



Entrepreneurship Development in India: Emergence from Local to Global Business Leadership

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**EVOLUTION OF ENTREPRENEURSHIP IN INDIA:
Emergence from Local to Global Business Leadership**

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PREFACE

Coping with discontinuous change resulting from ‘creative destruction’ is the task of the entrepreneurs and keeping in step with these changes demands innovativeness. Catching up with global changes can be managed as long as the time context is known. Strategic time is so crucial in introducing radical changes, otherwise global business leadership will be a distant strategy. Nonetheless, keeping always in step with the changing environment, when change is abrupt and unexpected will remain a challenge.

It was only after the emergence of innovative entrepreneurship that the world has been witnessing spectacular growth in per capita income and economic welfare. But for the innovators, the world would have been enmeshed in the 17th century dirigiste and mercantile conundrums. In the age of laissez faire, not only big corporations, but small and medium enterprises, institutions and public authorities also participate in the entrepreneurial culture and vie for global business leadership. In this, the US had been the lead goose, Japan following the lead and itself becoming the lead goose subsequently, to be followed by Korea, China, India and other countries. In this way, the ‘V’ formation has facilitated the standardization of business methodologies and emerging leadership in focal areas. Not only the geese lay golden eggs, they fly to farther lands to spread the message of innovation and leadership. Sometimes, a lead goose may depart from the regular route to be a radical innovator in its own way.

Learning, when fortified with innovative culture, results in the emergence of entrepreneurship in any respective field of study and application. Once diffused and assimilated, it is the local entrepreneurial culture that ultimately pervades into global business scenario. Consequent on the economic liberalization in the 1990s and the growth of privatization, India has emerged a global leader in many business areas, in spite of its multitude developmental bottlenecks and lack of sophisticated industrial revolution. It is now in a position to be a lead goose, especially in sectors like information technology, biotechnology and automotive industry.

Looking at the pace with which countries like Japan, Korea, Taiwan, China, India and the rest of Asia has spearheaded in entrepreneurial and business model building, it seems that Asia has the potential leadership to change the global business scenario in the future.

Look South (with due apologies to Westward Ho!) is a message that may be implicated in the study of evolutionary changes of India’s entrepreneurship. Socio-historical studies in the past had damped off a possibility of appreciating potentials of local entrepreneurship, while economics of entrepreneurship often reflects a historical atavism, once Western experiences are applied to the countries in growing phases like India. The book begins its initial deliberation by reviewing in a nutshell, major theoretical premises behind the related discipline of entrepreneurship studies, in so far as are relevant to the present-day study.

This book that concentrates on India's experience in wider spectrum of time-horizon should manifest itself as a revisit to the importance of entrepreneurship in streaming type and pattern of national development of a country. Though zigzagged path India had undergone in the past, the entrepreneurs, though small in number but globally competent in capability are pushing the country to a front in global business leadership.

There is a clue in the drama that tells a story to catch a missing link within a fast changing structure of opportunity in a world technological domain. The IT soft-ware, bio-pharmaceuticals, and others are the one that established sovereignty in technology domain in the world. Only entrepreneurial capability accounts for the lead flying goose to pave the way. 'Look south' is a way for the respective innovation.

Each country can enjoy advantage in ***opportunity structure*** in industry with the appropriate entrepreneurship intent. So does a country like India that is highly embodied with potential entrepreneurial ability in the most of innovative technology domains, and in many sectors of human activities like medicals, ecological, and what else. The country has now reached a point of no return where India's global business leadership is bound to lead, not only the country, but also the world for a sustained growth and stability. This is the message of optimism for India and the world.

The drama is unfolding! Look south!! Invent in thy future fortunes!!!

Noboru Tabe and Somu Giriappa

CONTENTS

Foreword

Preface

Introduction

Chapter 1	Conceptualisation and the Process of Entrepreneurship	8
1.1	Introduction	8
1.2	The ‘Flying Geese’ Concept	10
1.3	A Prelude to Entrepreneurship	12
1.4	Theories of Entrepreneurship	
1.5	Socio-cultural and psychological approaches	15
1.6	Discovery and Opportunity theories of entrepreneurship	18
1.7	The Entrepreneurial Process	
1.8	Entrepreneurial models	22
1.9	Resume and Conclusion	
1.10	Chapter Outlines	26
Chapter 2	The Evolution of Entrepreneurship and its Development in India	
2.1	Introduction	29
2.2	Business enterprising in the past	29
2.3	Overview of the traditional Indian society and entrepreneurship development	35
2.4	The post-Independence period	37
2.5	The current scenario	42
2.6	Conclusion	43
Chapter 3	Development of Entrepreneurship in Iron and Steel Industry	45
3.1	Introduction	45
3.2	The Chinese experience	46
3.3	Entrepreneurship development in Korea	48
3.4	The Indian iron and steel industry	50
3.5	The Tata Entrepreneurs	54
3.6	Conclusion	57
Chapter 4	The Emergence of Indian Information Technology Industry	58
4.1	Introduction	58
4.2	Software development in India	58
4.3	Bangalore, the IT hub of India	63

4.4 The Hyderabad experience	71
4.5 The IT achievers	73
4.6 Conclusion	78
Chapter 5 Biotechnology Enterprising in India	80
5.1 Introduction	80
5.2 Biotechnology in India	81
5.3 Recent Initiatives	87
5.3.1 <i>Biopharma segment</i>	87
5.3.2 <i>Bioagriculture segment</i>	89
5.3.3 <i>Bioenergy</i>	90
5.3.4 <i>International collaboration</i>	90
5.4 Barriers that impede innovation and discovery	91
5.4.1 <i>Weak entrepreneurial skills</i>	91
5.4.2 <i>Lack of public–private partnerships</i>	92
5.4.3 <i>Risk-averse nature of industry</i>	92
5.4.4 <i>Lack of venture funding</i>	92
5.4.5 <i>Lack of venture capital system</i>	92
5.4.6 <i>Streamlining the regulatory process</i>	93
5.5 The biotech firms	93
5.5.1 <i>Leading Biotech companies in India</i>	93
5.5.2 <i>Dr Reddy's</i>	96
5.5.3 <i>Wockhardt Ltd</i>	98
5.5.4 <i>Nicholas Piramal India Ltd</i>	99
5.5.5 <i>Ranbaxy</i>	100
5.6 The bioentrepreneurs	101
5.7 Conclusion	102
Chapter 6 Indian Business Houses and Development of Entrepreneurship	106
6.1 Introduction	106
6.2 The business groups	106
6.3 Major business groups in India	108
6.3.1 <i>The Tatas</i>	108

6.3.2	<i>Reliance group</i>	115
6.3.2a	<i>Reliance Industries</i>	116
6.3.2b	<i>Reliance ADA</i>	117
6.3.3	<i>Aditya Birla group</i>	118
6.3.4	<i>ITC Limited</i>	119
6.3.5	<i>The Bajaj group</i>	121
6.3.6	<i>Bharti Airtel</i>	123
6.3.7	<i>The Godrej group</i>	124
6.3.8	<i>The Adani group</i>	125
6.3.9	<i>The Wipro group</i>	126
6.3.10	<i>The Hero group</i>	126
6.3.11	<i>The Escorts group</i>	126
6.3.12	<i>The M P Birla group</i>	127
6.4	Prospects of Indian business groups	128
6.5	Conclusion	129
Chapter 7	Entrepreneurship in Small and Medium Enterprises	131
7.1	Introduction	131
7.2	SMEs in India	131
7.3	SMEs in Indian automobile industry	133
7.4	Growth of entrepreneurship in SMEs	135
7.5	Technology and information-based growth of entrepreneurship	138
7.6	Diffusion of entrepreneurship	140
7.7	Case studies	142
7.7.1	<i>Anuja Electronics</i>	142
7.7.2	<i>ELICO</i>	144
7.7.3	<i>Cheminnova Remedies</i>	145
7.7.4	<i>Ducom</i>	146
7.7.5	<i>Micro FX</i>	148
7.7.6	<i>Safety match industry</i>	150
7.8	Conclusion	155

Chapter 8	Development of Social, Ecological, Public, Institutional and Women Entrepreneurship	157
	8.1 Introduction	157
	8.2 Social entrepreneurship	157
	8.3 Ecological Entrepreneurship	161
	8.4 Public entrepreneurship	163
	8.5 Institutional entrepreneurship	167
	8.6 Women entrepreneurship	171
	8.7 Conclusion	177
Chapter 9	Innovation and Entrepreneurship: India's Emergence in Business Leadership	179
	9.1 Introduction	179
	9.2 Types of innovations	180
	9.3 The 'flying geese' theory and entrepreneurship	182
	9.4 Business opportunities in different countries: a comparison	184
	9.5 Some developments in the IT sector	187
	9.6 The genesis of innovative entrepreneurship	189
	9.7 The development of entrepreneurship in different phases	190
	9.8 Development of intrapreneurship	195
	9.9 Innovativeness in different sectors	202
	9.10 The predominance of software industry	208
	9.11 Conclusion	210
Chapter 10	The Prospects of Entrepreneurship Development in India	213
	10.1 Introduction	214
	10.2 Entrepreneurship in retrospective	214
	10.3 Global competitiveness index	215
	10.4 Global entrepreneurship assessment	219
	10.5 Global entrepreneurship development index	224
	10.6 Chapter summaries (10.6.1 to 10.6.10)	229
	10.7 Some questions to be answered	241
	10.8 An assessment of Indian entrepreneurship	244
	10.9 Scope of entrepreneurship in India	248
	10.10 Conclusion	250
	Further Reading	254

Afterword**Index**

266

Chapter 1**The Concept of Entrepreneurship****1.1 Introduction**

The role of the governments in modern economic development began to change dramatically with the advent of the Industrial Revolution. Industrialization and economic development in the West were based on the establishment of individual property rights that encouraged the growth of private capital. Competition and individual enterprise thrived because individuals pursued their self-interest of survival and wealth accumulation. The instinct to survive under competitive pressures resulted in the growth of innovations and productivity increases, which eventually led to both increased profits for business and lower prices to consumers. However, capitalism (private ownership of capital) has led to greater degree of inequalities in income and wealth, while private decisions has not always led to socially desirable outcomes, especially in the case of developing countries and market imperfections. Many policymakers saw market failures as quite common and therefore assumed that only appropriate government interventions could guide an economy to a path of sustained economic development (Krueger, 1993).

In the early 20th century, the former Soviet Union attempted an experiment of improving individual well-being without sacrificing the objective of greater equality of income and wealth through total ownership of capital by the government. Initially, the Soviet Government was able to raise productivity through directed industrialization and by the end of World War II positioned itself as a superpower. It was around this time that a substantial number of colonized nations were gaining their independence. During their time as colonies to the Western nations, these countries had been deprived of the industrialization that had engulfed those nations. Based on the successful experience of the former Soviet Union, many economists and policymakers concluded that planning was essential for the efficient allocation of an economy's resources in poor countries (Panagariya, 1994).

The governments in newly independent nations assumed a significant role in economic development. They sought to quickly and substantially raise the standard of living through directed and controlled management of the economy. These developing countries invested

heavily in education to promote literacy and to ensure an adequate supply of technical manpower to meet growing needs. Further, these nations did not want to subject their poor and weak economies to international economic fluctuations and thus sought to industrialize through import substituting industrialization, where imports were expected to be increasingly replaced by domestic production.

Many developing countries like India are in a state of transition. They are striving to move from a subsistence-oriented, tightly integrated, inward looking local economy to a surplus seeking, market led, outward looking economy. Such a move is possible only with the emergences of a multitude of entrepreneurs in all walks of life. This requires building up of a wider base of population capable of entrepreneurial behaviour. The initial build up of entrepreneurial activity took place in urban centres. Enterprises and entrepreneurs have been in the centre stage of modernization since the days of Industrial Revolution. Economists, sociologists, psychologists and anthropologists have studied this concept, mostly within the frontiers of their respective disciplines.

Entrepreneurship was not a serious agent of development for developing economies despite the important role played by entrepreneurship in the overthrow of feudal economies in the first world. The first paper that looked at the issue of entrepreneurship and the development of poor economies was probably by Leff (1979) who identified poor institutions as an impediment to entrepreneurship. Yet, it was not until the 1990s and the works of Baumol (1990, 2002) and North (1990) that significant theoretical insights emerged about the relationship between the quality of institutional environment and type of entrepreneurship and to some extent these have remained the important arguments about why growth of entrepreneurship may be sub-optimal in the developing countries.

Few of the earlier studies on entrepreneurship may include (Kilby, 1971) for general introduction; Lamb (1955) for growth of business enterprises; Berna (1959), Medhora (1965), Rungta (1970) and Tripathi (1971) for growth of entrepreneurship in India and Watanabe (1970) for growth of small scale entrepreneurship in Japan. These and other studies have been attempted to analyze the growth of entrepreneurship mostly in the developing countries. Tabe (1970), for example published a book on 'Indian Entrepreneurs at the Cross-roads.' We intend to carry forward some of the arguments of the book and ours is an attempt to focus on the growth and impact of entrepreneurship on economies like India in the transformation toward realizing the fruits of traditional and modern-day elements of entrepreneurship. Though the concept can be viewed in respect of many disciplines (social entrepreneurs, political entrepreneurs, travel entrepreneurs and culture entrepreneurs besides business entrepreneurs), this work concentrates on business leadership. Further, an attempt will be made to analyze the relevance of the theory to developing countries like India.

This chapter introduces the concept of entrepreneurship and the various theories explaining its development over the years. Section 1.2 reviews the concept in its different connotations, while section 1.3 summarizes the economic, managerial and sociological theories of entrepreneurship. Section 1.4 specifically explains the socio-cultural and psychological approaches to entrepreneurial development and section 1.5 extends it by introducing the discovery and creation theories, which have transformed the concept to the present status. The discussion on different types of entrepreneurs is attempted in section 1.6, while section 1.7 discusses different models of entrepreneurship. Section 1.8 concludes, summarizing the behavioural approach.

1.2 Entrepreneurship

Entrepreneurship is an evolving phenomenon. With the advancement of science and technology it has undergone metamorphosis change and emerged as a critical input for socio-economic development. Entrepreneurship is the process of being an entrepreneur, of gathering and allocating the resources, financial, creative, managerial or technological, necessary for the success of new ventures. Entrepreneurship is characterized by creative solutions to problems and ingenuity and innovation are the forte of an entrepreneur. Economies have been characterized by innovations and new products that entrepreneurs have brought to the market. Further, entrepreneurship has acted as the catalyst to transfer a segment of new generation of people into self-employed business owners to provide jobs and motivation for the rest. Entrepreneurship is a phenomenon associated with entrepreneurial activity and entrepreneurs who seek to generate value by identifying and exploiting new products, processes, markets and creating or expanding economic activities (OECD, 2008).

