabilities, Resource capabilities, Export capabilities and Technology capabilities. The concordance test done on the four groups - CEOs and the functional heads of the two groups of companies, gave a Kendall's M value of 0.848 with significance value p as 0.002, showing a high level of concordance of the ratings by the four groups for the capability constructs.

The relative rankings of the capability factors of competitiveness in the revised model by both the CEOs and functional heads of the Top 20 companies and companies outside Top 20 gave good Spearman's rank correlation values. Based on this, the relative importance of the seven factor constructs in the revised model were identified as Management Capabilities, Process Capabilities, Market Capabilities, Resource Capabilities, Leadership Capabilities, Export

Capabilities and Technology Capabilities, in that order. An assessment of the qualitative statements made by the respondents was studied at this stage. However, reliance was placed on the quantitative basis for the relative rankings.

The T Test for equality of means was performed to show that there is similar perception about the seven factors determining competitiveness in the revised model with all respondents – CEOs and functional heads, in the top 20 companies and the companies outside the top 20. This was also done only for the two groups of CEOs, which showed similar perception on the factors of capabilities.

For the conceptual model to have practical utility, it has to be also statistically tested with actual secondary data. The hypotheses for testing of the relationships in the revised model were framed. Using multivariate regression, the relationship of competitiveness index and the individual capability factors was established to be significant.

For testing the hypothesis of the combined relationship of competitiveness and the seven capability factors, a multivariate regression revealed that from out of 33 variables in the secondary research examined, 13 variables emerged, covering six out of the seven factors in the revised model. A simpler relationship of significance, with one variable for each of the six capability factors was also established. This led to acceptance of hypotheses related to six individual factors determining competitiveness of firms. The factor – Leadership, was not covered since choice of variables available from published data was possibly not adequate nor possibly discriminative enough among the firms. Thus, at this stage, the hypothesis of combined relationship of the seven factors could be accepted only for the six factors, except leadership, based on all secondary data.

From a mediator and moderator analysis for intervening variables, it emerged that export sales strongly mediates sales and to a good extent, research expenditure mediates sales. The moderator factors were mainly related to leadership and management, mainly good corporate governance, positive effect of promoter holding and positive effect of foreign entity holding. This led to the Leadership capability factor also to be accepted.

Thus, all the seven capability constructs of competitiveness and the relationship of competitiveness and the individual constructs were accepted, all based on secondary data.

Having statistically proved the revised conceptual model and the ability of competitiveness index to represent firm level competitiveness, a regression exercise was performed to compute the competitiveness index using just four variables - Sales revenues, Average of three year PAT, Research expenditure and Foreign entity holding, the data for which are available in public domain for most companies and can be computed with minimum effort. This was done for practical purposes where the variables have to be parsimonious, readily available and not have subjective values. This simple relationship would thus be useful to practitioners in computing competitiveness index of firms in the pharmaceutical industry. The regression equation was also forward tested for the subsequent financial year.

Notwithstanding this, it was stated that the regression equation to compute the competitiveness index would be good for about 3 years. It would be better to re-compute the equation every three years in order to provide for better estimation.

In summary, the rigorous empirical analysis has helped in discovering and establishing the new model of competitiveness with specific reference to the Indian pharmaceutical industry.

CHAPTER 7

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents a summary of the study along with the important empirical findings. An interpretation of the findings and implications for the concept of firm level competitiveness and its measurement for the Indian pharmaceutical industry is also presented. The recommendations based on the findings are then made. The contribution that this study has made along with the limitations of the study is discussed. Finally, the suggestions for future research are made.

6.2 Research Objective

The basic purpose of this research study was to develop a measure of competitiveness of firms. This was based on a review of extant literature which showed that the concept of firm level competitiveness has remained at the conceptual level and that empirical work on what this would mean in practical terms was largely unexplored and has not received much attention from researchers. It was posited that this is possibly on account of the multi-dimensional nature of competitiveness and the variety of approaches to understand and define the concept.

It was mentioned that if an indicative measure of firm level competitiveness can be formulated, it would be useful in several ways. Firstly, it would help in assessing the strength of the competitive position of the firms in the industry based on the value of the index. The ratio of values of two firms can reveal the strength of the relative competitiveness of the firms. Progress of one firm can thus be measured in a quantitative fashion to understand if it has gained or lost competitiveness.

Therefore, the primary objective of this study was “to determine the key factors that influence and impact the competitiveness of firms and to determine whether firm level competitiveness can be measured”. Since the context of competitiveness of firms is the industry in which they operate, the Indian pharmaceutical industry was chosen for the study.

The pharmaceutical industry in India lends itself well to a study of competitiveness of firms, since it is a very competitive, vibrant and a successful industry in India, with many firms having global presence due to their strong innovation quotient and marketing capabilities.

6.3 Research Questions

For the specific purpose of the study outlined, the following key research questions were formulated.

1. What are the key factors that influence and impact the competitiveness of firms?
2. What is the relative importance of these factors?
3. Are these factors different between groups of firms at the top rung and the others?
4. What is the relationship between competitiveness and the variables represented by these factors?
5. Would there be intervening variables influencing competitiveness?
6. Can an index of competitiveness be developed for the firms in the industry?

The conceptual framework presented provided the starting point of conceptual guidance in exploring and addressing these research questions.

6.4 Objectives

To help address the research questions, the following research objectives were framed.

1. To investigate the possible relationships between competitiveness of firms and the various factors influencing competitiveness.
2. To determine which factors are important and the relative importance of the factors of competitiveness.
3. To determine if these factors are different for the top rung firms as compared to firms outside the top rung.
4. To establish a quantitative relationship between competitiveness and the variables represented by these factors.

5. To identify the intervening variables that could influence competitiveness and their influence.
6. To develop an index of competitiveness for the firms in the industry.

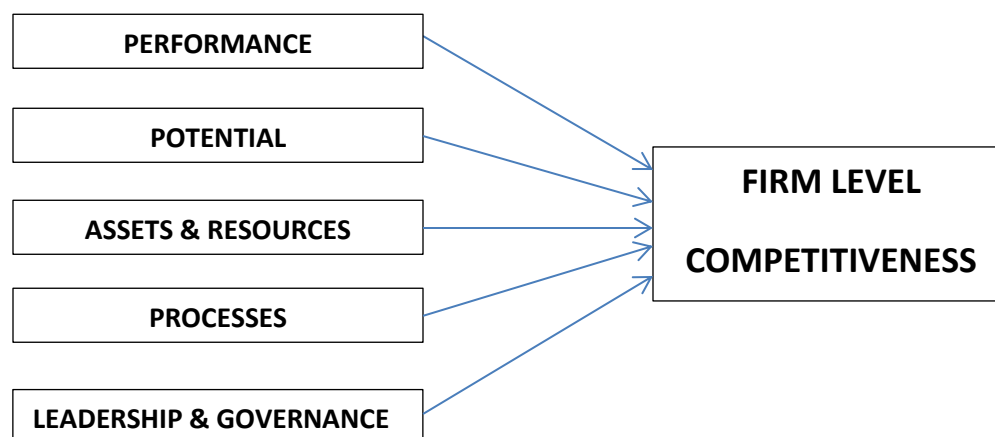
6.5 The Conceptual Framework

The following paragraphs narrate how the above research objectives were achieved.

1. To investigate the possible relationships between competitiveness of firms and the various factors influencing competitiveness.