Successful entrepreneurship depends on dedicated, talented, creative entrepreneurs. The person who has the ideas, the energy and the vision to create a new business is the cornerstone to any start-up business. But the individual must have ready access to a variety of important resources in order to make the new venture more than just a good idea. He or she needs to develop a plan of action, a road map that will take the venture from the idea stage to a state of growth and institutionalization. The entrepreneur needs to put together a team of talented, experienced individuals to help manage the operations. Entrepreneurship depends on access to capital, human, technological and financial. In short, entrepreneurship is a process that involves preparation and the involvement of others in order to exploit an opportunity for profit.

Definitions of entrepreneurship have emphasized a broad range of activities including the creation of organizations (Gartner, 1988), the carrying out of new combinations (Schumpeter, 1934), the exploration of opportunities (Kirzner, 1973), the bearing of uncertainty (Knight, 1921) and bringing together of factors of production (Say, 1964).

Richard Cantillon (1755) defines entrepreneurship as self-employment of any sort. Entrepreneurs buy at certain prices in the present and sell at uncertain prices in the future. The entrepreneur is a bearer of uncertainty. According to Jean Baptiste Say (1766), the entrepreneur is an agent who combines all means of production and finds in the value of the products the fruits of the entire capital he employs and the value of the wages, the interest and rent which he pays, as well as profits belonging to himself.

Frank Knight (1921) emphasizes the entrepreneur's role in bearing the uncertainty of market dynamics. Entrepreneurs are required to perform such fundamental managerial functions as direction and control. Joseph Schumpeter (1934) argues that entrepreneur is the innovator who implements change within markets through the carrying out of new combinations. The carrying out of new combinations can take several forms like the introduction of a new good or quality thereof and the introduction of a new method of production, besides opening of a new market and conquest of a new source of supply of new materials or parts or the carrying out of the new organization of any industry.

Schumpeter (1950) equates entrepreneurship with the concept of innovation applied to a business context, exhibiting what he calls as a creative destruction system of development. Schumpeter's definition emphasizes the combination of resources and therefore managers of already established business are not entrepreneurs. He contends that the defining characteristic of entrepreneurial ventures was innovation. By finding a new production function in an existing resource, a previously unknown means through which a resource could produce value, the entrepreneur is innovating. An innovation could take place in product design, organization of the firm, marketing devices or process design. Innovation is what separates the entrepreneur from others who undertake closely related endeavours. Schumpeter points out that entrepreneurship is crucial for understanding economic development. The dynamics of the process can be vastly different depending on the institutional context and level of development within an economy.

Penrose (1959) opines that entrepreneurial activity involves identifying opportunities within the economic system. Managerial capacities are different from entrepreneurial capacities. Harvey Leibenstein's (1968) entrepreneur fills market deficiencies through input-completing activities. Entrepreneurship involves activities necessary to create or carry on an enterprise where not all markets are well established or clearly defined and/or in which relevant parts of the production function are not completely known. Extending this line of argument, Israel Kirzner (1997) argues that an entrepreneur has to recognize and act upon market opportunities. The entrepreneur is essentially an arbitrageur. In contrast to Schumpeter's viewpoint, the entrepreneur moves the market toward equilibrium.

The Entrepreneurship Center at Miami University of Ohio (Smith et al, 2005) defines entrepreneurship as the process of identifying, developing and bringing a vision to life. The vision may be an innovative idea, an opportunity or a better way to do something. The end result

of this process is the creation of a new venture, formed under conditions of risk and considerable uncertainty. Entrepreneurship is often viewed as a function which involves the exploitation of opportunities which exist within a market system. Entrepreneurs usually are considered to bear risk while pursuing opportunities and are associated with creative and innovative actions. Entrepreneurs undertake a managerial role in their activities, but routine management of an ongoing operation is not considered to be entrepreneurship. An individual may perform an entrepreneurial function in creating an organization, but later is relegated to the role of managing it without performing an entrepreneurial role. In this sense, many small-business owners would not be considered to be entrepreneurs..

Arthur Cole (1959) defines entrepreneurship as purposeful activity to initiate, maintain and develop a profit-oriented business, wherein individuals must create a new business organization in order to be considered entrepreneurial. Cole's entrepreneur is a builder of profit-minded organizations.

Shapero and Sokol (1982) argue that all organizations and individuals have the potential to be enterprising. They focus on activities rather than organizational make-up in developing entrepreneurship. They contend that entrepreneurship is characterized by an individual or group's initiative taking, resource gathering, autonomy and risk taking. Their definition includes all types and sizes of organizations with a wide variety of functions and goals.

Peter Drucker (1985) puts forward the view that Schumpeter's type of innovation can be systematically undertaken by managers to revitalize business and non-business organizations. By combining managerial practices with the acts of innovation, business creates a model of entrepreneurship that will result in the institutionalization of entrepreneurial values and practice. Drucker contends that entrepreneurship is something that can be strategically employed by any organization at any point in their existence, whether it is a start-up or a firm with a long history. To him, entrepreneurship is a tool to be implemented by managers and organizational leaders as a means of growing a business.

1.3 Theories of entrepreneurship

Cantillon was the first thinker to define the entrepreneur as an agent who buys means of production at certain prices to combine them into a new product. He classifies economic agents into landowners, hirelings and entrepreneurs and considered the entrepreneur as the most active among these three agents, connecting the producers with customers. Say improves Cantillon's concept by adding that the entrepreneur brings people together to build a productive item.

Knight introduces the dimension of risk-taking as a central characteristic of entrepreneurship. This theory considers uncertainty as a factor of production, and holds the main function of the entrepreneur as acting in anticipation of future events. The entrepreneur earns

profit as a reward for taking such risks. According to classical theory, it is entrepreneurship which is the driving factor that brings the four factors together. The characteristics of a successful entrepreneur include a thorough understanding of the industry, good leadership skills and foresight on demand and supply changes and the willingness to act on such risky foresights. Success of an entrepreneur depends not on possession of these skills, but on the economic situations in which they attempt their endeavors. Based on this precept, entrepreneurship has been termed as the fourth factor itself instead of organization, coordinating the other three factors.

Mark Casson (1990) holds that entrepreneurship is a result of favourable economic conditions. The demand for entrepreneurship arises from the demand for change, which includes taxation and industrial policy, easy availability of raw materials, easy access to finance on favorable terms, access to information about market conditions, availability of technology and infrastructure and marketing opportunities.

Economic development takes place when a country's real rational income increases over a period of time wherein the role of entrepreneurs is an integral part. Development implies that carrying out of new combination of entrepreneurship is basically a creative activity. According to Schumpeter (1934), an entrepreneur is one who perceives the opportunities to innovate and carry out new combinations or enterprise. In his view, the concept of new combination leading to innovation includes the introduction of new goods consumers not yet familiar of its quality and the introduction of new method of production, besides the opening of new market, the conquest of new source of supply of raw material and the carrying out of new organization

Schumpeterian entrepreneur is one who has three major characteristics of innovation, foresight and creativity. Entrepreneurship takes place when the entrepreneur creates a new product, introduces a new way to make a product, discovers a new market for a product, or finds a new source of raw material and finds new way of making things or organization. The concept of innovation has five functions of introduction of a new good, introduction of a new method of production, opening of a new market, conquest of a new source of supply of raw materials and carrying out of a new organization of any industry. The concept of innovation includes the elements of risk taking, superintendence and coordination.

Schumpeter (1950) stresses the fact that these attributes unaccompanied by the ability to innovate would not be sufficient to account for the emergence of entrepreneurship. However, his theory ignores the entrepreneur's risk taking ability and organizational skills and place undue importance on innovation. This theory applies to large-scale businesses, but economic conditions force small entrepreneurs to imitate rather than innovate. This entails successful imitation by adapting a product to a niche in a better way than the original product innovators innovation. Schumpeter's innovating entrepreneur represents the enterprise with the R & D and innovative character, which the developing countries lack most. The theory emphasizes on innovation and excludes the risk taking and organizing aspects. Schumpeter's entrepreneurs are large scale

businessman who introduce new technology and improved methods of production. However, Schumpeter remained silent about as to why some economics had more entrepreneurial talent than others.

Israel Kirzner (1973) opines that spontaneous learning and alertness are two major characteristics of entrepreneurship which is the transformation of spontaneous learning to conscious knowledge, motivated by the prospects of some gain. Kirzner considers the alertness to recognize opportunities more characteristic than innovation in defining entrepreneurship. The entrepreneur either remedies ignorance or corrects errors of the customers. According to him, the entrepreneur subconsciously discovers an opportunity to earn money by buying resources or producing a product and selling it. The entrepreneur finances the venture by borrowing money from a capitalist and uses the funds for his entrepreneurial venture and pays back the capitalist, including interest, retaining the pure entrepreneurial profit.

Peter Drucker (1985) contends that innovation, resources and an entrepreneurial behavior are essential to entrepreneurship. According to him, entrepreneurship involves increase in value or satisfaction to the customer from the resource, creation of new values and combination of existing materials or resources in a new productive combination. Drucker opines that the entrepreneur always searches for change, responds to it and exploits it as an opportunity. He lays emphasis on innovation and resource that lead to emergence of entrepreneurship. According to him, innovation is the real essence of entrepreneurship which creates resource. A thing is regarded as resource when its economic value is recognized. For example, mineral oil was considered worthless until the discovery of its use. Similarly, purchasing power was considered an important resource by an innovative entrepreneur who invented installment buying.

Successful entrepreneurship, according to Drucker involves value and satisfaction obtained from resource by the consumer to be increased. Material is converted into a resource or exiting resources are combined in a new or more productive configuration Entrepreneurship is the practice which has a knowledge base and it is not confined only to big businesses and economic institutions. Entrepreneurship behavior rather than personality trait is more important to enhance the spirit of entrepreneurship. The foundation of entrepreneurship lies in concept and theory rather than in intuition. Druckerian entrepreneur may not be a capitalist or an owner. A banker who mobilizes money and allocates it in areas of higher yield is very much an entrepreneur though he is not the owner of the money.

The Harvard School concept of entrepreneurship comprises any purposeful activity that initiates, maintain or develop a profit-oriented business in interaction with internal situation of the business or with the economic, political and social circumstances surrounding the business. This approach emphasizes two types of activities: the organization or coordination activity and the sensitivity to the environmental characteristics that effect decision making. Despite its stress on the human factor in the production system, the Harvard tradition never

explicitly challenged the equilibrium-obsessed neo-classical theory. This is challenged by the neo-Austrian School, which argues that disequilibrium, rather than equilibrium is the likely scenario and as such, entrepreneurs operate under fairly uncertain circumstances. The essence of entrepreneurship consists in the alertness of market participants to profit opportunities. A typical entrepreneur is an arbitrageur, the person who discovers opportunity at low prices and sells the same items at high prices because of inter-temporal and interspatial demands.

Following this line of argument, Harvey Leibenstein (1968) considers entrepreneur as a gap-filler. The three traits of entrepreneurship include recognizing changing market trends, developing new goods or processes in demands but not in supply and determining profitable activities. Entrepreneurs have the special ability to connect different markets and make up for market failures and deficiencies.

While Baumol (2002) argues that institutions enshrine incentive structures for rent-seeking as opposed to productive entrepreneurship that would contribute to growth, Douglas North (1990) identifies the essential endogeneity of institutions and economic activity in entrepreneurial development. Entrepreneurial firms will adapt their activities and strategies to exploit opportunities and overcome the limitations in their business environment through the formal and informal institutional network. Two aspects of formal institutional environment pose particular problems in developing economies: poor private property protection and poor capital market institutions. One predominant effect of poor private property protection is corruption which may increase the transaction costs of doing business. Johnson et al. (1999) argue that businesses in transition economies generally circumvent this problem by relational contracting (i.e. contracts informally enforced through networks). Access to informal networks to alleviate the shortcomings of the environment and the resources of the firm is also seen as relevant in developed market economies where entrepreneurs with good ideas may nonetheless lack all the resources required for successful new firm formation.

1.4 Socio-cultural and psychological approaches

The sociological theory of entrepreneurship holds that social culture as the driving force of entrepreneurship. The entrepreneur becomes a role performer in conformity with the role expectations of the society, and such role expectations base on religious beliefs, taboos and customs. According to Max Weber (1930), religion is the major driver of entrepreneurship and he stressed on the spirit of capitalism, which highlights economic freedom and private enterprise. Capitalism thrives under the protestant work ethic that hinges on these values. The right combination of discipline and an adventurous free-spirit define the successful entrepreneur. He emphasizes that entrepreneurial energies are exogenous supplied by means of religious beliefs. Capitalism thrives under the protestant work ethic that hinges on these values. The right combination of discipline and an adventurous free-spirit define the successful entrepreneur.

Capitalism is an economic system in which economic freedom and private enterprise are glorified, so also the entrepreneurial culture.

Weber makes a distinction between spirit of capitalism and adventurous spirit and the former is influenced by the strict discipline whereas the latter is affected by free force of impulse. Entrepreneurship culture is influenced by both these factors. According to him, the spirit of capitalism can be grown only when the mental attitude in the society is favorable to capitalism. Weber introduced the new businessman into the picture of tranquil routine. The spirit of capitalism intertwined with the motive of profit results in the creation of greater number of business enterprises. In fact, this theory suited the colonial rulers, who desired to encourage European entrepreneurship in the colonies.

Hoselitz (1952) explains that the supply of entrepreneurship is governed by cultural factors, and culturally minority groups are the spark-plugs of entrepreneurial and economic development. In many countries, entrepreneurs have emerged from a particular socio-economic class. He emphasizes the role of culturally marginally groups like Jews and the Greeks in medieval Europe, the Chinese in South Africa and Indians in east Africa in promoting economic development.

McClelland (1961) contends that people have three motives for accomplishing things, namely, the need for achievement, need for affiliation and need for power. Need for achievement and need for power drive entrepreneurship. Entrepreneurs are people who do things in a better way and makes decisions in times of uncertainty. The desire to achieve big things overpowers monetary or other external incentives. McClelland's experiment revealed that traditional beliefs do not inhibit an entrepreneur and that it is possible to internalize the motivation required for achievement orientation through training. In many systems, socio-cultural history accounts for the performance of entrepreneurial functions by a considerable number of individuals. The focus in entrepreneurship shifts from the act to the actors.

McClelland and Winter's (1969) need for achievement (n-Ach) is responsible for economic development. Greater the development of n-Ach, during early socialization of people, the more likely would be economic growth. Achievement motivation could be inculcated through training in self reliance, rewarding hard work and persistence in goal achievement and creating interest in excellence.

In a psycho-social theory, Hagen (1962) relegates economic variables to a relatively minor role emphasizing on certain aspects of personality. Hisrich (1990) identifies several characteristics of entrepreneurs in terms of conditions that make entrepreneurship desirable and possible wherein the childhood family background and education level, personal values and motivations and role modeling effects and other support systems are persistent.

Another way of explaining the characteristics of entrepreneurs has been through trait and demographic approaches (Robinson et al, 1991). In the trait approach, the entrepreneur is assumed to be a particular personality type whose characteristics are essential in explaining entrepreneurship as a phenomenon. In the demographic approach, demographic information is used to arrive at a profile of a typical entrepreneur assuming that people with similar background possess similar underlying stable characteristics. The approach presumes that by identifying demographic characteristics of known entrepreneurs it will be possible to predict entrepreneurship in unknown populations (Robinson et al, 1991). The demographic variables are family background, birth order, role model, marital status, age, education level of parents and self, socio-economic status, previous work experience and work habits. The approach assumes that human behaviour is strongly influenced by demographic characteristics such as sex, race, or birth order. However, it has been argued that using demographic characteristics as surrogates for personality characteristics is not appropriate. The approach does not help predict who will or will not be an entrepreneur on the basis of knowledge of one's birth order, level of education or parental heritage. Besides, demographic characteristics being static in nature cannot explain a dynamic multifaceted phenomenon like entrepreneurship.

Johnson et al, (2000) argue that reputational incentives often substitute for court enforcement of contracts. Though poor institutional environments provide obstacles which may often reduce the profitability of an economic opportunity, entrepreneurial firms can and do devise ways to get around them. The absence of capital market institutions and other intermediate markets for industrial goods and services can hinder the emergence of entrepreneurial businesses because they make the risk of starting a business quite high. Their role in facilitating the formation of business groups in emerging economies has been stressed by Khanna and Palepu (2000). In the context of scarce capital and large initial scales of production to compensate for missing intermediate markets, business groups are able to derive the advantages of risk pooling and cross-subsidy in order to overcome problems of lack of availability of finance and this feature probably also makes them more likely to undertake larger risks. This is of course very relevant for technology-based entrepreneurship which is likely to suffer particularly as a result of high riskiness and information asymmetries with regard to capital borrowing. In developing economies business groups take on such technology-based entrepreneurship and the evidence of the East Asian and South Asian experience certainly confirms this reasoning.

Hansemark (1998) uses the population-ecology model to analyze the concept of entrepreneurship. This model seeks to predict the probability of births and deaths within a population of firms within a given industry niche, conferring the environment rather than the person with the status of the key entity in determining organizational survival. Recent research following this approach is focused on the presence, characteristics and change in a population or organization in an ecological context provided by the host society (Reynolds et al, 2005).

1.5 Discovery and creation theories of entrepreneurship

The theoretical work in the discovery theory (Alvarez and Barney, 2007), which is called the individual-opportunity (I-O) nexus view, focuses on the existence, discovery and exploitation of opportunities and the influence of individuals and opportunities. The I-O nexus suggests that opportunities are objective, individuals are unique and that entrepreneurs are risk-bearing. Opportunities have an objective component and these opportunities exist whether or not an individual recognizes them. Opportunities are derived from the attributes of an industry or market within which an entrepreneur is functioning. If an entrepreneur understands the attributes/structure of a particular industry, he or she will be able to anticipate the kinds of opportunities that exist in that industry. For example, the primary opportunity in fragmented industries is to exploit economies of scale in order to consolidate these industries. The primary opportunities in mature industries are to refine products and engage in process innovations to improve quality and lower costs. Understanding entrepreneurial opportunities becomes important because the characteristics of an opportunity influence the very value that the opportunities might create.

Entrepreneurship requires differences in people and these differences manifest themselves in the ability to recognize opportunities. Individuals in this view are alert to existing opportunities. Entrepreneurial alertness is an attitude (emotional state with a pre-disposition for action) of receptiveness to available--but currently overlooked by human actors--opportunities in a market. From Kirzner, this assumption recognizes that the entrepreneurial nature of human action refers to more than just the action taken, but additionally refers to the human agent that is at all times spontaneously on the lookout for unnoticed market imperfections that might inspire new activity. Entrepreneurial alertness is not a deliberate search, but the constant scanning of the environment by an entrepreneur who exploits market imperfections. The recognition of these market imperfections is accompanied by a sense of surprise that the imperfection had not previously been recognized.

Risk-bearing is a necessary part of the entrepreneurial process. The notion that opportunities are objective by definition assumes risk. In order for the assumption that an opportunity is objective to hold true, the existence of the opportunity is merely a matter of some economic actors having differential information. The assumption of imperfectly distributed information is based in neo-classical economics and assumes that all relevant information about technologies, demand and other determinants of market competition are known to be available, but may be costly to acquire. The economic actor in this view acquires the information at a lower cost than other economic actors and this becomes the source of profit.

The I-O nexus explains entrepreneurship by considering the nexus of special individuals and objective opportunities. In this view every price, invention, and information has within it objective opportunities. Individuals discover and give opportunities agency, but they do not create opportunities. What entrepreneurs do in this view is to apply a new means-ends framework for recombining resources. While it is not known with certainty at the time the opportunity is discovered whether or not it will be successful, because of the nature of the discovery used in this view it can be estimated probabilistically what the outcome will be. Thus the entrepreneurship process in this view is about risk and not uncertainty.

The theoretical work in the creation theory (Alvarez and Barney, 2007) has focused on the entrepreneur and the creation of the firm. Similar to the I-O nexus, there are three major theoretical assumptions in the creation theory. The first assumption is that opportunities are created through a series of decisions to exploit a potential opportunity. The creation theory suggests that it is difficult to separate the ex-ante and ex-post theory of opportunities. Opportunities in this theory do not exist independent of economic actors, but are created by economic actors. Whatever the source of opportunities, their existence, per se, often only holds the potential for generating profit.

The creation theory, which assumes uncertainty and not risk, argues that under conditions of uncertainty the attributes of an industry are either not knowable or changing in difficult to predict ways. In these settings, knowledge about industry structure cannot be used to anticipate opportunities. In such settings, opportunities must be created and refined through a process of hypothesizing what an opportunity might be, trying to exploit this hypothesized opportunity, revising one's hypothesis, testing this revised hypothesis until, at some point in the future, one's hypothesis roughly correlates with what turns out to be objective opportunities in an industry, but opportunities that could not have been known or anticipated ex-ante.

The theories in perspective

. The above works rarely examine entrepreneurship explicitly within the context of the developing countries or ask how the modern problems of development affect the ability of entrepreneurs to operate. These include the presence of underdeveloped financial markets, poor protection for property rights and weak contract enforcement. Most entrepreneurship research today implicitly assumes that there is no difference between the entrepreneurship being carried out in the most developed nations and that carried out in latecomer or developing countries.

Two aspects of formal institutional environment pose problems in such countries with poor private property protection and poor capital market institutions. One predominant effect of poor private property protection is corruption which may increase the costs of doing business. Johnson et al. (1999) argue that businesses in transition economies generally circumvent this problem by relational contracting (contracts informally enforced through networks). Access to

informal networks to alleviate the shortcomings of the environment and the resources of the firm is also seen as relevant in developed market economies where entrepreneurs with good ideas may nonetheless lack all the resources required for successful new firm formation.

However, entrepreneurship has not been considered as a serious agent of development in the case of developing economies despite the important role played by it in the overthrow of feudal systems in the first world. Leff (1979) identified poor institutions as an impediment to entrepreneurship. Yet, it was not until the 1990s and the works of Baumol (1988, 2006) and North (1990) that significant theoretical insights emerged about the relationship between the quality of institutional environment and type of entrepreneurship and to some extent these have remained the important arguments about why entrepreneurship has not flourished in the developing economies.

1.6 Types of entrepreneurs

Jeffrey Timmons (1989) define entrepreneurship as the ability to create and build something from practically nothing, exemplifying the great American entrepreneurs. Entrepreneurs have a personality that is different than those of normal people. Today's entrepreneurs are big and tall and short and small and come from every walk of life, every race and ethnic setting, all age groups, male and female and from every educational background.

It is self-motivation that distinguishes successful entrepreneurs from those that fail. It is the one quality which entrepreneurs themselves admit is critical to the success of their initiatives. Other traits include business knowledge which includes business planning, marketing strategies and asset management, self-confidence, technical and other skills, communication abilities and courage. Creative solutions to difficult problems may make or mar the growing business wherein the ability of an entrepreneur to find unique solutions would be the key to his or her success. One of the most problematic situations entrepreneurs face is the allocation of scarce resources. Owners of new ventures have to decide how to best use a small advertising budget or how best to use their limited computer resources. They must be creative in their ability to find capital, team members or markets.

Entrepreneurial success is often directly related to the business owner's ability to cope with the limited resources available. Besides being creative, an entrepreneur must be able to tolerate the ambiguity and uncertainty that characterize the first years of a new organization. In nearly all cases, business or market conditions are bound to change during the first few years of a new business's life, causing uncertainty for the venture and for the entrepreneur. Being creative enables entrepreneurs to more successfully manage businesses in new and ambiguous situations, but without the ability to handle the pressure that uncertainty brings upon an organization, the entrepreneur may lose sight of the purpose.

Entrepreneurs may be of different types (Casnocha, 2011). Home-run sluggers want to change the world in a big and obvious way. They are not thrilled with incremental success, and the trend toward serial entrepreneurship is not necessarily appealing to them. Sluggers would rather make a single business their life's work and make it big. They are not as amenable to early exits or succession planning. Fred Smith of FedEx is an obvious example of a slugger.

Business owners who have a series of successful business start-ups to their name are hitters in baseball who have a high on-base percentage. Like the on-base hitter, these entrepreneurs are content to achieve success in bite-sized bits on a regular basis, rather than all in one flourish. Rene Lacarte, the founder of PayCycle and Bills.com has launched a series of similar businesses in the online payment field (Casnocha, 2011). Fact Finders are entrepreneurs who seek details before making decisions. Just as picking at a single yarn in an old sweater unravels it, each answer to a fact finder's question triggers a new set of questions. The fact finder seeks out the answers to his or her questions before making decisions. Follow-through entrepreneurs love systems and creating a system is how they react when confronted with the chaos created by any start-up enterprise. Follow-through entrepreneurs think in a linear fashion, where step 1 leads to step 2 and so on. Their companies tend to operate by methodology (like Six Sigma) and to reward employees for continuous process improvement. Implementers live in the physical world and enjoy building and fixing things. They are innovative by nature. Implementers thrive in environments that allow them to work with their hands. Successful entrepreneurs, however, work hard to build their organizations, starting from little and undertaking a process that results in a thriving business (Casnocha, 2011). Even the best ideas become profitable only because the entrepreneur goes through the steps necessary to build a company.

Contributions by Pinchot (1985) and others identify intracorporate entrepreneurship (intrapreneurship) in the emergence of entrepreneurs within an organization, showing how managers can create new businesses within large corporations. Corporate entrepreneurship employs internally generated innovations from employees. Burgelman (1983) shows how traditional research and development has to be transformed into new business through internal corporate venturing that grow in stages from the conceptual, pre-venture, entrepreneurial and organizational. The process of corporate entrepreneurship includes pure venture capital, new venture development incubator, idea creation centre and employee project model.

A technopreneur is an entrepreneur who is technology savvy, creative, innovative, dynamic, dares to be different and take the unexplored path and very passionate about work. He takes failure as a learning experience, a stimulator to look things differently and stride for next challenge. Technopreneurs continuously go through an organic process of continual improvement and always try to redefine the dynamic digital economy. Technopreneurship is not a product but a process of synthesis in engineering the future of a person, an organization and the nation. However, traditional educational programmes lack the methodology to transform students

into creative, innovative and visionary global leaders who understand the importance of technopreneurship. Siti-Maimon (1993) coined exopreneurship as part of the process of corporate entrepreneurship to revitalize large organization by acquiring ideas or innovation from external sources. The term is viewed as acquiring innovations that are outside the organization into the firm through franchising, strategic alliance, external capital venture and subcontracting. Intrapreneurial activities which are focused include internal corporate venturing known as new venture division and formal research and development group.

1.7 Entrepreneurial models

Entrepreneurial models focus on the different choices available to the entrepreneurs either in the shape of opportunities or necessity, besides information exploitation and skill development. The occupational choice model (Lucas, 1978) states that individuals do not have to be entrepreneurs and those who select into it tend to have different characteristics when compared those who do not. Occupational choice models partition the workforce between individuals who do best by becoming entrepreneurs, and those who do best by choosing an alternative occupation, usually taken to be either safe investment or paid employment. Lucas (1978) argues that individuals differ in terms of their innate entrepreneurial ability which is distributed continuously across the workforce. While agents operate under certainty, there is no separation of ownership and control. Utility maximizing agents choose their occupation and the most able choose to become entrepreneurs. The marginal entrepreneur has an ability which makes him or her just indifferent between entrepreneurship and paid employment. Lucas also shows that the most able entrepreneurs end up running the largest firms. Wages adjust until the labour market clears and entrepreneurs hire all the workers. The interest rate adjusts in a similar way to clear the capital market. Under various simplifying assumptions, Lucas contends that as economies accumulate capital, they are likely to witness a shift of workers from entrepreneurship to paid employment. That is, over time average firm size rises with small-scale entrepreneurs increasingly replaced by larger companies. This replacement does not occur because entrepreneurs are driven out of the market by unfair competition. In dynamic general equilibrium the average wage raises, which makes paid employment more attractive to owners of the smallest firms and these entrepreneurs quit voluntarily.

In the Holmes and Schmitz (1990) model, the economy is assumed to be in a permanent state of disequilibrium. Individuals are continually exposed to new opportunities, fueled by exogenous technological factors but they differ from each other in the probability that their new ventures will survive. Holmes and Schmitz investigate the circumstances under which entrepreneurs decide either to continue operating a venture or to transfer it to other entrepreneurs in order to release time and resources to explore new opportunities. They show that the least able types will only manage existing firms, while the most able individuals specialize in setting up new businesses. Those with intermediate ability optimally either manage the businesses they started or they replace them with higher quality businesses purchased from able entrepreneurs.