For a conceptual guidance, the starting conceptual framework of competitiveness of firms was developed based on the review of literature of firm level competitiveness. This is captured in Figure 7. 1 below:

Figure 7.1 Conceptual Framework of Firm Level Competitiveness



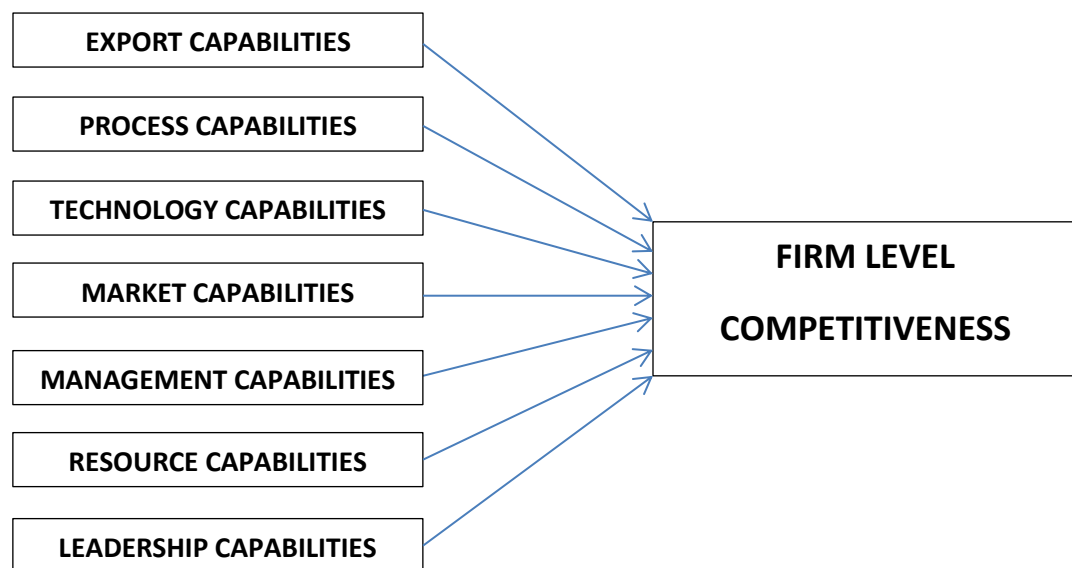
Although the factor measurement helped accept the hypotheses broadly about the relationship between competitiveness and the individual factors of competitive performance, competitive potential, assets and resources, competitive processes and leadership and governance of the firms in an industry, it was noted from the exploratory factor analysis that the new factor components which emerged were a mixture of the factors in the original conceptual model.

The new factor components were therefore now stated in terms of ‘capabilities’ relating to exports, process, technology, market, management, resources and leadership. This term brought clarity and was chosen in order to reflect the essence of the variables that these factors come to represent – about converting competencies to outcomes or results, and about strengths that are both the tangible and intangible. However, this is only in relation to the pharmaceutical industry in India, since the empirical testing was with respect to this industry.

Accordingly, the conceptual model was revised with the factors affecting competitiveness now constructed with capabilities - Management capabilities, Process capabilities, Market capabilities, Leadership capabilities, Resource capabilities, Export capabilities and Technology capabilities.

The revised conceptual model of competitiveness in the Indian pharmaceutical industry is represented as in Figure 7. 2 below:

Figure 7.2 Revised Conceptual Model of Competitiveness of Firms



This model was rigorously tested with several statistical methods, from rank correlation of rankings of the factors, concordance among groups of respondents of CEOs and functional heads, T Test for equality of means for testing that there was no difference in perception among the groups of respondents, regression analysis with secondary data i.e operating data of firms in the pharmaceutical industry, mediation and moderation analysis with operating data, *to finally conclude that the major hypotheses of competitiveness of firms in the Indian pharmaceutical industry as related to the seven capability factors - Management capabilities, Process capabilities, Market capabilities, Leadership capabilities, Resource capabilities, Export capabilities and Technology capabilities, was accepted.*

2. To determine which factors are important and what are the relative importance of the factors of competitiveness.

Based on the relative ranking of the capability factors by the four groups of respondents – CEOs and functional heads of the Top 20 companies and companies outside the Top 20 list, and using the rank correlation test and concordance tests on the rankings, the relative importance of the seven factors determining competitiveness of firms in the pharmaceutical companies in India are in the order of:

1. *Management Capabilities*
2. *Process Capabilities*
3. *Market Capabilities*
4. *Resource Capabilities*
5. *Leadership Capabilities*
6. *Export Capabilities*
7. *Technology Capabilities*

3. To determine if the factors are different for the top rung firms, which are perceived to be more competitive, as compared to firms outside the top rung firms.

Based on the T Test for equality of means on the factor scores of the seven factors by the respondents, both CEOs and functional heads, of the Top 20 companies and companies outside

Top 20; as also the CEOs separately of these two groups of companies, the null hypothesis that there is no significant difference between each of the seven different capabilities determining competitiveness between these groups of companies was accepted. *Thus, there is no difference in the perception on the competitiveness factors between the top rung firms (Top 20) and firms outside the top rung. The findings of the sampling unit could therefore be applied to the entire Indian pharmaceutical industry.*

4. To establish a quantitative relationship between competitiveness and the variables represented by these factors.

Using multivariate regression, the overall relationship of competitiveness index and the variables manifest in seven factors from the primary data of the CEO responses of 13 companies from the top 20 companies, was tested and accepted.

From out of 33 variables in the secondary research examined, 13 variables emerged, covering six out of the seven factors in the revised model. A simpler relationship with just one operating variable for each factor was also established. This led to acceptance of hypotheses related to six individual factors determining competitiveness of firms. The quantitative relationship captured in the regression equation is given in the following Table 7.1.

Table 7.1 Results of Multivariate Regression of Competitiveness Index on 6 Identified Variables from Secondary Data of Top 20 Companies

R² = 0.948 Adjusted R² 0.899				
Variables Included	Constant	Coefficient B	F Value	Significance
Export Sales	-0.16474	0.00003	19.372	0.000
Quality Practices		0.15692		
Research Expenditure		0.0011		
Domestic Market Share		0.02938		
Average PAT to Sales		0.00318		
Debt Equity Ratio		0.02584		

It can be seen that the above Table that the regression equation of the combined relationship of capability factors has R^2 value of 0.948 and level of significance of 0.000. These factors are export capabilities, process capabilities, technology capabilities, market capabilities, management capabilities and resource capabilities.

Thus, a good quantitative relationship of competitiveness of firms in the pharmaceutical industry in India was established with 6 variables covering the six factors of competitiveness.

5. To determine the intervening variables that could influence competitiveness and their influence.

The mediator analysis was performed with the Sobel Test of mediation using the Baron and Kenny approach; and the moderator analysis was performed using the Baron and Kenny approach (Sobel, 1982; Baron and Kenny, 1986).

The analysis clearly revealed the strong mediating effect of exports and research on competitiveness in the industry in realizing sales revenues and in sales growth. This is also borne out by the results of the multivariate regression of competitiveness index on the 6 variables with secondary data in Table 6.18, where export sales and research expenditure are prominent.

The moderator analysis has brought out the fact that Leadership indeed plays a moderating role in competitiveness, more than a direct role in enhancing competitiveness. The finding here supports the finding in the primary survey where Leadership and Governance was given the highest rank by both CEOs and the functional heads, among all the competitiveness factors in the starting conceptual framework. Important among the Leadership variables are good corporate governance, number of corporate governance committee, positive effect of promoter holding, positive effect of foreign holding.

6. To develop an index of competitiveness for the firms in the industry.

The index representing competitiveness of firms in the Indian pharmaceutical industry had the following form:

Competitiveness Index (on scale of 0-100) = 18.343 (constant) + 0.002 x Sales Revenues (Rs Cr) + 0.946 x Avg 3 year PAT/Sales (%) + 0.019 x Research expenditure (Rs Cr) + 0.084 Foreign Entity Holding.

This simplified equation has R^2 value of 0.840 with significance of 0.000 and therefore has good predictive ability. It was forward tested for data of the firms in a subsequent financial year FY 2014-15.

This equation uses only 4 variables – Sales revenues, Average of three year PAT and Research expenditure and the Foreign entity holding. Data on these are all available in public domain for most companies and can be computed with minimum effort. It can thus be used as an equation for measuring competitiveness of firms in the pharmaceutical industry in India.

6.6 Discussion of Results

The major findings of the study are:

1. Competitiveness of firms are more about capabilities

The study revealed that competitiveness at the level of the firm is more about capabilities, than about performance or potential, or assets and resources as the extant literature initially suggested. As mentioned earlier, capabilities are the collective skills, abilities and expertise of an organization. They represent the ways that people and resources are brought together to accomplish work. They represent the collective strength of the firms. Capabilities relate to how the leadership guides the destiny of the firm, how well management executes sound strategies by deploying technology, processes, resources, and achieve results in the market place, domestic and global. The specific capabilities identified for firms in the pharmaceutical industry relate to leadership, management, process, technology, resources, market, and exports.

Capabilities are about converting competencies to outcomes or results for the firms, and about strengths that are both the tangible and intangible. This is echoed in the work of Barney (1991) and Peteraf (1993), who held the view that firms which make their capabilities valuable, rare, inimitable and non-substitutable resources (known as VRIN) can obtain superior competitive advantage.

Capabilities are also about being heterogenous in nature, which are unique, which cannot be easily transferred, acquired or copied by competing firms, and thus not mobile from one firm to another.