The model incorporates and extends the key ideas of Schumpeter and Kirzner about opportunity recognition and provides a basis for understanding why some individuals are portfolio entrepreneurs, while others become serial entrepreneurs or simply rely on buying businesses created by others.

The model developed by Kihlstrom and Laffont (1979) builds on an early insight by Knight by modelling entrepreneurial choice as trading-off risk and returns. It is assumed that a parameter representing risk aversion is distributed continuously across the workforce. The least risk-averse choose entrepreneurship and run the largest firms. Effectively, entrepreneurs provide income insurance to workers, and are rewarded by being residual profit claimants. The model explains the coexistence of firms of different sizes. Kihlstrom and Laffont showed that there is a welfare loss caused by a lack of risk-sharing and that in general the wrong (from a social welfare standpoint) number of individuals become entrepreneurs. This includes the case of too few entrepreneurs, which can be exacerbated if domestic entrepreneurs have to compete with more efficient foreigners. Efficiency losses of this kind are best addressed by creating risk-sharing mechanisms, such as a stock market.

The Stiglitz and Weiss (1981) model assumes asymmetric information, whereby entrepreneurs are better informed about their projects than banks are. Banks therefore have to offer the same debt contract to all loan applicants. Stiglitz and Weiss assumed that projects (or equivalently entrepreneurs) differ from each other in terms of risk, with some entrepreneurs operating risky and others relatively safe investment projects. Entrepreneurs running projects that turn out to be undesirably risky from the bank's viewpoint cannot be detected at the time loans are extended. This gives banks an incentive to set interest rates below market clearing levels and to ration loan applicants rather than to raise interest rates since the latter action would cause the bad risks to dominate borrowers which is because of credit rationing. Stiglitz-Weiss model implies that banks necessarily under-invest in entrepreneurial activities relative to the social optimum.

Hayward et al (2006) propose a hubris theory of entrepreneurship, wherein many new ventures are created in the shadow of high venture failure rates and more confident players start ventures. They act on such over-confidence when deciding how to allocate resources in their ventures. This confidence affects the manner in which they interpret information about their past and current ventures. The propensity to be overconfident to the decisions of the entrepreneurs may be related their decisions to allocate, use and attain resources. Entrepreneurs with greater socially constructed confidence tend to deprive their ventures of resources and resourcefulness which will increase the likelihood of failures.

The model of de Meza and Webb (1999) treats entrepreneurs to differ from each other in terms of expected returns, with the ablest entrepreneurs having the greatest probabilities of success. Ability is unobserved by banks, which have to offer a pooled interest rate. This makes

the ablest entrepreneurs to end up cross-subsidizing the least able, which induces individuals with socially inefficient investment projects into new ventures. De Meza and Webb show that neither credit rationing nor under-investment hold in this set-up. But there is always over-investment in the sense that too many entrepreneurial projects are undertaken. Everyone could be made better off if the least able entrepreneurs are discouraged from becoming entrepreneurs. By making credit more expensive to obtain, only the ablest entrepreneurs will be willing to pay for it.

Evans and Jovanovic (1989) develop a model of borrowing constraints, which has a much simpler structure assuming that entrepreneurs' wealth limits the amount of funds they are given. Entrepreneurs learn from a series of stochastic draws that come in from the market. Based on constantly arriving new information, entrepreneurs adjust their beliefs and their market strategies. Able entrepreneurs survive and grow, while the less able exit the market. Newer and smaller firms will have higher and more variable growth rates, and also higher exit rates than older and larger firms.

Similar to Schumpeter's, Klepper (1996) model showcases new firm entry and exit rates and seeks to explain the temporal pattern of innovations and market concentration as industries evolve. It can also explain why the pace and importance of major product innovations and new firm entries slow down as industries age, and the increasing importance of process innovations at later stages of the industry's life. Schumpeter's insights continue to be developed wherein patent races have emerged that make established firms fight against each other in the drive to discover new innovations that yield monopoly profits while rendering previous products obsolete. But as Bianchi and Henrekson (2005) point out, this race does not capture the existence of Schumpeter's entrepreneur who is termed as an extraordinary individual who is responsible for the innovation; instead the focus is on firms that devote resources to large-scale routinized R&D activities.

The contribution by Lazear (2002) contends that entrepreneurial selection and performance are guided by the mix or balance of skills held by individuals, rather than by specialized expertise. Lazear claims that entrepreneurs are jacks of all trades rather than specialized experts as are generally found in wage and salary work. Accordingly, if entrepreneurs have balanced skills sets, then industries, like art (which requires disparate skills including artistic talent and business management), are less likely to be populated by entrepreneurs than insurance, where the required skill set is more homogeneous. And if technological progress demands additional skill requirements, this may decrease the number of suitably equipped individuals and therefore the equilibrium number of entrepreneurs. However, technological change might also increase individuals' ability to acquire skills.

There is growing recognition of the importance of human capital to entrepreneurship. Moskowitz and Vissing-Jorgensen (2002) observe that entrepreneurs earn similar average returns to those obtained from publicly traded equity, yet with a much riskier profile. Human capital is

not put at risk when one becomes an entrepreneur, because future labour earnings are unaffected by the risk of the current business. Hence the risk of total net worth (which includes the present value of human capital) is much lower than of financial wealth alone. Parker and van Praag (2004) propose an extension of credit rationing model to unify the human capital and borrowing constraint literatures. Parker and van Praag predict that more highly educated entrepreneurs will face lower borrowing constraints, which endows human capital with both a direct and indirect effect on entrepreneurial performance. The direct effect is the rate of return to education and the indirect effect is enhanced performance via lower capital constraints that enable more productive capital to be obtained. The combined rate of return for entrepreneurs exceeds the average rate of return for employees, suggesting that highly educated individuals are well placed to become among the most successful entrepreneurs.

Although Krugman (1991) argues that knowledge spillovers diffuse easily and do not respect national boundaries, this does not rule out advantages deriving from geographical proximity, promoting spillovers and other benefits to small entrepreneurial ventures. These include networking, trust and co-operation, and social capital that all facilitate exploitation of new opportunities. Audretsch and Lehmann (2006) provide evidence that knowledge- and technology-based new ventures in Germany have a high propensity to locate close to universities in order to access knowledge spillovers. They find that firms locate closer to universities the more graduates they produce and the greater is the production of social science knowledge. The latter contains a greater proportion of tacit knowledge than natural science, which is more codified and hence can cross national boundaries more easily. Using hazard analysis, the greater the geographic proximity of the new venture to a university, the quicker the venture progresses from start-up to a stock market listing.

Birch (1979) highlights the superior job creation performance of small firms. Birch claims that during 1969-76, small firms employing fewer than 20 workers generated 66 percent of all new US jobs and firms with less than 100 employees accounted for 82 percent of net job gains. The implication was that the small firm sector was the primary engine of job creation. Bernhardt (2000) challenge that claim and argue that larger US manufacturing plants create (and destroy) most manufacturing jobs and there is no clear relationship between rates of net job creation and employer size. To OECD (1998), the share of jobs accounted for by small firms has increased since the early 1970s in most developed economies. As Schumpeter (1934) pointed out, innovation is a key aspect of entrepreneurship and a reason to encourage entrepreneurship might arise if small entrepreneurial firms are more innovative than large firms. According to Acs and Audretsch (2003) small firms contributed around 2.4 times as many innovations per employee as large firms did. They also noted that innovation in small entrepreneurial firms has different causes than those in large firms, responding more to the availability of skilled labour. Carroll and Khessina (2005) estimate that lower marginal income tax rates are significantly and substantially associated with both small firm growth rates (measured in terms of business receipts) and investment expenditures. Therefore, while it is true that more evidence on this issue is sorely

needed, the available evidence does indeed generally support the notion that tax cuts stimulate entrepreneurship.

It cannot be assumed that the unchecked market economy will always find the right balance between knowledge creation by scientists and knowledge exploitation by entrepreneurs. There might therefore be a role for government intervention to promote entrepreneurship as a growth-enhancing strategy. Here a crucial question is whether new small firms are best placed to exploit knowledge spillovers or whether incumbents can do as well or better (intrapreneurship). The presumption among small business and entrepreneurship practitioners is invariably that entrepreneurship is a good thing. Entrepreneurship is held to stimulate competition, create innovation and jobs, generate positive externalities and provide a way out of poverty and discrimination. If credit rationing and under investment exist, the free market will generate too little entrepreneurship. Therefore, government has to intervene to correct market failures and increase involvement in entrepreneurship to everyone's benefit. Weak entrepreneurs are effectively cross-subsidized by more able entrepreneurs because of asymmetric information. Everyone can be made better off if governments tax interest-bearing deposits to make capital more expensive. Entrepreneurship generates substantial benefits to the rest of the economy and society by intensifying competition, promoting innovation and knowledge spillovers and reducing social exclusion. Cost-benefit analysis has not been widely used to evaluate government entrepreneurship policies, where entrepreneurial learning has been very useful for characterizing certain aspects of industry. Alternative sources of funds can help entrepreneurs to bypass credit

1.8 Resume and Conclusion

While personal initiative and purposeful behaviour can be viewed as an entrepreneurial effort, many such initiatives fail. The archetype successful entrepreneur is supposed to characterize achievement motivation (McClelland, 1961) which facilitates the creation and development of enterprises in competitive environments. People with high n-Ach are known to seek and assume high degree of personal responsibility, set challenging but realistic goals, work with concrete feedback, research their environment and choose partners with expertise in their work (Kanungo and Bhatnagar, 1978). Such characteristics of high n-ach people contribute to successful completion of tasks that they venture to take up. Hence achievement orientation becomes a set of cognitive and behavioural tendencies that are oriented towards ensuring that outcomes such as enterprise creation, survival and growth are realized.

The context in which an individual brings to bear initiative, achievement orientation and visioning has a strong bearing on what it produces. When these forces are directed towards realizing surplus or value addition in a market environment, over a period of time, enterprises are created. This perspective of the entrepreneur as a merchant adventurer, who balances out imperfections in the market (Gopakumar, 1995) in pursuit of wealth, provides the historical basis

for the development of entrepreneurship. The wealth is seen as the reward the entrepreneurial individual gains for the risk taken or exercise of judgment where there is greater possibility for error. This distinguishes between certain return from wage labour, and return from risk-oriented production for the market. Hence opportunity seeking would include one's ability to see situations in terms of unmet needs, identifying markets or gaps for which product concepts are to be evolved and the search for creating and maintaining a competitive advantage to derive benefits on a sustained basis.

Schumpeter (1950) conceptualizes entrepreneurs as persons who are not necessarily capitalists or those having command over resources, but as those who create new combinations of the factors of production and the market to derive profit. In the process, Rostow suggested that countries go through five stages of traditional society, preconditions for take-off, take-off and drive to maturity and the age of high mass-consumption. While these stages are a simplified way of looking at the development of modern economies, they identify critical events. While Rostow focused on the age of high mass-consumption, Porter follows recent developments in the economics of innovation. Porter (1990) has provided a modern rendition of this approach by identifying three stages of development consisting of a factor-driven stage, followed by an efficiency-driven stage and then by an innovation-driven stage.

The factor-driven stage is marked by high rates of agricultural self-employment. Countries in this stage compete through low-cost efficiencies in the production of commodities or low value-added products. Almost all economies experience this stage of economic development. These countries neither create knowledge for innovation nor use knowledge for exporting. To move into the second stage, the efficiency-driven stage, countries must increase their production efficiency and educate the workforce to be able to adapt in the subsequent technological development phase. The preconditions for take-off play a crucial role. The drive to efficiency describes the first transition that is predominantly institutional in nature. To compete in the efficiency-driven stage, countries must have efficient productive practices in large markets, which allow companies to exploit economies of scale. Industries in this stage are manufacturers that provide basic goods and services. The efficiency-driven stage is marked by decreasing rates of self-employment. In the efficiency-driven economy capital and labor play a crucial role in productivity and the focus is on technology, in the decision making process.

The transition to the innovation-driven stage is characterized by increased activity by individual agents. In the innovation-driven stage knowledge provides the key input. In this stage the focus shifts from firms to agents in possession of new knowledge. The agent decides to start a new firm based on expected net returns from a new product. The innovation-driven stage is biased towards high value added industries in which entrepreneurial activity is important. Institutions dominate the first two stages of development. In fact, innovation accounts for only about 5 percent of economic activity in factor-driven economies and rises to 10 percent in the

efficiency driven stage. However, in the innovation-driven stage when opportunities have been exhausted in factors and efficiency, innovation accounts for 30 percent of economic activity. An S-shaped relationship (Acs and Szerb, 2010) between entrepreneurship and economic development develops because in the first transition stage entrepreneurship plays a minimal role in productive entrepreneurship. It increases in the efficiency-driven stage. In the process of transition from the efficiency-driven stage to the innovation-driven stage (the knowledge-driven stage), entrepreneurship plays a more important role increasing at an increasing rate and then leveling off as economies become fully developed.

Entrepreneurs go through three stages in the process of creating their ventures. First is the concept formation stage where ideas are generated and the innovation and opportunity are identified and the business begins to take shape. Second, a resource gathering stage where necessary resources are brought together to launch the new business and in the third stage the organization itself is actually created. Entrepreneurs must also be able to balance their managerial duties with leadership activities. In other words, they have to be able to handle both the day-to-day operations of the business as well as decision making obligations that determine the organization's long-term goals. Entrepreneurs must be both managers and visionaries in order to build their organizations. Many entrepreneurs fail because they are unable to strike an appropriate balance between details of management and the larger mission that guides the new ventures. Many entrepreneurs eventually reach a point where they realize that these twin obligations cannot be fully met alone. Entrepreneurs have to delegate some of their management tasks rather than their leadership tasks. In most cases the new business has long been far more dependent on its founder's leadership and vision than on his or her ability to monitor product quality or select new companies.

The system of entrepreneurship that evolved in the US has been quite successful, having considerable applicability to other technologically advanced countries like Germany and Japan, which need more economic dynamism. However, the role for individual entrepreneurs and the public policies necessary to support this role are somewhat different in the developing countries. In advanced countries, most resources are already in use or near their highest value use and any further increase in their productivity would require new technologies. In the US, small businesses started by individual entrepreneurs and the initiative of large established companies have played complementary roles in developing ultra new technologies.

In a developing country like India, value system and cultural issues hold their importance in any entrepreneurial development, besides infrastructural development. Any innovation to succeed needs to be accepted by social system and cultural issues. It can be argued that acceptance by the mass in itself is a kind of social innovation. Where the population is more concerned about making both ends meet, entrepreneurial activity will achieve sustainability only when support is provided both at the societal and governmental levels. The second chapter will discuss the evolution of entrepreneurship in India, a developing economy.

Chapter 2

The Evolution of Entrepreneurship Development in India

2.1 Introduction

Entrepreneurial development in India relies on generational mentoring, family business skill set, and exploration of technological progress. The know-how of skills, learned and refined over generations, leads to sustained development that is then converted into technology. Inheritance is one aspect that plays a major role in skill development. The transformation of skill into a technological component paves the way for the successful entrepreneurship. The spark initiated through inherited skill sets and ignited through the addition of technology results in useful entrepreneurial value. The basic societal needs remain the same while the trends take a changed form with the advent in technology. This requires the conversion of the time-honored skills through adaptation of the technological exponent in the changing societal trends.

This chapter documents different works on the evolution of entrepreneurship in India during the pre and post-independence periods. Section 2.2 describes the nature of business enterprising as obtainable from the middle ages down to the pre-independence period. Section 2.3 summarizes the essentials of entrepreneurship in the traditional Indian society as evidenced by the first author (Tabe, 1970) in his earlier work. Section 2.4 discusses the post-independence experience regarding the growth of entrepreneurship in the country and the various factors involved in the process. Section 2.5 showcases the current scenario, taking cue from the global entrepreneurship monitor, while section 2.6 summarizes.

2.2 Business enterprising in the past

Since ancient times, Indian products have made their way to markets abroad. Muslin from India was used by the Pharaohs for Egyptian mummies. Value systems and cultural norms affect the acceptability and perceived utility of entrepreneurial activity. Thus, whereas Western culture tends to encourage the drive to achieve that McClelland (1961) found to be a key aspect of the entrepreneurial personality, the Indian culture consists of a network of beliefs that in many ways counter entrepreneurship development. For example, Indians believe that being passive and content with the status quo is healthier for the inner soul than striving to improve one's situation. They believe that peace of mind can be achieved from spiritual calm rather than from materialism. Work, in and of itself, is not valued in India and is done with involvement only when done for a nurturing superior; otherwise, it gets perfunctory attention (Sinha, 1990). People in India perform their work only as a favor to their employer (McClelland, 1965). In India, much

energy and creativity (which may have been manifested in entrepreneurial behavior in the context of a different culture) is redirected toward aligning oneself with the environment status quo (accepting destiny). As Kahar (1978) explains, people are more sensitive to emotional affinity in the workplace than toward work and productivity.

When a culture is such that people are conditioned to believe in an external locus of control, self-efficacy may be low, resulting in low levels of entrepreneurial effort. Many researchers have found correlations between self-efficacy and subsequent task performance (Bandura, 1982). In India, an external locus of control has been reinforced by the caste system, which has impeded class mobility for centuries. Gadgil (1959), Medhora (1965) and Weber (1958) have observed that the caste system and its series of obligations reinforce the practice of following a family occupation rather than launching a new venture. Entrepreneurs tended to belong to communities in which caste divisions were not rigidly observed (Nafziger, 1971). Nafziger recounts that Virji Vora, the 17th century merchant prince of Surat, Gujarat had enormous liquid capital and dealt in goods of various descriptions. His mercantile operations were spread far and wide. Whenever the English East India Company needed loans, it approached Vora who would gladly advance funds at exorbitant rates of interest. His position in the market was unassailable, but there is nothing to suggest that the enormous profits he earned were utilized either for diversification or manufacturing.

There were other ethnic businessmen who limited themselves to the kind of activities in which the above Surat merchant prince was interested. The Jagat Seths, who flourished in the early half of the 18th century in the eastern part of India, depended mainly on money lending and amassed a huge wealth. They supported the English in their economic and political activities and were a decisive factor in the turn of events which gave Bengal to the British in 1757. The *seths* were the collectors of revenue to the Nawab of Bengal during the pre-Plassey days. They lent their support to the British probably without realizing that the emergence of the British as a territorial power would end their main source of profit. Thus the traditional mercantile classes dominated the business and commercial activities almost till the onset of the 19th century but they introduced no qualitative change in the business practices of their forefathers and that they remained wedded to liquidity preference. There is no evidence to suggest that occupational division, sanctioned by the caste system, underwent any change (Tripathi, 1971).

Max Weber (1930) and later writers have pointed out the negative elements in the Hindu value system. The Weberian approach presupposes that there is a single system of Hindu values and that this was all-pervasive and influenced the behaviour and values of the followers of other Indian religions including Islam. The Indian community internalized these values and translated them into daily behaviour and these values remained insulated against external pressure and change. However, it is difficult to identify a single Hindu value system and it is doubtful whether the Jain ethics which, according to Weber, approximated Protestant ethics would have instilled among the Jains a spirit of enterprise. Jainism, with its stress on *aparigraha* (non-attachment),

ahimsa (non-violence), *aasteya* (non-stealing), and *brahmacharya* (desirelessness for sensuous pleasure), is neither less ascetic nor less other-worldly than Hinduism (Tripathi, 1971). The fact that the business behaviour of the Jains in India was at variance with the essence of their faith might indicate that they did not practice the values which Jainism stressed. As a matter of fact, the behaviour of businessmen throughout the world justifies the impression that their business ethics and values do not necessarily conform to their personal ethics or religious values. In most cases there is a contradiction between the business ethics and the personal ethics of businessmen. This would have been true of the mediaeval Indian businessmen.

The European travellers have testified that Indian merchants were as shrewd that they possessed in plenty business acumen and judgment and that they were not inferior in any respect to their Western counterparts including the Jews. Their practices and attitudes find sanction neither in Hinduism nor in Jainism. Obviously, these men, while clinging to religious rituals in their personal lives either deviated from the spirit of their faiths or interpreted them anew to suit their business practices and activities. In other words, there was substantial difference between the formal expression of ideas as contained in the scriptures and the practices of these men. This may also be true for the rest of the society (Tripathi, 1971).

Whereas the behaviour of the mercantile communities was not very entrepreneurial in the modern sense, the non-mercantile communities did not break the occupational barriers as imposed by the caste system sanctified in the scriptures. Environmental changes in a society may force reinterpretations and readaptations of religious and cultural beliefs. This is what happened in Japan and in Western societies of today, wedded to religions which were neither less other-worldly nor less spiritualistic than Hinduism. An effective communications system is an obvious prerequisite for entrepreneurial growth and India lacked it. The existence of innumerable systems of currency was another adverse factor (Tripathi, 1971). Some of these depreciated in value every two or three years and in the absence of any effective and clear cut system of exchange, bankers and money lenders fixed their own arbitrary exchange rates. Even the regional markets were plagued by unpredictable and arbitrary interference by the political authorities.

Commenting on Hindu education in about 1000 A D, Al-Beruni said that the Hindu people kept themselves aloof from the outer world and were ignorant of the arts and sciences of the West (Tripathi, 1971). The situation was still the same 800 years later. The educational system reinforced the occupational structure as it was sanctified in the caste system. Secondly, business was held in low esteem in India throughout the period. Kautilya's belief that a businessman was a thief but was not called so seemed to have become commonly held view in later years. A weak economic infrastructure, like the one that prevailed in pre-1800 India, was capable of offering little or no inducement for a major entrepreneurial breakthrough to those who were already in business. Again, it was not tempting enough for non-commercial classes to give up their traditional professions (Tripathi, 1971).

According to McClelland (1961), entrepreneurial response, as distinct from adventure or gambling, consists in moderate risk engendered by a combination of achievement motivation and expectancy of reward. It is the low expectancy of reward, more than anything else, which explains the business behaviour and occupational structure in pre-British India. The British occupation of Bengal facilitated the operations of British free merchants and the entry of the company's servants into mercantile activities. Their methods were dubious, exploitative, and arbitrary; but there is no doubt that the British displayed greater aggressiveness, drive and imagination in their business tactics, because the British environment in which they had grown up had endowed them with a superior entrepreneurial initiative. The agency houses were established in the presidency cities of Calcutta, Bombay and Madras during the last decades of the 18th century as supportive of British firms in London. The original purpose of these establishments was to facilitate remittances of money to England by Englishmen residing in India. But since this in itself would yield little profit, these houses entered trade and commerce and added European banking and steam shipping. The number of such houses increased and their activities expanded after the East India Company lost its monopoly of the India trade in 1813. In the wake of the Industrial Revolution in Britain, the agency houses and the free merchants opened up new vistas for business by indicating that India had vast untapped natural resources waiting for exploitation. They financed and promoted indigo plantations, participated in the risky business of coal mining, established leather manufacturing and steel-making. The growth of secular education and spread of Western ideas led to the establishment of the Brahmo Samaj in the cultural field and in the economic field the non-commercial classes were encouraged to look at the opportunities for gain more (Tripathi, 1971).

Dwarkanath Tagore, an enterprising businessman of Bengal had great sympathy for Western ideas and culture. He welcomed British rule as a great blessing and supported the Brahmo Samaj movement. After the fall of the agency houses in Bengal, as a result of the depression of 1829, Tagore proceeded to fill the vacuum. He founded the Carr Tagore Company jointly with William Carr to participate in the same kind of activities which had remained in the hands of the agency houses (Tripathi, 1971). He established a bank, a steamship company and a colliery and promoted a host of minor ventures. Tagore belonged to a big landlord family and it is possible that the permanent settlement, introduced in Bengal during the closing decades of the 18th century, had improved his financial position and so enabled him to promote his business ventures. Between 1834 and 1847, a host of partnership ventures were started jointly by Bengalis and Englishmen. Those who participated in these ventures were ideologically and culturally close to the English either by personal contact or by education. Probably safe in their traditional lines of money-lending and trade, the traditional business classes, with little contact with new values, refrained from entering the more challenging fields. The partnerships remained confined to the lines made relatively familiar by the agency houses or free merchants.

The English East India Company had established tea gardens in Assam in 1830s to demonstrate the capability of India to produce tea and with the declared intention that the

gardens would be handed over to private enterprise in due course. In 1837, the company was ready to fulfill this promise, but Bengali businessmen felt reluctant to take advantage. Dwarkanath Tagore and a few of his associates made some attempts to form the Bengal Tea Association, but uncertain about the future they gladly stepped aside when some Englishmen established the Assam Company in 1838 in London to exploit the tea resources of Assam. Not in all cases did the founders of British enterprises in India have access to sufficient capital. Most of them were people of moderate means and a large number of firms which later developed into huge empires had humble beginnings. Their success, however, was the result of use of superior British technology and their managerial skills were reflected in their success in floating one enterprise after another by ploughing back profits and in cooperation with other ambitious individuals. In the process of doing the latter, they developed the unique managing agency system (Tripathi, 1971). Thus the activities of the British entrepreneurs in India pointed to increasing business opportunities, gave the Indians a form of corporate management, brought them face-to-face with superior technology and contributed to their capacity to borrow it by ensuring the availability of personnel to handle the new machines. The plantation and generated the facilities which the national government provided for indigenous ventures which gave a push to entrepreneurial upsurge.

While the established business groups responded to the new opportunities by diversifying their activities and entering into foreign collaboration to exploit the relatively less familiar fields, others began to enter into diverse undertakings. Owing to changes in the material environment, the Hindu value system transformed itself to permit the entry of non-business classes into industrial ventures. Hinduism was not immune to external influences, nor had the Indians internalized its value system to such an extent as to withstand the pressure of profitable opportunities which emerged in the wake of material changes (Tripathi, 1971).

The demand for Indian goods in Europe was great in the 17th century due to the exploits of East Indian companies (Tripathi, 1971). Since the demand for European goods in India was limited, the balance of trade always remained in favour of India. In spite of the restrictions imposed by several European governments against the export of bullion from their respective countries, these companies had to import treasures into India to finance their operations. The British government revised its customs regulations in 1700 and then in 1720 to discourage the use of Indian textile goods in Britain. The activities of the Europeans resulted in net economic gain to India and a large portion of these gains went to the mercantile classes. The weavers, who used to manufacture the textile goods in which the Europeans were mainly interested, were too poor to finance their operations. They depended on the mercantile communities for capital who advanced funds under a system of contract which precluded any marginal profit accruing to the manufacturers. The mercantile communities used their gains to finance their traditional activities like trade and money-lending

Although colonialism provided opportunities for Western entrepreneurs, colonial government was rarely an agent of expatriate enterprise or metropolitan industries (Hopkins, 1987). Goswami (1985) finds that the rise of *marwari* businessmen in Eastern India began well before Independence and that the political history of late colonialism was only loosely connected to business history on the subcontinent. Entrepreneurship flourished among ethnic minorities which formed special links with colonial authorities, such as the *parsees* in nineteenth century India or the Chinese (Dobbin, 1996). The Jains have long been a trading community, not out of an entrepreneurial spirit based on materialism, but rather because trading was an occupation that kept them relatively free from conflict with the requirements of their religious practices. The *marwaris* (formerly known as *baniyas*) are a non-Bengali caste specializing in domestic trade. Their enterprises have complemented those of English entrepreneurs had become prominent in a diversified industrial economy (Medhora, 1965).

The colonial regime in late 19th century India differed radically from that of its exploitative predecessor a hundred years previously (Jones and Wadhwani, 2007). While traditional Indian handicraft industries were forced to compete with Lancashire textiles because of British free trade policies in the nineteenth century, by the interwar decades British India was protectionist, including against British imports. Moreover the impact of colonialism was multifaceted. It provided a channel for entrepreneurs in colonies to acquire international knowledge and access international markets, although within a context of institutional racism (Tripathi, 2004). This may have been important factor in affecting entrepreneurial recognition. Entrepreneurs who were not white men from the rich Western European and North American countries might have felt less qualified to pursue opportunities, even if there were none. In contrast, other groups of Indian entrepreneurs had experiences of another kind. During the 1800s, the British discriminated against those communities that competed with English entrepreneurs in international commerce. Many Indian entrepreneurs were thus forced out of business. During the 1880s, local firms with established reputations were defrauded by British partners, an action which led to more withdrawals from the business sector. Nafziger (1971) comments that lack of indigenous entrepreneurship had resulted from the discrimination and duplicity of the colonial rulers. After the independence however, the ‘tryst with destiny’ did not promise the encouragement of private enterprise in the beginning. Anything that was small and tiny was allowed to be played in the private sector and everything that mattered in the Indian state would remain in the hands of the public sector.