The advocates of capability based competitiveness Stalk, Evans and Shulman (Stalk et. al., 1992), proposed four principles of capability based competitiveness:

1. The building blocks of corporate strategy are not products and markets but business processes.
2. Competitive success depends on transforming a company's key processes into strategic capabilities that consistently provide superior value to customers.
3. Companies create these capabilities by making strategic investments in a support infrastructure that links together and transcends traditional SBUs and functions.
4. Because capabilities necessitate cross functions, the champion of capabilities based strategy is the CEO.

The capability based view was over a period of time overshadowed by the resource based view of firms. It is possibly time to bring the capabilities based view of the firm to the fore again.

2. The foremost capability for competitiveness is that of management

The study repeatedly brought out the fact that management capability is foremost among all the capabilities of the firm. The role played by management in bringing uniqueness and power to the set of firm capabilities is paramount in creating competitive advantage. Although management is a broad and fuzzy term, in terms of specific capabilities, management includes the ability to strategize, the ability to take appropriate decisions, the ability to bring product and market focus, the ability to harness resources and work professionally to deliver results.

These aspects have not been stressed in the extant literature, which looked more at outcomes and features of the firms, in terms of performance, potential, assets and resources, rather than on what really drives competitiveness at the very core i.e strong management. This may sound

obvious but somehow this aspect of management capabilities as the binding force was not stressed in the literature.

The fact that Management plays a crucial role has been echoed in the literature, starting with Alfred Sloan (1964), who brought the role of management in competitiveness rather than mere entrepreneurship and Peter Drucker (1969) who continually espoused the tenets of management being central to a successful organization; till Michael Porter (2011) who put management as the central player in shaping strategies in the internet era.

3. Among all other capabilities, process capabilities are most important

While management capabilities encompass the entire body of the firm, its assets and resources, it is the processes deployed that bring distinction to the competitive ability of the firm. The study brought to fore this dimension of competitiveness. The importance of processes is often missed in competitiveness evaluation and in the literature. This can be counted as a unique contribution of this study.

Among, process capabilities, the chief ones were the process to manage technology, people, creativity, quality and even risks faced by the organization. Of specific importance were best practices in the use of information technology. For the pharmaceutical industry, quality practices are the foremost process capability that determines competitiveness.

Modern organizations have learnt to deal with complexity and scale in operations with sound processes, which reduce variability and consistently deliver performance on parameters of quality, cost and time. Processes are now seen as the nervous system of modern organizations. Therefore, it is pertinent to note that process capability is seen as the next important determinant of competitiveness, much more than market, resource and technology capabilities.

4. Capabilities are nurtured by supportive and positive leadership

The study brought to focus the strong moderating role played by the leadership on competitiveness. Important among the moderating leadership variables are good corporate

governance, positive effect of low promoter holding and positive effect of higher foreign holding.

The aspect of leadership as a determinant of firm competitiveness finds echo in the literature. Iain M. Cockburn, Rebecca Henderson and Scott Stern (2000) established that the ‘origins of competitive advantage lie in the unusual foresight and ability of the firm’s managers’. Shaker A. Zahra (1999) concluded that “tomorrow's global marketplace will reward companies that value entrepreneurial risk-taking and invest heavily in developing their intellectual capital...”

Competitiveness is not a static phenomenon, but a dynamic one since the competitive space is ever changing with changing business environment, emergence of new players, technological changes which at times is disruptive, as also changing social and political climates. To steer companies in these rapid waters calls for good, dedicated leadership and proper governance. Of importance therefore is foresight, strategic intent, response to environment and ability to create competitive advantage.

5. Market capabilities more than resources or technology assume importance in a competitive market

Rather than merely specify competitive performance, which the current literature refers to as a major determinant of competitiveness, the study helped narrow this to market performance and thereby clearly bring to the fore the market capabilities of the firm as a major determinant of competitiveness. This is important for a very competitive industry like the pharmaceutical industry, where the therapeutic categories are many and brands play an important role.

The study identified not just consistent sales growth as a major determinant, but also the ability to grow sales above industry growth rates and the ability to take leadership position in the industry. This may sound minor, but is actually very profound. Unless a firm aspires to take a leadership position in the industry, it will not build capabilities, chief of all market capabilities. Market capabilities in many ways are the engine for the growth of the firm which leads to consistent sales and profits.

6. Capabilities for geographic expansion and reach is critical for growth

The study brought out the fact that export capabilities are major determinants of firm level competitiveness. This is particularly important for the Indian pharmaceutical industry which has built competitiveness by focusing on the developed country markets, particularly in N America and Europe. Export sales were also seen as a major mediating factor of competitiveness in the pharmaceutical industry.

The export capabilities of firms hinge on first, a commitment to international business, then on the ability to identify potential foreign markets and increase foreign presence, bring international scales of operations and maintain consistent export growth. The number of countries operated also moderates competitiveness to a significant extent. Firms would do well to focus on this capability. However, it is also to be understood that process capabilities to deliver quality in a highly regulated industry is a prerequisite for exports.

7. Technology capabilities can be built by research spending

The study showed that research expenditure strongly mediates competitiveness. Generally, research expenditure is directed to improve a firm's technology edge, in products and processes. Increasing research expenditure for well directed and strategic research programmes will help build technology capabilities.

For the Indian pharmaceutical industry, the research spending would be in terms of the number of technology collaborations and of quality patents filed, both in India and outside. This is significant considering that in an innovation industry, although research is no doubt important, what is more important is the need to push the product offerings from merely branded generics to the next level of discovery based products.

8. Assets do not matter as much as resources

Another significant finding of the research was that the initial factor of assets as a determinant of competitiveness did not find place in the revised model, as assets were not seen as a significant

factor affecting competitiveness. More than assets, the factor – resources, came to occupy the position as a determinant of competitiveness.

This means that the construct of assets to include physical assets, including manufacturing facilities, IT infrastructure and human resources are not so relevant for competitiveness. It is now common view that assets need not be owned by firms but can be outsourced. More than assets, it is more the resources at the disposal of the firms, in terms of funds availability, capacity to borrow, ability to source raw materials in a cost effective manner and the pool of technical skills, to name a few which really matter. Thus the assets and resources framework of Ambastha and Momaya (2004) has to be viewed as without empirical basis, at least in so far as it concerns the pharmaceutical industry.

9. Combination of capabilities results in competitiveness and competitive advantage

The study also demonstrated that combination of all capability factors substantially improves competitiveness. Not only did this validate the revised model of competitiveness based on the capability framework, it also conveyed that competitiveness can be greatly strengthened by building on all the seven factors. While this may be possible in theory, it may not be possible in practice for a firm to excel in all the capability factors. However, it does mean that assiduously improving competitiveness on the capability framework can help firms build unassailable level of competitiveness which the other firms will find difficult to emulate.

The study also identifies the importance of each of these capabilities. Focusing on the more important ones would give better marginal returns. The order of relative importance identified were management capabilities, followed by process capabilities, market capabilities, resource capabilities, leadership capabilities, export capabilities and technology capabilities.

10. Competitiveness of firms can be measured and in a simple manner

The study has helped establish the relationship between competitiveness and variables representing the factors of capabilities, in terms of an index. The values of variables can be obtained from public sources which are readily accessible. This makes measurement of competitiveness eminently feasible, in a practical manner. Besides, the variables are only four –

sales revenues, average profit after tax for three years, research expenditure and foreign entity holding, which makes the computation simple and convenient.

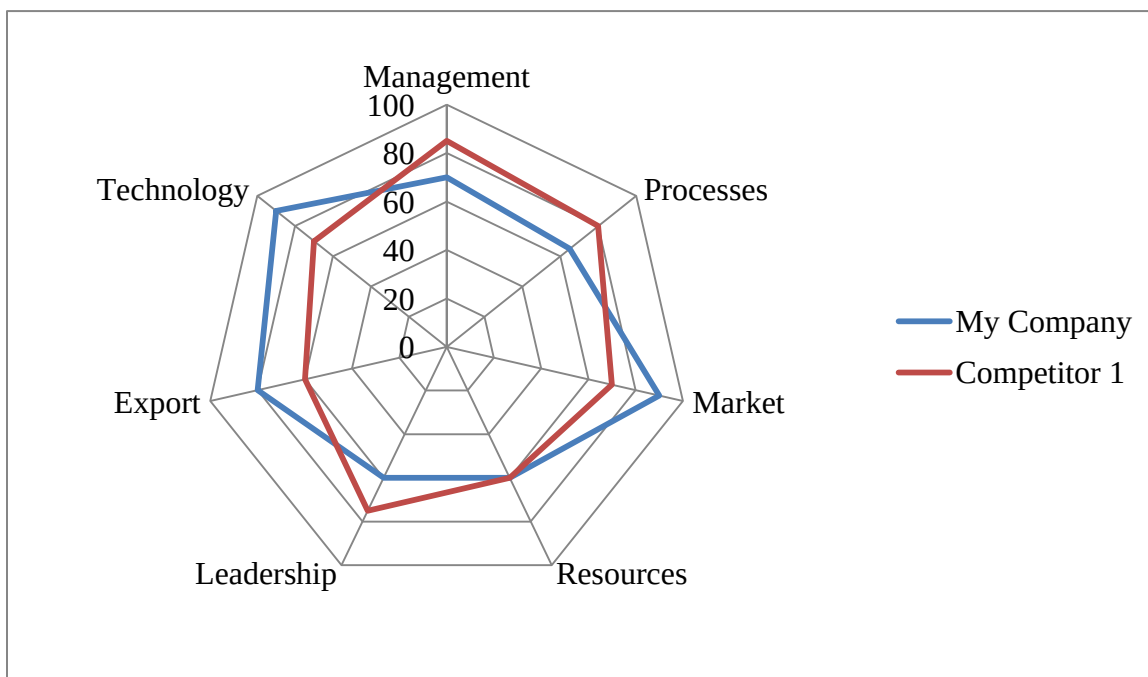
6.7 Implications of the Study

The study has several implications for firms working to improve competitiveness. First, firms must recognize and pay more attention to the basic determinants of competitiveness. This starts with addressing the capabilities aspects of management which is identified as the foremost factor determining competitiveness. This would be followed by aspects for the processes employed, the market capabilities and so on to the other capabilities, as described earlier.

Firms should first identify the key aspects of each capability factor which are important for competitive success in their industry. They could then look at where they are placed with respect to the ideal position and with respect to where competitors are placed. This would give them an idea of the distance they have to traverse, as also the distance competitors have to traverse.

It would be worthwhile to map this in terms of radar chart as shown in Figure 7.3 below.

Figure 7.3 Radar Chart to Map Competitiveness Capabilities



The radar chart will give a quick snapshot of the relative capabilities of the firm in comparison with other firms and help frame a mental picture.

Firms could also consciously develop scores of competitiveness or index of competitiveness. This can be used in two ways. First, it can be used to track the progress of the firm itself. Second, it can be used for comparison with the other firms in the industry. This said, the basis for computation of the index needs to be periodically reviewed, say every three years, and revalidated using the approach outlined in this study.

As regards the implications for the Indian pharmaceutical industry, apart from the measures suggested above, in terms of practical aspects, the study would help firms looking to improve competitiveness by bringing strong management, best practice processes, strong market prowess, unassailable set of resources, geographical expansion, investment in research and above all an ambitious and supporting leadership. These would be the ingredients to competitiveness and competitive success.

6.11 Conclusion

In conclusion, it can be stated that this study has been able to empirically put to test the concept of competitiveness of firms using the pharmaceutical industry as the competitive space. The unique aspect of this study is that it has also established the capability model of competitiveness using secondary data viz. operating data of the firms in the industry. It has been able to identify that competitiveness of firms are more driven by seven key capabilities, viz. Management Capabilities, Process Capabilities, Market Capabilities, Resource Capabilities, Leadership Capabilities, Export Capabilities and Technology Capabilities. While these were derived for the Indian Pharmaceutical industry, they would still have generic import and thus be useful for other competitive industries as well.

The study has also helped establish and validate a sound relationship between competitiveness of firms and these determinants. Further, it has been able to express competitiveness as an index for the pharmaceutical firms in India, to be measured in a simple manner using just four variables, values of which would be easily accessible.

6.12 Contribution of the Study

The research study is justified both in theoretical and practical terms. The theoretical contribution has been in terms of a better understanding of the complex concept of competitiveness of firms which could help researchers advance their knowledge about competitiveness theory.

The practical contribution has been in terms of elucidation of the specific determinants of competitiveness both in the generic sense and in terms of empirically tested determinants of competitiveness for the Indian pharmaceutical Industry. In addition, useful measure of firm level competitiveness of pharmaceutical industry in India was obtained.

6.13 Limitations

The study's main limitation was that it had to work with limited sample size as the CEOs and functional heads, who comprise the top management, itself is limited. This was also in part determined by the sampling unit and due to the time consuming process of obtaining responses from industry CEOs and functional executives many of them who were circumspect and were wary of giving responses, lest it be used by competitors. However, this was not a deterrent to the statistical analysis.

Higher sample size could have led the analysis to conduct a different approach to evaluation of relationships from the primary survey data using Structural Equation Modelling (SEM) which would lead to confirmatory modelling. However, this study has the value of using secondary data of operating data of firms.

The second limitation was that the study could explore only 42 variables of competitiveness through the measuring instrument. Although all these variables are important and adequately covered, given that the concept of competitiveness is indeed a complex concept, there would still be other variables important to competitiveness.

The third limitation was that aspects of leadership as a determinant of competitiveness could not be captured in the operationalization, as realized from the empirical analysis. Future studies would do well to operationalize the construct of leadership capabilities well. To a good measure,

this limitation was addressed by the moderator analysis. This could be a study by itself, given the complexity of this construct and the different premises posited on the concept.

6.8 Suggestions for Future Research

Based on the experience with this research study it is suggested that it would be worthwhile to study generic aspects of capabilities as determining competitiveness, by looking at a cross section of industries. This would help understand if there are generic factors of competitiveness across industries and their relative importance. For example, are Management and Processes are high on the list of capabilities as it was determined for the pharmaceutical industry.

It would also be useful to look at how the capabilities have assumed importance over a period of time for a specific industry. Was it market and asset capabilities first, and as the industry matured, or did process capabilities take precedence? A study of this nature would give a life cycle dimension to the capabilities model of competitiveness.

6.9 Concluding Remarks

Competitiveness is the very core of the life of organizations and firms. Competitiveness permeates every part of an organization. Competitiveness gives meaning to an organization's pursuits to excel in the industry and at the market place. Competitiveness is not in born. It can be assiduously built by focusing on the core capabilities. The core capabilities have been identified in this research study. A method to measure competitiveness has also been presented. The study attempted to establish that it will have immense value to both researchers and practitioners alike.

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SURVEY QUESTIONNAIRE

Introduction

Although the term competitiveness is widely used in management literature, there is no single measure of competitiveness of a firm in the literature. Most of literature link competitiveness to financial performance and market position. However, competitiveness is more than just financial performance or market position. It is also dependent, inter alia, on the level of innovation, the quality of management, quality of human capital, access to funds and government support.

The study aims to understand the determinants of competitiveness and develop a quantitative model for measurement of competitiveness of firms. This model should help researchers obtain a clearer understanding of the relationship between competitiveness and performance. It should help practitioners in assessing competitive positions of their own firms and in assessing progress in competitiveness in response to improvement measures undertaken.

The information provided is strictly for research purposes and will be kept confidential.

Questionnaire

For the following statements related to competitiveness of firms in your industry, please rate on the scale provided, what you think are level of importance. You must review all statements before you start rating the statements.

S No.	Statement	Not at all important	Does not matter	Somewhat important	Important	Most important
1	High equity stake held by the owners in the company					
2	Foreign ownership of the					

S No.	Statement	Not at all important	Does not matter	Somewhat important	Important	Most important
	company					
3	Well defined vision and mission for the company					
4	Consistently good corporate governance practiced by the company					
5	Professionally qualified CEO/MD with relevant industry experience					
6	The stability of CEO and top management					
7	The professional quality of management in the firm.					
8	Well documented and clear corporate policies					
9	The ability to strategise and implement strategies.					
10	The ability to take hard decisions on closing business or moving out of markets					
11	The ability to have a clear market focus					
12	The ability to take leadership position in the industry					
13	The ability of the firm to consistently grow in sales.					

S No.	Statement	Not at all important	Does not matter	Somewhat important	Important	Most important
14	The ability of the firm to consistently grow in sales above the industry average.					
15	The commitment of the firm to international business					
16	The ability of the firm to consistently grow its export sales.					
17	The ability of the firm to consistently grow in profitability, year on year					
18	The ability of the firm to consistently grow in profitability above industry average					
19	The ability of the firm to increase presence in foreign markets					
20	The number of foreign markets that the company operates.					
21	The presence of the firm in developed country markets such as N America & Europe					
22	The ability of the firm to introduce new products successfully.					