Regarding the occupational division as sanctified by the caste system among the Hindus, it remained more or less intact. There was no evidence to suggest any major innovation in the field of agriculture or any other sector of the economy. Social and occupational mobility, which was much easier during the early days, became increasingly difficult. As a result, commercial activities became a monopoly of the *vaishya* sect. The other three Hindu varnas, the *brahmana*, the *kshatriya* and the *shudra* never became interested in trade and commerce even when India had extensive commercial relationship with many parts of the world, particularly with the

countries of South-East Asia. The beginning of European commercial enterprise in India in 1600 did not disturb to any substantial degree the occupational basis of Indian society, nor did it effect any qualitative change in the activities of the commercial classes.

2.3 Overview of the traditional Indian society and entrepreneurship development

This section purports to summarize the views of the first author as in his 1970 book on entrepreneurship in the traditional Indian society. Nakamura (1981) finds that in the traditional Indian society, the interest rates charged to different castes varied from 2 to 5 percent, which indicates the absence of economic factors in entrepreneurship development. Further, interest rates varying among the different business communities led to economic separation, where small business communities were divided along religious and social classes (Ito, 2001). In spite of this separation, the *parsis* were able to create the Tata business combine, though there were no comparable Hindu business combines. Ray (1992) emphasizes on the enterprising spirit of the *parsis*, who 'are highly Britonized. The Gujaratis are cold-hearted and selfish.' Indeed, the *parsis* have grown into the richest group of entrepreneurs in India through their participation in opium and yarn trade with China and were able to control Bombay business by the mid-19th century, which enabled them to develop into leading industrial combine.

Unlike the conservative Gujaratis of Ahmedabad, Gujaratis of large cities were diligent and adventurous and following the example of the *parsis* were venturing into new business combines. The 'clever and sensitive' Bengalis, owing to their affinity with the colonialists were able to amass wealth and start new businesses. If we look into the basic differences between Calcutta (the first trading capital of East India Company) and Bombay (the trading capital of India in later days), the differences in their functioning become very clear. Under the prevalent managing agency system, capital was raised within a particular business group based on the credit standing of a small number of capable entrepreneurs, who controlled their enterprises. Each business group developed itself into a trust based on family ties, which aspect has greatly diminished in importance in recent times.

Big cities provided prospective businessmen the opportunities for their growth and determined the nature of domestic consumption in the light of import of British goods. The British way-of-life became common amongst the high-income classes, with its own demonstration effect. As the cities expanded, factory system of production was adopted, leading to a different mode of commodity consumption, as distinct from the traditional way in the rural areas. While the city-made goods would be available everywhere, the artisanries were consumed mainly in the rural areas. The factory products and the rural traditional products in a way performed different roles in the lives of Indian people (Morris, 1967). However, the picture is fast changing with the impact of urbanization and industrialization which are changing the rural

consumption habits very much. The retarding caste system has resulted in a high proportion of people (especially in rural areas) living below poverty line.

The towns of Navsari (in the hinterland of Bombay and the Mecca of *parsi* community) and Murshidabad (in the hinterland of Calcutta where the *marwaris* were expanding their influence into that city) can be compared in respect of consumption differences (Tabe, 1970). Navsari was a cotton centre, while Murshidabad was a silk trading centre. While the kinds of products supplied by handicrafts industry varied according to castes, their distribution and consumption were also on caste lines. In Navsari, the *parsi* entrepreneurs effected the substitution of traditional products by new products which were cheaper as a result of large scale production.

Murshidabad had many silk centres and it was a major East India Company commercial centre that Lord Clive compared the town to London and declared that if the rich inhabitants wanted to expel the Europeans there, they could have done at any time they wished (Tabe, 1970). However, the present day Murshidabad presents a dilapidated and a deprived rural caricature owing to its neglect. On the other hand, a village named Surul, which was in the same district as that of Murshidabad was able to adapt to the colonial demands and prospered by indigo trade. Ranade (1898) points out the absence of individual rationalism, prevalence of personal tie and lack of competition in Indian society as contrast to the west. The social inertia resulted in inflexibility in the supply of factors of production according to him.

Tabe (1970) analyzes the structure of opportunity available for entrepreneurial development in India from 1854 (when the first cotton mill was established) to 1914, interwar period and from 1940 to independence. The occurrence of economic opportunity took place that it almost coincided with the changes in the political situation and industrial policy of the government. The *marwari* community of Calcutta controlled the economic activity of east India. They were regarded as 'northern imperialists', being shunned by the locals. The *marwari* group of Calcutta had developed from the merchant class of Rajaputana, *marwadi mahajan*. After using Murshidabad as their base, they slowly penetrated into Calcutta. The *marwaris* and the *baniyas*, the other business class grew into powerful communities. As they extended their influence, they came into close contact with the imperialists in both economic and political activities. However, the alien culture and profit-seeking attitude of the *marwaris* earned the wrath of local politicians and public.

Entrepreneurial activity was mainly confined to particular communities, which were restricted by caste belongingness. The factors that enabled the entrepreneurs to carry on their businesses included intuition and the ability to utilize the opportunities. They were termed a 'political merchants' in view of their connection with the colonialists. The motives and profit seeking activities were entirely different from those in the post-independence period. If a

comparison is made of the value standards of Japanese businessmen in the Meiji period with their Indian counterparts, it seems that the system that prevailed among the Zaibatsu business combine was characterized by protestant ethical functions and public interest orientation. They turned to recruitment and promotion by ability and merit as a management technique to survive (Lockwood, 1954). This will explain why the entrepreneurial system emerged in Japan quite early, when compared to that of India.

The Birla combine of the *marwari* community is characterized by solidarity of family ties and has been mainly involved in the production of consumption goods. Its proposal for construction of a steel plant was rejected by the government in 1954 which resolved that only government can undertake new steel plants. B M Birla had explained to the estimates Committee of the Parliament that the negotiations for British aid was satisfactory and that the costs would be lower than that under any government venture of similar type.

The nationalism movement resulted in a 'decolonial motive' wherein the entrepreneurs were expected to carry out their activities in tune with the existing public interest provided for by the new dispensation and they were to see to it that their activities will further the interest and promote the prosperity of the business combines they belonged to. This has to be contrasted from the 'pro-colonial motive' of enriching both the enterprise and the society by availing of opportunities created by the colonialists.

Many business combines of today had their origins in the 17th century. These castes achieved their growth by associating themselves with the Portuguese, Dutch and French business houses operating in important trading centres. After the British domination, these merchants continued their activities entering into close association with British capital. Hence their profit-seeking interests were in contradiction with the national spirit of the intellectual class. That the entrepreneurs had deliberately separated their economic and political activities to enable their communities to prosper is significant when compared to that of industrialized countries.

2.4 The post-Independence period

India's economic development strategy immediately after Independence was based primarily on the Mahalanobis model, which gave preference to the investment goods industries sector, with secondary importance accorded to the services and household goods sector (Nayyar, 2008). For example, the Mahalanobis model placed strong emphasis on mining and manufacturing for the production of capital goods and infrastructural development (including electricity generation and transportation). The model downplayed the role of the factory goods sector because it was more capital intensive and therefore would not address the problem of high unemployment in India. Any increase in planned investments in India required a higher level of savings than existed in the country. Because of the low average incomes in India, the needed higher levels of savings had to be generated mainly by restrictions on the growth of consumption

expenditures. Therefore, the Indian government implemented a progressive tax system not only to generate the higher levels of savings, but also to restrict increases in income and wealth inequalities. Among other things, this strategy involved canalization of resources into their most productive uses. Investments were carried out both by the government and the private sector, with the government investing in strategic sectors (such as national defence) and also those sectors in which private capital would not be forthcoming because of lags or the size of investment required (such as infrastructure). The private sector was required to contribute to India's economic growth in ways envisaged by the government planners. Not only did the government determine where businesses could invest in terms of location, but it also identified what businesses could produce, what they could sell, and what prices they could charge.

Thus the strategy of economic development in India meant direct participation of the government in economic activities such as production and selling and regulation of private sector economic activities through a complex system of controls. In addition, the Indian economy was sheltered from foreign competition through use of both the 'infant industry argument' and a binding foreign exchange constraint. Imports were limited to goods considered essential either to the development of the economy (such as raw materials and machines) or to the maintenance of minimal living standards (such as crude oil and food items). It was further decided that exports should play a limited role in economic development, thereby minimizing the need to compete in the global market place. As a result, India became a relatively closed economy, permitting only limited economic transactions with other countries. Domestic producers were sheltered from foreign competition not only from abroad but also from within India itself.

India created a large number of government institutions to meet the objective of growth with equity. The size of the government grew substantially as it played an increasingly larger role in the economy in such areas as investment, production, retailing, and regulation of the private sector. For example, in the late 1950s and 1960s, the government established public sector enterprises in such areas as production and distribution of electricity, petroleum products, steel, coal, and engineering goods. In the late 1960s, it nationalized the banking and insurance sectors. To alleviate the shortages of food and other agricultural outputs, it provided modern agricultural inputs (for example farm machinery, irrigation, high yielding varieties of seeds, chemical fertilizers) to farmers at highly subsidized prices (World Bank, 2001). In 1970, to increase foreign exchange earnings, it designated exports as a priority sector for active government help and established, among other things, a duty drawback system, programmes of assistance for market development, and 100 per cent export-oriented entities to help producers export. Finally, from the late 1970s through the mid-1980s, India liberalized imports such that those not subject to licensing as a proportion to total imports grew from five per cent in 1980-1981 to about 30 per cent in 1987-1988 (Pursell, 1992). However, this partial removal of quantitative restrictions was accompanied by a steep rise in tariff rates.

This active and dominant participation by the government in economic activities resulted in the creation of a protected, highly-regulated, public sector-dominated economic environment. Along with this government domination of the economy, India soon faced not only some major problems in its overall approach to development, particularly in the area of industrialization (Ahluwalia, 1985), but also a dramatic increase in corruption in its economy. Finally, like any other growing economy, the Indian economy faced a number of serious sectoral imbalances, with shortages in some sectors and surpluses in others.

Business people bribed government officials not only for the right to enter a particular line of business, but also to prevent others from entering that same line of business. Government officials made payoffs to politicians to receive the premium government positions that would allow them to easily contact businesses to seek illegal income and wealth. Indeed, as Wade (1990) indicates, those officials could earn far more through bribes and other corrupt behaviour than they could earn in salary. Consumers bribed government officials, politicians, and business people to receive a particular amount of a scarce good or a higher quality version of the good. Even individuals and organizations outside India took part in the corruption. Some bribed both officials and politicians, particularly those connected with the revenue and police departments, to smuggle scarce goods into India at a high profit.

The complex system of government controls, including price ceilings, along with the resultant corruption, meant that decision making was arbitrary and the transactions non-transparent. The result was an increase in transaction costs. For example, businesses had to spend more to “stay connected” with appropriate government officials and politicians. And consumers, in addition to waiting in line to purchase needed products and services, also made illegal payments for what they should have received at a reasonable price in the first place. It has already been explained how India’s government grew in size as it played an increasing role in controlling the economy. It grew even further in trying to be appropriately vigilant in dealing with the increased corruption among government officials, businesses, and other participants. Price controls were only one example of the regulated economic environment. Another example of a harmful policy was the control of ownership of private capital (both income and wealth) by Indian nationals in India and also by foreign nationals doing business in India. Such policies, coupled with high individual and corporate income tax rates and high customs and excise duties, led to outcomes similar to those resulting from price ceilings namely, increased corruption and higher transaction costs.

The progress of Indian economic development provides further evidence that individuals do respond to incentives in their pursuit of self-survival and accumulation of wealth. Further, the nature of this response depends on the economic climate, particularly the role of the government. India’s economy struggled as long as it was based in a system of government regulation with little interaction with economic forces outside the country. The economic reforms of the early 1990s set the stage for substantial improvements in the Indian economy. As was stated earlier,

India's economy grew at an average of 6.3 per cent from 1992-1993 to 2000-2001 (Acharya, 2001). Further, its rate of inflation and fiscal deficit both decreased substantially (Bhalla, 2000). Improved exchange rate management led to improved financing of the current account deficit and higher foreign exchange reserves. Finally, India's GDP and per capita income both increased substantially from 1990 onwards.

The strategy of economic development in India meant direct participation of the government in economic activities such as production and selling and regulation of private sector economic activities through a complex system of controls. In addition, the Indian economy was sheltered from foreign competition through use of both the infant industry argument and a binding foreign exchange constraint. Imports were limited to goods considered essential either to the development of the economy or to the maintenance of minimal living standards. It was further decided that exports should play a limited role in economic development, thereby minimizing the need to compete in the global market place. As a result, India became a relatively closed economy, permitting only limited economic transactions with other countries. Domestic producers were sheltered from foreign competition not only from abroad but also from within India itself.

The Nehruvian legacy

Jawaharlal Nehru, the first prime minister of independent India strongly believed that entrepreneurs should focus their efforts on nation building rather than selling products or competing with each other, because he felt that it did not directly contribute to this cause. To ensure that the concept of nation building was properly enforced by all business owners, Nehru made sure that every entrepreneur received a certified nation building licence from the relevant licence officer. He also put forth a rule stating that only two to three companies could be granted a licence within the same industry, greatly limiting the possibility of establishing competition.

In addition, Nehru wanted industries to be located all over India, rather than be positioned at select industrial clusters which would ensure a balanced industrial growth. Therefore, he passed laws requiring entrepreneurs to obtain a location permit prior to the start of their company. In order to avoid capitalistic monopolies, Nehru stated that companies should obtain licences to expand their production capacity. To prevent money laundering within companies, Nehru made it mandatory for the excise and licensing officials to visit and audit every company each year in order to ensure quality assurance. All of these strict regulations had their problems as well. Not only did every entrepreneur need to obtain multiple licences but the government officers who were in charge of overseeing all licensing aspects were underpaid and eventually resorted to bribery and corruption. This led the entrepreneurs in paying bribes in order to acquire the necessary licences.