S No.	Statement	Not at all important	Does not matter	Somewhat important	Important	Most important
23	The ability of the firm to innovate in the market place.					
24	The ability to retain customers consistently.					
25	The ability to deploy international scales of operation in manufacture.					
26	The ability to deploy superior technology compared to competition					
27	The ability to better access raw material resources					
28	The ability to develop cost effective procurement of raw materials.					
29	The quality of human resources deployed by the firm.					
30	The quality of work culture in the organization					
31	The ability to deploy better quality assurance systems.					
32	The use of quality advancement tools such as TQM, Six Sigma, IMS, ISO					
33	The use of systematic Customer Relationship					

S No.	Statement	Not at all important	Does not matter	Somewhat important	Important	Most important
	Management (CRM) tools					
34	The use of best practices in IT systems					
35	The absence of discord in industrial relations					
36	The level of government support that the firm enjoys.					
37	The number of technology collaborations that the firm has.					
38	The quantum of research spending by the company					
39	The number of patents filed by the firm or owned by the firm.					
40	The ability to foster creativity and innovation in the company					
41	The ability to manage risks in the business better.					
42	The ability to access funds easily for operations and for growth					

- From the following list of top 20 pharmaceutical companies in India, please rank the companies on their competitiveness. Please rank 1 for most competitive and 20 for the least competitive.

	Company	
1	Ranbaxy Laboratories Ltd	
2	Dr Reddy's Laboratories Ltd	
3	Sun Pharmaceuticals Ltd	
4	Lupin Ltd	
5	Cipla Ltd	
6	Wockhardt Ltd	
7	Cadila Healthcare Ltd	
8	Aurobindo Pharma Ltd	
9	Mylan Laboratories Ltd	
10	Jubilant Lifesciences Ltd	
11	Glenmark Pharma Ltd	
12	Piramal Enterprises Ltd	
13	Torrent Pharmaceuticals Ltd	
14	Strides Arcolabs Ltd	
15	IPCA laboratories td	
16	Biocon Ltd	
17	GSK Pharma Ltd	
18	Divi's Laboratories Ltd	
19	Nectar Lifesciences Ltd	
20	Sanofi India Ltd	

3. What were your top five considerations in choosing the top 20 companies for their competitiveness?

1.

2.

3.

4.

5.

4. Where would you place your company on the competitiveness ranking in the list of 20 companies?

5. What are the three things that you would do to improve your company's competitiveness position? You may look at this in terms of potential for performance, management process, the assets/resources and the expectation on performance results.

1.

2.

3.

Please provide copy of your latest Financial statements or Annual Report.