The size of the government grew substantially as it played an increasingly larger role in the economy in such areas as investment, production, retailing and regulation of the private sector. For example, in the late 1950s and 1960s, the government established public sector enterprises in such areas as production and distribution of electricity, petroleum products, steel, coal and engineering goods. In the late 1960s, it nationalized the banking and insurance sectors. To alleviate the shortages of food and other agricultural outputs, it provided modern agricultural inputs (farm machinery, irrigation, high yielding varieties of seeds, chemical fertilizers and plant protection chemicals) to farmers at highly subsidized prices. In 1970, to increase foreign exchange earnings, it designated exports as a priority sector for active government help and established a duty drawback system, programmes of assistance for market development and 100 per cent export-oriented entities to help producers export. Later, the government liberalized imports such that those not subject to licensing as a proportion to total imports grew from five per cent in 1980-1981 to about 30 per cent in 1987-1988 (Pursell, 1992). However, this partial removal of quantitative restrictions was accompanied by a steep rise in tariff rates.

Situations got so precarious that even business owners had to obtain a government licence just to meet with foreign business delegates in other countries. During those times, entrepreneurs debated on the ideas that mostly involved cornering manufacturing or importing licences. This sort of business environment offered absolutely no incentive to invest time in technical innovation to reduce manufacturing costs or even offer better quality products and services since one could get far higher results by influencing the customs or excise officer to classify a product under a category that attracted a lower rate of duty. Realizing that the existing economy was in dire crisis, Indian business practices began changing in 1991 after extensive economic reforms. Rapid economic growth has resulted since the removal of the license raj.

India's economy struggled as long as it was based in a system of government regulation with little interaction with economic forces outside the country. As a matter of fact, India was branded as a stagnant economy with the 'Hindu rate of growth' of 2.5 percent for long, wherein entrepreneurial development was also stunted. The economic reforms of the early 1990s set the stage for substantial improvements in the Indian economy. India's economy grew at an average of 6.3 per cent from 1992-1993 to 2000-2001) as contrasted to just around 2.5 percent earlier (Acharya, 2001). Further, its rate of inflation and fiscal deficit both decreased substantially improved exchange rate management led to improve financing of the current account deficit and higher foreign exchange reserves (Bhalla, 2000).

In the past few years entrepreneurship in India has slowly taken off. Indian engineers who migrated to the United States in the eighties have found the U.S. to be a haven for entrepreneurial pursuits and have become highly successful in their respective fields. They initially started high technology product companies in Silicon Valley that primarily focused on solving critical market problems. Most of these Indian entrepreneurs, after making fortunes by

excelling in their respective market segments, started helping entrepreneurs in India with start-up companies.

The successful implementation of technologies that are new to India will almost certainly require a host of new complementary goods and services to make them suitable for local use. Individual entrepreneurs who have a comparative advantage in conducting low budget experiments can play a critical role in developing such small-scale complements, many of them unique for a developing economy. Large companies may have an advantage in acquiring and implementing modern technologies to build automobiles. However, the widespread diffusion of the new automobiles requires a host of new distribution and servicing outlets. Individual entrepreneurs may enjoy advantages in starting these outlets.

2.5 The current scenario

India was second among all nations in Total Entrepreneurship Activity (TEA) as per the Global Entrepreneurship Monitor Report of 2002. But after several years of data, India appears to have a TEA level rather close to the world average. India is ninth in the Global Entrepreneurship Monitor (GEM) survey of entrepreneurial countries. It is highest among 28 countries in necessity-based entrepreneurship, while 5th from the lowest in opportunity based entrepreneurship. The liberalization, which was started in 1991, and the Information Technology boom of the mid-late 90's, has been significant factors, leading to a wave of entrepreneurship sweeping through the country. The society and government are not very encouraging towards entrepreneurship. To a large extent, the Indian society is risk averse. People usually seek secure and long-term employment, such as government jobs. The physical infrastructure needs to be improved. Social Attitudes, lack of capital, inadequate physical infrastructure and lack of government support are major factors of hindrance.

The liberalization of the economy in the 1990s has paved the way for a huge number of people to become entrepreneurs. Over the years India and China have followed opposing strategies for development. While China's growth has been fuelled by the heavy dose of foreign direct investment, India has followed a much more organic method and has concentrated more on the development of the institutions that support private enterprise by building a stronger infrastructure to support it. Its corporate and legal systems operate with greater efficiency and transparency than do China's. The Government has encouraged entrepreneurship by providing training and also the facilities to succeed, particularly in the rural areas. One style of innovation that really works in a country as large and diverse as India, is grassroots innovation: this includes inventions for a milieu that is quintessentially Indian.

The post-liberalization and globalization era has brought with it a growing middle class - roughly estimated to be 300 million and rising disposable incomes. This presents a huge potential and entrepreneurs can make the best of this by catering to various demands of this

segment. India, with its abundant supply of talent in IT, management and R&D, has become a major outsourcer of services from all parts of the globe where companies can reduce their costs, but not their quality. In terms of improvement, there needs to be an increase in the quality and quantity of venture capital and angel investors. While there is an apprehension that Indian education system does not encourage independent thinking, the social system has discouraged risk-taking and punishes failure. Therefore, young people in India are encouraged to settle down into safe careers with large corporations. The adventurous few who do step off the corporate ladder face several problems on their entrepreneurial journey. Foreign venture capitalists either do not understand the Indian market or do not give it sufficient importance. The venture capitalists who do invest in India are risk-averse and unwilling or unable to offer the right size of investment at the right stage. Even the few startups that do get the right funding at the right time quickly run into problems. They fail to attract the right employees, or are unable to work with large corporations, or get bogged down in antiquated government regulations.

2.6 Conclusion

One is more likely to become an entrepreneur if someone in one's environment is or has been one, one's father for instance or some other family member. In understanding cases of successful and unsuccessful technology entrepreneurship in developing economies one needs to look beyond just the environmental conditions and the technological capabilities of firms which though important are not likely to be sufficient in explaining technology entrepreneurship in open, developing economies. The Indian software industry provides a good example as more recent efforts at entrepreneurship have tried to better the outsourcing model by exploiting some niches in the semi-conductor market, but met with only moderate success.

Political impediments come in the way of institutional change in the form of vested interests, distributive conflicts and collective action on the part of disenfranchised groups in response to the proposed reforms. It is unclear who should be the agents of institutional reform even if institutional reform were accepted as necessary to improve entrepreneurship. Policies to improve entrepreneurial performance in developing countries have often taken the form of the provision of finance to small scale industries. An optimistic view of the importance and necessity of entrepreneurship in developing economies comes from Hatten and Ruthland (1995), who point out that in the presence of uncertainty about what a country can be good at producing, there can be great social value to discovering costs of domestic activities because such discoveries can be easily imitated. However, as in the case of all externalities this would make entrepreneurship subject to underinvestment. Government policy has to intervene to induce investment in entrepreneurship while at the same time rationalizing excessive diversification once such investment has occurred.

In the past few years has slowly taken off. Indian engineers who migrated to the United States in the eighties have found the U.S. to be a haven for entrepreneurial pursuits and have

become highly successful in their respective fields. They initially started high technology product companies in Silicon Valley that primarily focused on solving critical market problems. Most of these Indian entrepreneurs, after making fortunes by excelling in their respective market segments, started helping entrepreneurs in India with start-up companies. The next chapter will discuss about the Korean and Indian experiences in the case of iron and steel industry entrepreneurship development.

Chapter 3

A Case of Entrepreneurship Growth in China, Korea and India

3.1 Introduction

Development and innovativeness imply the evolution from a resource-based to a knowledge-based economy (Porter et al, 2002). At the lowest levels of economic development, production is based upon the mobilization of primary factors of production. At this factor-driven stage, international competitiveness is primarily based upon low factor costs and the presence of minerals and other commodities. As countries move to the next of industrialization, economic growth becomes more capital intensive and thus investment-driven. The third, innovation-driven stage is that of a technology generating economy and countries reaching this stage innovate at the global technological frontier in at least some sectors. Transitioning to this stage requires not just developing the ability to generate new knowledge, but also to commercialize it. Entrepreneurs create new businesses and in turn new businesses create more jobs, intensify competition and may even increase productivity. Entrepreneurship has enabled to realize high levels of economic growth.

Globalization means more than just participating in global markets. A truly global company embraces a culture that emphasizes international leadership and ownership. For example, Nokia realized that alone it could not become a global company so it initiated a merger with Siemens and now has a diverse leadership cadre. A diverse leadership team is a sign of a truly global company. The economic state of affairs in both countries reflects their roots and presents barriers to globalization. In China, the roots of communism restrict openness and foreign ownership. In India, the roots of socialism mean high taxes, which inhibit companies from becoming strong enough to compete globally. While India and China are producing competitive companies in their domestic markets, without liberalizing their economic and legal infrastructures there are limits to the ability of these companies to go global. In the wake of the financial crisis countries will focus on their own problems and will pull back from the global economy, as occurred following the depression crisis of 1929. Homogeneity is an advantage in China and heterogeneity is probably a disadvantage in India. India has 14 official languages along with different cultures and religions, which can make doing business and forging national policies a challenge. Whereas in countries like the United States, two keys to entrepreneurial success are availability of capital and the ability to fail, in India, it is almost impossible to shut down a company because failure is such a stigma.

This chapter, after introducing the entrepreneurship development experience of China and India, compares the iron and steel industry growth in Korea and India with reference to entrepreneurship success and problems as evidenced in both the countries. Section 3.2 explains the Chinese entrepreneurship development. Section 3.3 presents the Korean experience of

Pohang Iron and Steel Company Ltd and the growth of entrepreneurship in that country, while section 3.4 documents the experience of Tata Steel of India as an emerging entrepreneurial venture. Section 3.5 encounters some of the noted entrepreneurs of Tata group, while section 3.6 summarizes.

3.2 The Chinese experience

China, experiencing an economic transition from central planning system to market-oriented economy, has shown an interesting trend in entrepreneurship development (Zhang and Duysters, 2010). Before the 1980s, its economic activities were planned, controlled and distributed by the government rather than by market. Entrepreneurship was hardly developed during that period and the number of private enterprises declined to 150,000 in 1978 compared to 9 million in 1949. China's economic reform has initiated a long termed institutional transition, which was marked by many comprehensive changes (Peng and Heath, 1996). They have led to many changes like economic liberalization, permitting private enterprises to be involved into economy and allowing them as one of important components of economic growth.

Beginning 1978, China's entrepreneurship development can be divided into three phases (Zhang and Duysters, 2010). The first generation of Chinese entrepreneurs emerged during the reform programme to encourage entrepreneurial activities in the early 1980s. With the first generation of entrepreneurs, light industry grew rapidly from 1979 till 1984 (Wong, 1988). Since the mid 1980s, private entrepreneurial activities had started to evolve to the second phase, characterized by the organizational mode of township and village enterprises. These two kinds of enterprises are mostly owned by privates or collectively owned by local governments. Together with the newborn private enterprises, the commune and brigade enterprises from the first phase were also restructured into them.

The third phase of entrepreneurial activities was stimulated by the entry of foreign investment in the late 1980s. For many years private enterprises were largely restricted to develop only in the rural areas. In order to enter urban market, a new organizational mode called *getihu* emerges, which promoted entrepreneurial activities in many sectors. After the era of *getihu*, the third phase of entrepreneurship development was remarked by the emergence of private sectors and another organizational mode called *si ying qiye* (Zhang and Duysters, 2010). By this, private enterprises were recognized to coexist with stated-owned enterprises. The emergence of socialist market economy dispelled the bias on entrepreneurship and narrowed down the differences between state and private owned businesses. Large state-owned enterprises were converted into more independently run companies and many state owned enterprises were privatized. The central government provided the Innovation Fund for Technology Small and Medium Enterprises to be invested in high-tech zones, which in turn resulted in the growth of science parks and technology business incubators. Technology-oriented entrepreneurs were encouraged to invest in start-ups in science parks with incentives such as reduced corporate

income tax, exemption of income tax in the first three years and no restrictions being levied on local residence permit. By 2006, China had already six thousand industrial parks and fifty eight national level science parks (Cai, 2008).

China's entrepreneurship development has been characterized by its relationship-based network, which not only included an association with business partners such as suppliers, customers and competitors but also political interactions with government (Peng and Heath, 1996). In the pre-1999 period, the entrepreneurs relied heavily on informal, interpersonal relationship and had to rapidly build ties in professional networks with other entrepreneurs and managers as well as government officials. China has been recognized as an opportunity-oriented entrepreneurial country (60 percent of respondents as contrasted to 40 percent necessity-oriented) and ranked 10th as an opportunity-oriented economy in the world according to Global Entrepreneurship Monitor report (Zhang and Duysters, 2010).

With accelerating reform and increased exposure to the west, values in China are also changing. Perceptions of entrepreneurs are improving, and people are rushing to *xiaohai*. Successful entrepreneurs are upheld as role models and idols. The Internet is changing the nature of entrepreneurship by introducing stronger foreign involvement through foreign-educated entrepreneurs and foreign funding. It is evident that Chinese entrepreneurs will continue pursuing their dreams and ambitions of becoming the chicken's head. Just as they were undaunted and unsuppressed during Maoist China, their resilience and resourcefulness will continue to elevate them towards success.

When India and China are compared, traditional of debate, dissent and pluralism identifies India's culture heritage whereby China's heritage developed with order, harmony and hierarchy (Fuller, 2010). Indian workers tend to have a higher internal locus of control and often score at the most extreme point of internality when compared to other countries. It appears that Asians appear as less passive avoiders of control what motivates entrepreneurial tendencies in emerging markets such as China where the cultural roots in Confucianism seems to contradict such an orientation. The Chinese exhibit collectivist tendencies with loyalties geared to the group rather than individual effort. Hofstede (1980) describes China as a culture that has strong uncertainty avoidance (little acceptance for uncertainty), large power distance (a high tolerance for unequal relationships), feminism (a focus on harmony and relationships) and collectiveness (focus on group accomplishment).

Lee and Peterson (2000) suggest that countries with specific cultural tendencies experience more entrepreneurial competitiveness. The India culture consists of characteristics that project a strong entrepreneurial orientation including weak uncertainty avoidance, small power distance, masculine, and individualism. These characteristics provide favorable conditions that aid in the establishment of entrepreneurial activity. The Chinese culture, which exhibits the opposite characteristics on each of these dimensions, a strong uncertainty avoidance, large power

distance, feminine and collectivism are less likely to support entrepreneurial activity. This would tend to support the notion that within a culture, whether Chinese or Indian, there are cultural characteristics that dominate and influence behavior including entrepreneurial behavior. However, entrepreneurs exhibit characteristics of high individualism, high power distance, low uncertainty avoidance and high masculinity, indicating that entrepreneurs are alike regardless of their cultural background and based on this belief, it may be said that both Indian and Chinese cultures have individuals who have entrepreneurial traits that differentiate them from non-entrepreneurs (Fuller, 2010).