Name_____

Designation_____

THANK YOU

Annexure 2

BRIEF PROFILES OF THE TOP 20 PHARMACEUTICAL COMPANIES IN INDIA

Rank 2013-14	Company	Operating Performance and Other Data					
1	Ranbaxy Laboratories Ltd Estb 1961	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14 (15 mths)	Remarks
		Sales Revenues Net	Rs Cr	10595	12750	13451	3 year avg gr 4.6%
		Export Sales	Rs Cr	8466	10125	10280	3 year avg gr 6.6%
		Profit After Tax	Rs Cr	-2900	922	-1085	3 year avg gr -9.4%
		Market Capitalization	Rs Cr	17893	21441	15045	
		Employees	Nos	14000	14600	15300	
		Research Spending	Rs Cr	452	449	528	
		Research Spending % to Sales	%	4.27	3.52	3.92	
		Debt Equity Ratio	Ratio	1.40	1.19	1.94	3 year avg.1.51
		Return on Capital Employed	%	-38.9	19.9	-2.0	3 year avg -12.23
		Manufacturing Plants	Nos			24	
		Research Centres	Nos			4	
		Countries Exported				150	
		3 Years Indian Patents Filed				47	
		Cum ANDA Filings	%				NA
		Cum DMF filings	Nos				NA
		Promoter Holding	Nos	63.68	63.54	63.41	
		Foreign Entity Holding	%	8.47	10.65	11.79	
		Independent Directors Percentage	%			50	
		Board Committees for Corporate Governance	Nos	4	4	7	Quality and integrity committees after US FDA debacle
- Broad based player, First Indian entrant in USA & N America, Wide geographical presence, Broad therapeutic range with strong OTC range (Largest OTC brand in India – Revital and Volini) - Sales by geographies in 2013-14 – N America 31%,Other Devp Mkts 9%, India 17%, Other Emerging Mkts 34%, APIs 6%. - Acquired by Daichi of Japan in 2011-12. Regulatory issues with US FDA on quality management. - Now acquired by Sun Pharma. - Company witnessed erosion in net worth to Rs 4502 Cr, with accumulated losses of Rs 3410 Cr, due to US \$ 489 mio settlement with US Dept of Justice, Derivative losses of Rs 328 Cr, Stock write off Rs 356 Cr, Impairment Rs of Rs 328 Cr, Stock write off Rs 356 Cr, Impairment Rs76 Cr.							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
2	Dr Reddy's Laboratories Ltd Estb 1984	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	9814	11895	13415	3 year avg. gr.21.2%
		Export Sales	Rs Cr	8334	10143	11597	3 year avg. gr.22.9%
		Profit After Tax	Rs Cr	1300	1527	1963	3 year avg. gr.13.6%
		Market Capitalization	Rs Cr		30260	46223	
		Employees	Nos		16500	19000	
		Research Spending	Rs Cr	595	791	1263	
		Research Spending % to Sales	%	6.1	6.6	9.4	
		Debt Equity Ratio	Ratio	0.56	0.50	0.49	3 year avg. 0.52
		Return on Capital Employed	%	20.88	20.78	20.41	3 year avg. 20.7
		Manufacturing Plants	Nos			24	
		Research Centres	Nos			8	
		Countries Exported				23	
		3 Years Indian Patents Filed				107	
		Cum ANDA Filings	%			209	
		Cum DMF filings	Nos			631	
		Promoter Holding	Nos	25.61	25.56	25.52	
		Foreign Entity Holding	%	59.14	58.78	59.95	
		Independent Directors Percentage	%			80	
		Board Committees for Corporate Governance	Nos			8	
• Fast growing. Made rapid shift from APIs to generics to N American and European market. Now moving to complex products and biosimilars. • Sales by geographies in 2013-14 – N America 47%, Europe 12%, Russia 15% India 15%, Others 11% • Sales by product groups in 2013-14 – Global branded generics 80%, APIs 18% Others 2% • With focus on exports of generics, growth in India is low at 7.9 % and in APIs -21.9% • Strong in processes – Analytical chemistry, Quality by Design, E Batch Processing Records, Self Managed Teams. • Has good record of corporate governance.							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
3	Sun Pharmaceutic al Industries Ltd Estb 1983	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	8491	11688	16633	3 year avg. gr.39.4%
		Export Sales	Rs Cr	5062	8207	12258	3 year avg. gr.54.0%
		Profit After Tax	Rs Cr	2657	2983	3141	3 year avg. gr.25.3%
		Market Capitalization	Rs Cr	58195	84254	124821	
		Employees	Nos			14000	
		Research Spending	Rs Cr	445	704	1042	
		Research Spending % to Sales	%	5.2	6.0	6.3	
		Debt Equity Ratio	Ratio	0.02	0.01	0.13	3 year avg. 0.05
		Return on Capital Employed	%	21.5	19.0	15.4	3 year avg. 16.81
		Manufacturing Plants	Nos			25	
		Research Centres	Nos			4	
		Countries Exported				50	
		3 Years Indian Patents Filed				10	
		Cum ANDA Filings	%			478	
		Cum DMF filings	Nos			256	
		Promoter Holding	Nos			63.65	
		Foreign Entity Holding	%			22.51	
		Independent Directors Percentage	%			67	
		Board Committees for Corporate Governance	Nos			3	
• Fastest growing company with good inorganic growth. Focused player with niche therapeutic positions. • Business from US Generics 60%, Indian Generics 23%, Other Markets 12%, APIs 5% • Acquired Ranbaxy in 2013-15 for US \$ 4 billion to emerge as largest player in India with 9% market share and as 4th largest generics player in the world. • Reputation as a successful acquirer with ability to turn around performance. Examples – Taro, Dusa, Caraco, URL • Has faced regulatory action by US FDA – in Caraco & Halol plant, but staved off without much damage • High cost focus							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
4	Lupin Limited Estb 1968	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	6960	9462	11087	3 year avg. gr.24.4%
		Export Sales	Rs Cr	4831	6902	8287	3 year avg. gr.27.7%
		Profit After Tax	Rs Cr	867	1314	1836	3 year avg. gr 14.3%
		Market Capitalization	Rs Cr	23650	28129	41842	
		Employees	Nos			15000	
		Research Spending	Rs Cr	594	770	958	
		Research Spending % to Sales	%	8.5	8.1	8.6	
		Debt Equity Ratio	Ratio	0.37	0.19	0.08	3 year avg. 0.21
		Return on Capital Employed	%	23.24	26.84	29.50	3 year avg. 22.0
		Manufacturing Plants	Nos			12	
		Research Centres	Nos			4	
		Countries Exported				75	
		3 Years Indian Patents Filed				36	
		Cum ANDA Filings	%			249	
		Cum DMF filings	Nos			158	
		Promoter Holding	Nos			46.75	
		Foreign Entity Holding	%			31.86	
		Independent Directors Percentage	%			50	
		Board Committees for Corporate Governance	Nos			3	
• Fast growing company. Of late in acquisition mode. Strong player in anti infectives • No 1 player in anti-TB and cephalosporin products in the world. • Business by Geographies – Developed markets 47%, Emerging markets 21%, India, 22%, APIs 10%. • Good presence in Japan, Mexico • 10th largest generics player in the world, 6th in USA • Acquired Nanomi BV in Netherlands and Laboratories Grin in Mexico • Good social responsibilty programmes even before CSR was mandated							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
5	Cipla Ltd Estb 1935	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	7160	8501	10366	3 year avg. gr.14.3%
		Export Sales	Rs Cr	3692	4426	5659	3 year avg. gr.14.5%
		Profit After Tax	Rs Cr	1144	1545	1389	3 year avg. gr.15.8%
		Market Capitalization	Rs Cr			31192	
		Employees	Nos			22000	
		Research Spending	Rs Cr	324	425	518	
		Research Spending % to Sales	%	4.5	5.0	5.0	
		Debt Equity Ratio	Ratio	0.0	0.109	0.122	3 year avg. 0.076
		Return on Capital Employed	%	14.9	16.8	14.1	3 year avg. 15.28
		Manufacturing Plants	Nos			34	
		Research Centres	Nos				NA
		Countries Exported				170	
		3 Years Indian Patents Filed				52	
		Cum ANDA Filings	%			161	
		Cum DMF filings	Nos			1139	
		Promoter Holding	Nos			36.8	
		Foreign Entity Holding	%			27.9	
		Independent Directors Percentage	%			50	
		Board Committees for Corporate Governance	Nos			3	
• One of the Oldest Pharma companies in India with widest geographical presence. • However, poor presence in N America and Europe (about 12% of sales), but strong in rest of the world. Africa accounts for 25 % of the sales. • No 1 company in the domestic market, growing at 20%. • Major player in anti retro-virals, pulmonology and anti-infective products. Strong institution business esp. with multilateral agencies. • Of late growth has slowed and not able to keep pace with its peers. Profits also on the decline.							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
6	Wockhardt Estb 1967	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	4354	5615	4836	3 year avg. gr.8.6%
		Export Sales	Rs Cr	3182	4514	3837	3 year avg. gr.12.5%
		Profit After Tax	Rs Cr	341	1594	841	3 year avg. gr. 17.8
		Market Capitalization	Rs Cr			5013	
		Employees	Nos			8600	
		Research Spending	Rs Cr	248	376	450	
		Research Spending % to Sales	%	5.7	6.7	9.3	
		Debt Equity Ratio	Ratio	2.01	0.61	0.37	3 year avg. 1.00
		Return on Capital Employed	%	13.98	42.57	18.93	3 year avg.25.2
		Manufacturing Plants	Nos			11	
		Research Centres	Nos			3	
		Countries Exported				21	
		3 Years Indian Patents Filed				94	
		Cum ANDA Filings	%			145	
		Cum DMF filings	Nos				NA
		Promoter Holding	Nos			74.7	
		Foreign Entity Holding	%			4.5	
		Independent Directors Percentage	%			62.5	
		Board Committees for Corporate Governance	Nos			7	
• An older player in the Indian market, facing slowdown in growth due to quality issues with US FDA. • However, has managed to stave off crisis situations by selling off nutraceutical and animal health business. • Growth largely organic growth. Very focused on profitability. High employee productivity.Avoids price controlled products. • Focused player specializing in anti-infectives, pain and anti-diabetic products. • Business from geographies - USA 44%, Europe 29%, India 21%, Others 6 %							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
7	Cadila Healthcare Ltd (Cadila Zydus) Estb 1952	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	5316	6395	7274	3 year avg.16.1%
		Export Sales	Rs Cr	2642	3294	3967	3 year avg.19.9%
		Profit After Tax	Rs Cr	711	652	690	3 year avg.11.5%
		Market Capitalization	Rs Cr			20674	
		Employees	Nos			16000	
		Research Spending	Rs Cr	400	492	445	
		Research Spending % to Sales	%	7.5	7.7	6.1	
		Debt Equity Ratio	Ratio	0.78	0.91	0.66	3 year avg. 0.78
		Return on Capital Employed	%	19.8	18.2	17.9	3 year avg. 18.7
		Manufacturing Plants	Nos			9	
		Research Centres	Nos			1	
		Countries Exported					NA
		3 Years Indian Patents Filed				137	
		Cum ANDA Filings	%				NA
		Cum DMF filings	Nos				NA
		Promoter Holding	Nos			74.8	
		Foreign Entity Holding	%			6.08	
		Independent Directors Percentage	%			71.4	
		Board Committees for Corporate Governance	Nos			5	
• An older player in the Indian market, with steady growth. • Late mover to N American and European markets • Niche player focused on cardiovascular, gastrointestinal, respiratory and gynaecology products. • Emerging strong player in vaccines and biotherapeutics with launch of adalimumab. • Good OTC range – Sugarfree and Nutralite • Business by geographies – USA 30 %, Europe 5 %, India 34 %, Other mkts 25%,APIs 5 % • Has not faced any regulatory issues with USFDA.							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
8	Aurobindo Pharma Ltd Estb 1986	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	4725	5855	8099	3 year avg. gr.4.7%
		Export Sales	Rs Cr	2924	3871	5327	3 year avg. gr.25.2%
		Profit After Tax	Rs Cr	-123.5	294	1173	3 year avg. gr.5.6
		Market Capitalization	Rs Cr			14980	
		Employees	Nos			9500	
		Research Spending	Rs Cr	199	233	271	
		Research Spending % to Sales	%	4.5	4.2	3.7	
		Debt Equity Ratio	Ratio	1.66	1.79	1.52	3 year avg. 1.65
		Return on Capital Employed	%	5.67	11.1	18.39	3 year avg. 8.6
		Manufacturing Plants	Nos			17	
		Research Centres	Nos			2	
		Countries Exported				125	
		3 Years Indian Patents Filed				38	
		Cum ANDA Filings	%			811	
		Cum DMF filings	Nos			2435	
		Promoter Holding	Nos			54.66	
		Foreign Entity Holding	%			24.02	
		Independent Directors Percentage	%			04	
		Board Committees for Corporate Governance	Nos			4	
• A relatively younger player, started out in APIs esp. cephalosporins. Now a major player in anti retro-virals and anti infectives. Now focusing on peptides and nutraceutical products. • Major dependence on APIs with large DMF filings in N America and Europe. APIs contribute to 43% of sales and formulations 57%, for which use own APIs upto 90% of requirement. • Business by geographies – USA 63%, Europe 21%, ROW 16 %,mainly in India. • Not a strong player in the domestic market. • Has focused on margin and profit improvements. Pulled out of China JV.							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data*					
9	Mylan Laboratories Ltd Estb 1984	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	4099	5593		3 year avg.31.8%
		Export Sales	Rs Cr	3766	4634		3 year avg. 33.2%
		Profit After Tax	Rs Cr	447	470		3 year avg. 10.8%
		Market Capitalization	Rs Cr		18000		
		Employees	Nos		12000		
		Research Spending	Rs Cr		406		
		Research Spending % to Sales	%		7.6		
		Debt Equity Ratio	Ratio	0.71	0.74		3 year avg. 0.68
		Return on Capital Employed	%		18.6		3 year avg. 18.6
		Manufacturing Plants	Nos		19		
		Research Centres	Nos		3		
		Countries Exported			50		
		3 Years Indian Patents Filed			62		
		Cum ANDA Filings	%		499		
		Cum DMF filings	Nos		354		
		Promoter Holding	Nos	97.8	97.8		
		Foreign Entity Holding	%	97.8	97.8		
		Independent Directors Percentage	%		0		
		Board Committees for Corporate Governance	Nos		0		
*Information available only till FY 2012-13 since following acquisition of Matrix Labs in India by Mylan, the company delisted and became a private company. - Mylan is the world’s 4th largest generics player. Only in APIs in India through the Matrix acquisition. - Major player in anti-retrovirals. - Acquired Agila specialities, the injectable division of Strides Arcolabs Also acquired 4 sMEs – SMS Pharma, Vivin Life, Glochem and Unichem Indore. - Profits stagnant. Margins under pressure. - Closed China API operations. Provided Rs 191 Cr in books for value dimunition.							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
10	Jubilant Lifesciences Ltd Estb 1979	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	4328	5196	5822	3 year avg. 18.8%
		Export Sales	Rs Cr	3035	3832	4326	3 year avg. 21.9%
		Profit After Tax	Rs Cr	15	153	109	3 year avg. 1.72%
		Market Capitalization	Rs Cr			2290	
		Employees	Nos			6185	
		Research Spending	Rs Cr	105	143	131	
		Research Spending % to Sales	%	2.42	2.76	2.25	
		Debt Equity Ratio	Ratio	1.54	1.45	1.11	3 year avg.1.366
		Return on Capital Employed	%	4.83	8.08	8.71	3 year avg. 7.20
		Manufacturing Plants	Nos			10	
		Research Centres	Nos			4	
		Countries Exported				100	
		3 Years Indian Patents Filed				25	
		Cum ANDA Filings	%				NA
		Cum DMF filings	Nos				NA
		Promoter Holding	Nos			54.03	
		Foreign Entity Holding	%			25.27	
		Independent Directors Percentage	%			55.5	
		Board Committees for Corporate Governance	Nos			7	
• Mainly in API business. More with Life Science Ingredients (Intermediates) in which is strong player. • Business segments : Pharma 47%.Life Science Ingredients 53%. • In Pharma, APIs 19%, Generic Formulations 32%, CMOs 26%,Others 23%. In Ingredients, Chemicals 44%,Advanced intermediates 43%, Nutrition 13% • Weak presence in markets outside N America. • Poor profitability and return on capital employed. This is getting worse now.							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
11	Glenmark Pharma Ltd Estb 1977	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	4030	5018	6010	3 year avg.24.5
		Export Sales	Rs Cr	2903	3269	3959	3 year avg. 26.1
		Profit After Tax	Rs Cr	464	628	546	3 year avg.11.0
		Market Capitalization	Rs Cr	8323	12528	15348	
		Employees	Nos			11000	
		Research Spending	Rs Cr	292	411	600	
		Research Spending % to Sales	%	7.2	8.1	10.0	
		Debt Equity Ratio	Ratio	0.83	0.83	0.93	3 year avg. 0.86
		Return on Capital Employed	%	17.4	17.1	15.7	3 year avg. 13.3
		Manufacturing Plants	Nos			14	
		Research Centres	Nos			6	
		Countries Exported				80	
		3 Years Indian Patents Filed				65	
		Cum ANDA Filings	%				NA
		Cum DMF filings	Nos				NA
		Promoter Holding	Nos			48.28	
		Foreign Entity Holding	%			33.23	
		Independent Directors Percentage	%			63.6	
		Board Committees for Corporate Governance	Nos			3	
- Steadily growing company. Focused player. - USA, Russia, Brazil and India account for 75 % of the sales. - Niche player. Mainstay in dermatology and now moving into biosimiliars, mainly biotherapeutics. - Has not faced regulatory issues like the other pharma companies							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
12	Piramal Enterprises Ltd Estb 1983 (acquisition of Nicholas)	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	2030	2498	2980	3 year avg. 21.0%
		Export Sales	Rs Cr	908	1844	2337	3 year avg. 41.6%
		Profit After Tax	Rs Cr	-282	-155	-61	3 year avg. -17.0%
		Market Capitalization	Rs Cr			5878	
		Employees	Nos			4236	
		Research Spending	Rs Cr	168	237	256	
		Research Spending % to Sales	%	8.3	9.5	8.6	
		Debt Equity Ratio	Ratio	0.148	0.670	0.974	3 year avg.0.596
		Return on Capital Employed	%	2.67	2.87	4.51	3 year avg. 3.35
		Manufacturing Plants	Nos			13	
		Research Centres	Nos			2	
		Countries Exported				75	
		3 Years Indian Patents Filed				3	
		Cum ANDA Filings	%			253	
		Cum DMF filings	Nos			0	
		Promoter Holding	Nos			52.94	
		Foreign Entity Holding	%			26.9	
		Independent Directors Percentage	%			69.2	
		Board Committees for Corporate Governance	Nos			4	
- Operates as division of Piramal Enterprises. Built largely through acquisitions, starting with Nicholas in 1988. - Sold Indian operations to Abbott in 2010 for US\$ 3.8 billion - Major business: Pharma Gen 62%, Critical Care 25%,OTC and Ophthalmology 11%, Others 2% - Pharma business is largely outsourced manufacturing. - Claims to be among top 10 global CDMO companies, serving 5 out of 7 big pharma companies. - Has JV with Allergen for ophthalmology products - Profitability has been generally poor.							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
13	Torrent Pharmaceuticals Ltd Estb 1974	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	2594	3254	4223	3 year avg. 25.6
		Export Sales	Rs Cr	1432	1784	2582	3 year avg. 34.2
		Profit After Tax	Rs Cr	286	433	664	3 year avg. 13.3
		Market Capitalization	Rs Cr			9272	
		Employees	Nos			9540	
		Research Spending	Rs Cr	125	125	138	
		Research Spending % to Sales	%	4.8	3.8	3.3	
		Debt Equity Ratio	Ratio	0.38	0.41	0.50	3 year avg. 0.43
		Return on Capital Employed	%	19.0	22.6	25.0	3 year avg. 22.2
		Manufacturing Plants	Nos			4	
		Research Centres	Nos			1	
		Countries Exported					NA
		3 Years Indian Patents Filed				15	
		Cum ANDA Filings	%				NA
		Cum DMF filings	Nos				NA
		Promoter Holding	Nos			71.51	
		Foreign Entity Holding	%			12.14	
		Independent Directors Percentage	%			0.57	
		Board Committees for Corporate Governance	Nos			4	
• The pace of growth witnessed by this company in the 80s and 90s of the 20th century has considerably slowed down due to unsuccessful diversification by the group in power sector. • Niche player with fair presence in domestic market. • Business by geographies : USA 31%, Brazil 21%, Germany 23%,Other EU 10%, UK 2%, ROW 13%.							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
14	Strides Arcolabs Ltd Estb 1984	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	2577	995	1401	3 year avg. 12.6%
		Export Sales	Rs Cr	1630	561	851	3 year avg. 21.3%
		Profit After Tax	Rs Cr	224	249	12	3 year avg. 11.3%
		Market Capitalization	Rs Cr			3293	
		Employees	Nos			1500	
		Research Spending	Rs Cr	104	30	52	
		Research Spending % to Sales	%	4.1	3.1	3.9	
		Debt Equity Ratio	Ratio	2.04	0.66	0.267	3 year avg. 0.99
		Return on Capital Employed	%	20.9	4.4	24.5	3 year avg. 11.8
		Manufacturing Plants	Nos			5	
		Research Centres	Nos			1	
		Countries Exported				75	
		3 Years Indian Patents Filed				3	
		Cum ANDA Filings	%			253	
		Cum DMF filings	Nos			0	
		Promoter Holding	Nos			27.67	
		Foreign Entity Holding	%			49.26	
		Independent Directors Percentage	%			44.4	
		Board Committees for Corporate Governance	Nos			5	
• Major presence in branded generics. Sold injectable business to Mylan in 2012. As a result, sales and profitability fell. • Acquired Aspen Pharma, a generic company in Australia and Shasun Pharma in India, an AI company • Focus on institution supplies to WHO prequalified tenders. • Business by geographies : Regulated markets 37%, Emerging markets 39%, Institutions 24%. • Venturing into biogenerics with Stelis Biopharma.							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
15	IPCA Laboratories Ltd Estb 1949	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	2342	2797	3256	3 year avg. 19.7
		Export Sales	Rs Cr	1402	1716	2047	3 year avg. 25.6
		Profit After Tax	Rs Cr	280	331	477	3 year avg. 12.8
		Market Capitalization	Rs Cr	4280	6752	10918	
		Employees	Nos			11727	
		Research Spending	Rs Cr	78	101	123	
		Research Spending % to Sales	%	3.4	3.7	3.9	
		Debt Equity Ratio	Ratio	0.42	0.34	0.22	3 year avg. 0.33
		Return on Capital Employed	%	18.8	18.3	20.9	3 year avg. 19.4
		Manufacturing Plants	Nos			12	
		Research Centres	Nos			5	
		Countries Exported				130	
		3 Years Indian Patents Filed				5	
		Cum ANDA Filings	%			160	
		Cum DMF filings	Nos			95	
		Promoter Holding	Nos			45.89	
		Foreign Entity Holding	%			25.69	
		Independent Directors Percentage	%			50	
		Board Committees for Corporate Governance	Nos			3	
Relatively old company with steady growth. However, facing profit pressure Major player in anti-malarials and cardiovascular segments. Business by segments : Anti-malarials 35%, Cardiovascular and Diabetes 31%, NSAIDs 17%, Anti-infectives 10%. Formulations 76%, APIs 24%. Business by geographies : Europe 29%, Africa 28%,Americas 20%, Asia 12%, CIS 8%, Australia 3%.							

Annexure 2 Contd.,

Rank 2013- 14	Company	Operating Performance and Other Data					
16	Biocon Ltd Estb 1978	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	1622	1989	2263	3 year avg. 11.7
		Export Sales	Rs Cr	677	990	1080	3 year avg. 15.8
		Profit After Tax	Rs Cr	255	276	324	3 year avg. 14.6
		Market Capitalization	Rs Cr			9800	
		Employees	Nos			7310	
		Research Spending	Rs Cr	37.7	72.8	89.1	
		Research Spending % to Sales	%	2.3	4.4	4.7	
		Debt Equity Ratio	Ratio	0.7	0.5	0.4	3 year avg. 0.55
		Return on Capital Employed	%	11.3	11.6	12.4	3 year avg. 11.8
		Manufacturing Plants	Nos			3	
		Research Centres	Nos			2	
		Countries Exported					NA
		3 Years Indian Patents Filed				12	
		Cum ANDA Filings	%				NA
		Cum DMF filings	Nos				NA
		Promoter Holding	Nos				60.97
		Foreign Entity Holding	%				13.54
		Independent Directors Percentage	%				67.7
		Board Committees for Corporate Governance	Nos				6

The only pure biopharmaceutical major among top 20 companies.
 Major player in statins and insulin.
 4th largest insulin company in the world.
 Now focusing on biopharmaceuticals, mainly monoclonal antibodies.
 Syngene as separate company now for Contract research and Clinigene for clinical trials.
 Collaboration with Mylan to develop Glargine, the long acting insulin.

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
17	GSK Pharma Ltd Estb 1924 (MNC)	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	2535	2823	2747	3 year avg. 8.3
		Export Sales	Rs Cr	36.5	19.6	9.5	3 year avg. -36
		Profit After Tax	Rs Cr	431	577	502	3 year avg.19.0
		Market Capitalization	Rs Cr			22988	
		Employees	Nos			5035	
		Research Spending	Rs Cr		2.45	2.74	
		Research Spending % to Sales	%		0.10	0.11	
		Debt Equity Ratio	Ratio	0.0023	0.0020	0.0018	3 year avg. 0.002
		Return on Capital Employed	%	20.7	25.7	22.4	3 year avg. 22.1
		Manufacturing Plants	Nos			3	
		Research Centres	Nos			1	
		Countries Exported					NA
		3 Years Indian Patents Filed				50	
		Cum ANDA Filings	%			0	
		Cum DMF filings	Nos			0	
		Promoter Holding	Nos			50.67	
		Foreign Entity Holding	%			24.03	
		Independent Directors Percentage	%			50	
		Board Committees for Corporate Governance	Nos			1	
A well established British MNC company formed through overseas merger of SKB and Glaxo. Operation in India as market for its parent company GSK plc. Strong in anti-infectives, steroids, dermatology and vaccines. Very little exports. Runs virtually debt free and is cash rich. Strong marketing setup. Good brand equity. Facing profit pressures due to price control on its products. Sales almost stagnant.							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
18	Divis Laboratories Ltd Estb 1991	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	1808	2160	2550	3 year avg. 24.7
		Export Sales	Rs Cr	1657	1916	2308	3 year avg. 24.1
		Profit After Tax	Rs Cr	436	533	602	3 year avg. 29.2
		Market Capitalization	Rs Cr			18312	
		Employees	Nos			1300	
		Research Spending	Rs Cr	19	24	25	
		Research Spending % to Sales	%	1.0	1.1	1.0	
		Debt Equity Ratio	Ratio	0.025	0.013	0.006	3 year avg. 0.015
		Return on Capital Employed	%	24.4	23.4	25.1	3 year avg. 24.3
		Manufacturing Plants	Nos			4	
		Research Centres	Nos			1	
		Countries Exported					NA
		3 Years Indian Patents Filed				10	
		Cum ANDA Filings	%			270	
		Cum DMF filings	Nos			3	
		Promoter Holding	Nos			52.08	
		Foreign Entity Holding	%			18.88	
		Independent Directors Percentage	%			50	
		Board Committees for Corporate Governance	Nos			5	
Company is focused on only the API business with own APIs and custom synthesis of APIs. Also in speciality chemicals and nutraceuticals. Business by geographies – USA 44%, Europe 37%, Asia 6.5 %, India 8.6 % ROW 4 % Low profile company, highly focused on high margin business in APIs. Closely controlled by the family in all key positions.							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
19	Nectar Lifesciences Ltd Estb 1995	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	1342	1673	1708	3 year avg. 16.5
		Export Sales	Rs Cr	654	991	749	3 year avg. 30.8
		Profit After Tax	Rs Cr	73	62	86	3 year avg. 4.73
		Market Capitalization	Rs Cr	518	395	455	
		Employees	Nos			1800	
		Research Spending	Rs Cr	46	36	56	
		Research Spending % to Sales	%	3.4	2.2	3.3	
		Debt Equity Ratio	Ratio	1.18	0.89	0.87	3 year avg. 0.98
		Return on Capital Employed	%	14.5	15.3	17.6	3 year avg. 15.8
		Manufacturing Plants	Nos			4	
		Research Centres	Nos			1	
		Countries Exported				70	
		3Years Indian Patents Filed				7	
		Cum ANDA Filings	%			12	
		Cum DMF filings	Nos			36	
		Promoter Holding	Nos			44.35	
		Foreign Entity Holding	%			33.4	
		Independent Directors Percentage	%			54.54	
		Board Committees for Corporate Governance	Nos			3	
Relatively young company. Mainly in APIs specializing in Menthol and hard Gelatin Capsules. Faced stiff competition from petroleum based menthol, which affected sales. Business by segments - APIs 59%, Menthol 34% and Branded generics 7%. Domestic sales 56% Exports 44 % Now moving to N American market with generics.							

Annexure 2 Contd.,

Rank 2013-14	Company	Operating Performance and Other Data					
20	Sanofi India Ltd Estb 1956 (MNC)	Operating Variables	Unit of a/c	2011-12	2012-13	2013-14	Remarks
		Sales Revenues Net	Rs Cr	1369	1613	1855	3 year avg. 16.4
		Export Sales	Rs Cr	224	249	418	3 year avg. 25.5
		Profit After Tax	Rs Cr	191	177	265	3 year avg.13.1
		Market Capitalization	Rs Cr			6580	
		Employees	Nos			3291	
		Research Spending	Rs Cr		4.17	6.07	
		Research Spending % to Sales	%		0.28	0.36	
		Debt Equity Ratio	Ratio	0	0	0	3 year avg. 0
		Return on Capital Employed	%	16.7	14.2	18.8	3 year avg. 16.6
		Manufacturing Plants	Nos			3	
		Research Centres	Nos			1	
		Countries Exported				33	
		3 Years Indian Patents Filed				277	
		Cum ANDA Filings	%			0	
		Cum DMF filings	Nos			0	
		Promoter Holding	Nos			60.4	
		Foreign Entity Holding	%			14.9	
		Independent Directors Percentage	%			40	
		Board Committees for Corporate Governance	Nos			2	
Company formed from successive mergers – Rhone Poulenc, Hoechst, May and Baker, Aventis Pasteur. Indian arm of French company. Leader in anti-diabetic, NSAIDs, cardiovascular products and vaccines. Innovative in marketing. Good brand equity.							