3.3 Entrepreneurship development in Korea

Devastated by Second World War, the Korean economy experienced tremendous change from the beginning of the 1960s during its transformation into a modern industrial country (Surie and Torras, 2007). In 1962, Korea promulgated its first economic development plan projecting rapid economic growth, followed by five subsequent plans. Exports and increased investment under government-private partnership programme contributed to the rapid growth of the economy. Whereas 3.5 percent of GNP was exported in 1962, exports increased to 29 percent in 1986 and to 38 percent in 1991. Education received a relatively large share of total investment and Korea achieved nearly universal adult literacy, universal primary education and enrolment rates grew rapidly at all levels above the primary level by 1960. Throughout the decade, resources were allocated to industries with relatively low capital intensity. The Sixth plan focused on industries producing capital goods. During the 1970s, the rate of growth of fixed investment (12.7 percent) outpaced GNP growth (8 percent). During 1962–1991, the ratio of gross investment to GNP rose from 0.10 to 0.32. By 1999, value added in industry as a percentage of GDP was 35.9 percent (Enos and Park, 1987).

The Korean government realized the need for backward integration into heavy industry and began to attract Japan's sunset industries such as the chemical, petrochemical and iron and steel industries. The government conditioned that companies have to be internationally competitive in scale and cost and entrepreneurs have to provide capital for at least 40 percent of the total investment. It established rules for selecting suppliers of technology and foreign loans and played a key role in industrialisation by directing the allocation of resources to entrepreneurship. Among the many challenges entrepreneurs faced in initiating such projects included lack of capital which had to be borrowed from overseas; lack of technology which necessitated acquisition from external sources; lack of skilled workers and managerial capabilities in the local environment and political risk which could result in policy changes such as nationalization of industries or strict government control.

However, only large companies (*chaebol*) and the government could participate because of the capital required. As capabilities strengthened government began to promote entrepreneurship further in the mid-1990s by providing more opportunities for financing to small

and medium sized firms. In addition, some *chaebol* also began to reduce delays in payments to small firms providing them with more financial stability (Shim and Steers, 2001). The government also offered incentives to Korean and foreign firms willing to invest in the new industries and granted tax privileges for a five year period. The government also made substantial investments in harbour facilities, water supply systems and roads for these industrial complexes (Enos and Park, 1987).

Korea acquired technology mainly through licensing rather than through foreign direct investment to build local capabilities. The case of Pohang Iron and Steel Company Ltd (POSCO), which began as a government owned enterprise (initially \$5.8 million) but later privatized, highlights the role played by the government in incubating technological capabilities (Westphal et al, 1985). POSCO was founded in 1968 as the first integrated iron and steel mill with a modern, large-scale, continuous production system. Construction of the plant began in 1970 with a capacity of one million tonnes per year of crude steel. In the first stage of expansion, completed in 1976, steel capacity was increased to 2.6m tonnes; in the second, completed in 1978, to 5.5m tonnes and in the third, completed in 1981, to 8.5m tonnes. In 2004, POSCO was the world's 5th largest producer of crude steel.

When the former South Korean general Park Tae-joon, the founder of POSCO passed away in December 2011, when he was 84, had left a vast steel empire in the world, including India. He built the first blast furnace at POSCO in 1974 in Pohang, south-eastern port city, with the full-fledged aid from Yawata Iron and Steel Company of Japan. He was the first and the most dynamic entrepreneur who introduced steel industry in the Korean economy where neither technology nor capital was available. When was assigned the establishment of the steel industry by the country's president, Korea was largely an agrarian economy with very little steel production, measured in a few hundred thousand tonnes only. Being a graduate from Waseda University, Japan, majoring in mechanical engineering. He learnt from Japanese experience to fuse a sense of economic nationalism of 'steel is the state'. Steel production helped the country's rapid industrialisation from the ashes of the Korean War and contributed decisively to the growth of its manufacturing sector. He foresaw an immediate future of Korean steel industry to take the lead which China later followed, thus giving credence to the 'flying geese' theory (detailed in the beginning of the 9th chapter). In the iron and steel innovation cycle, the US was the lead goose, soon followed by Japan, which was followed by Korea and later by China. A young goose which was nurtured by the Japanese goose, now would nurse a newly-born goose China in 1980s to fly up. Currently, China is number one steel producer, followed by India's Arcelor and POSCO.

Owing to challenges of a shortage of capital for financing large scale projects and lack of technology, a consortium named Korea International Steel Associates was formed to raise capital for the project. However, the consortium was dissolved in 1969 because of its inability to raise funds. Subsequently, agreements were signed with the Japanese for loans totalling \$123 million and all major technology and facilities (Enos and Park, 1987). The Japanese contract specified

the provision of help with planning and consulting, purchasing and construction, planning and execution of the construction and construction management system, and on-site assistance for start up and operation. Amsden (1989) documents the challenges faced during construction of the first stage facilities, such as delays in the laying of concrete, necessitating two month long emergency works to compensate. However, POSCO's employees worked round the clock and their efforts to learn built capabilities and established a tradition of early project completion. Initially, the major products of POSCO were hot rolled steel used for structural purposes, high tensile steel being developed in 1975.

As local engineers learned from the effort to absorb the technology, reliance on foreign technical assistance was reduced. By 1981, POSCO depended solely on the Japan Group for the master engineering plan. Also, the Pohang University of Science and Technology (1986) and an R&D centre were established to build science and technology capabilities and disseminate skills by establishing links between academia and industry. Emphasis on learning continued and POSCO engineers succeeded in absorbing the technology of making high carbon steel and producing high tension steel. Higher value-added products such as cold rolling coils and sheet, galvanised coils and sheet, as well as low-sulphur clean sheet and steel plate were included and further expansions were undertaken in the 1980s (Enos and Park, 1987). A strategy of exporting to other developing countries strengthened capabilities and helped to finance growth.

POSCO entered the global market by obtaining ISO 9002 certification after 1993 and listing on the New York, London and Korean Stock Exchanges. In 1999 the company began to globalize operations by launching corporate-wide process innovation and Six Sigma initiatives to cultivate a continuous improvement culture. Information technology was also used to streamline operations and implement activity based management. The company was privatized in 2000. After 2000, the company achieved ISO/TS16949 certification for its cold rolled steel quality management system in 2003 without reliance on external specialists. The company also focused on knowledge management through continuing education and R&D efforts. Collaborations with the Pohang Institute of Science and Technology (POSTECH) and the University of Pittsburgh materialized for establishing a Graduate Institute of Ferrous Technology at POSTECH in 2006. In 2006 POSCO was ranked third among global steel producers by the International Steel Institute. Similar developments in other manufacturing sectors like automotives, electronic goods and semiconductors have led to successful participation by Korean firms in global high technology markets indicating that building entrepreneurial capabilities by adapting to increasing returns technologies helps to catalyze development (Murphy et al, 2006).

3.4 The Indian iron and steel industry

From the late 1950s, the Indian government pursued an industrial strategy directed toward conserving foreign exchange, producing heavy capital and intermediate goods

domestically, building a science and technology infrastructure and maintaining national ownership of industrial enterprises with a leading role for the public sector. The scale and capital intensity of the steel industry ensured that the only large integrated steel plants established after 1950 were government-owned Steel Authority of India (SAIL) with the exception of one private company, the Tata Iron and Steel Company (TISCO, now Tata Steel). India faced the same difficulties as Korea in obtaining financing. Consequently, all the Indian public sector plants were turnkey plants gifted by Russia, the UK and West Germany and the best technology was not necessarily transferred. Both public and private sector projects faced challenges. SAIL was burdened with difficulties in transferring technology, besides poor engineering, failure to take account of poor local raw material characteristics, low capacity utilization, price controls and poor management which all contributed to its lacklustre performance. TISCO faced similar difficulties in obtaining quality inputs. Moreover, the government allowed only limited capacity expansion (from 1.3 million tonnes to two million tonnes in the late 1950s) and modernization of its aging facilities was possible only in 1983, partly because of the threat of nationalization and partly because price controls held back profitability (Lall, 1985).

In contrast to the industrial policy followed by Korea which favoured large enterprises, Indian industrial policy focused on encouraging small enterprises while containing the growth of large private enterprises. Consequently, India's progress was slow in comparison with other developing countries in the 1960s and 1970s. India's manufacturing value added was \$15.6 billion compared with \$40.3 billion for Brazil, \$23.4 for Mexico, \$11.2 billion for Argentina, \$10 billion for South Korea and \$12.8 billion for Yugoslavia (Lall, 1985). Value added as a percentage of GDP in 1999 was 25.9 percent as opposed to Korea's 35.9 percent, and it remained 26.6 percent in India with Korea at 34.6 percent in 2003 (World Bank, 2006).

From 1974 on the Indian government required foreign owned affiliates to dilute their shareholding to 40 percent as a result of which about 60 companies closed operations in India. No foreign firms were permitted to enter strategic industries such as computer hardware and foreign firms were not permitted to undertake turnkey work until the 1980s, leading to reliance on domestic consultants and licensing to gain access to foreign technologies (Lall, 1985). These regulations were designed to protect indigenous technologies, to reduce royalty rates and the life of the agreement and ensure that technology was absorbed fully and to permit the licensee to sublicense the technology locally. Existing Indian producers (including government owned enterprises), were protected regardless of efficiency and the market was insulated from external competition whereas Korean incentives to export resulted in earlier attempts to adjust to global standards and markets. However, low reliance on foreign technologies, together with efforts to boost indigenous R&D and local enterprise protected technological learning (Lall, 1985).

While India was not a major exporter of capital goods among newly industrializing countries in 1978, the total value of product exports in this category was \$421 million compared to \$1.4 billion for Brazil, and \$1.5 billion for Korea. However, if exports of technology are

considered as such or accompanied by the sale of capital goods, India was among the leaders, in terms of value of exports and the range and complexity of technologies. The departure of foreign computer firms created opportunities for new firms in business information services and software (Heeks, 2010). Economic liberalisation was accelerated by India's financial crisis in 1991. Foreign competitors were once again permitted, leading Indian firms to start joint ventures, license or import new technologies to enhance their competitiveness. By the end of the 1990s, some leading Indian firms had expanded overseas emerging as new multinationals. Capability building in various sectors such as trucks, heavy equipment, chemicals and computer hardware led to an expansion of each sector, creating further demand for skills (Murphy et al, 2006). The government continued to promote industry and entrepreneurship by easing regulations.

In 1981–1982, India produced 1.3 million tonnes of pig iron and 8.8 m tonnes of mild steel and was the 16th largest steel producer in the world. There were six integrated steel plants, one in the private sector. TISCO, the largest private integrated steel producer and consistently the best performer in the steel industry because of efforts to indigenize technology, built its own capabilities in maintenance and backward integration into manufacturing of equipment and R&D. TISCO was founded by Jamshetji Tata in 1907 with technology from USA. The steel industry was granted tariff protection by the British government from 1924 till 1941. In the 1950s and 1960s, Indian steel was much cheaper than imported steels. The import-substituting regime instituted by the 1960s reserved all future steel capacity for the public sector. Therefore, TISCO faced several challenges and the company had to achieve satisfactory performance in order to continue its existence and avoid nationalization. Price controls restrained local prices and reduced profitability; imports were permitted only when necessary to make up for shortfalls (Lall, 1987).

TISCO, like SAIL also had problems with raw materials but overcame these challenges by retaining its own collieries and installing washing and blending facilities to alleviate the high ash content of coal used in steel production. Instead of relying on foreign equity or licences, TISCO obtained foreign technology in the form of individually recruited experts and equipment. To compensate for difficulties in maintaining equipment and the scarcity of foreign exchange for spare parts, TISCO developed capabilities in project execution by the establishment of its growth shop which began as a maintenance facility for imported machinery and manufacturing spares. To solve production inefficiencies resulting from poor raw materials, process engineering capabilities were developed by making improvements in the raw material and coke oven areas. Further, to substitute expensive imported materials with local materials, TISCO continued to introduce new steels developed from its in-house R&D. Managing input costs was critical since government price controls prevented firms from capitalizing on a monopoly position. Other capabilities were developed in industrial engineering such as quality control, productivity monitoring, and cost evaluation. In 1983, TISCO launched its first expansion in almost 30 years and began modernization (Lall, 1987).

TISCO modernized further in the 1990s by importing a new state-of-the-art blast furnace which was installed mainly by local organized cross-functional team and learning was transferred to other divisions of the organization and to suppliers. Similar to POSCO, the blast furnace project team worked overtime to meet completion deadlines. By the late 1990s, the company focused on quality through continuous improvement, obtaining ISO certification and benchmarking progress against other global players. In 2000, a new cold rolling mill was installed using the same procedure and an internal reorganization to match new technology and enhance capabilities throughout the value chain was accomplished with the help of McKinsey and Company. Consequently, there was increased emphasis on value-added products, accelerating innovation through R&D and patenting. The company then began globalising via exports, overseas expansion, acquisition and diversification into information technology based industries. TISCO was ranked the fifth largest steel producer in the world by the International Iron and Steel Institute in 2006. In 2007 TISCO completed the acquisition of a steel company in the UK.

Despite facing a difficult regulatory environment until the 1980s, TISCO emerged as a leader. At each stage of its evolution, new capabilities built through technology acquisition increased demand for new products and skills and led to the emergence of ancillary industries serving other heavy industries. An example is the manufacture of bearings for trucks, cars and trains (lending credence to research on increasing returns technologies (Murphy et al, 2006). In Korea, the steel industry was developed entirely by the public sector with the government assuming the role of entrepreneur (Freeman and Duvall, 1984). In contrast, the expansion of the Indian steel industry was inhibited by government policies that regulated prices and threatened nationalization, but import substitution policies helped to build indigenous capabilities. Both countries used technology acquisition to foster entrepreneurship. While the timeframe and speed of evolution differed, companies in both countries followed a similar pattern of technological development. Although TISCO was established in 1907, the regulatory environment impeded its expansion and entry into the global economy until the 1990s. POSCO evolved more rapidly because newer technologies were adopted at the outset in the 1970s while TISCO began modernization only in the 1980s and was able to catch up in the 1990s. This aspect of innovation is being dealt in some detail in the ninth chapter.

Other industries follow a similar evolutionary path, suggesting that the framework is more widely applicable. For example, the Indian software industry emerged to provide services to the domestic computer hardware industry (Heeks, 2010) and software firms gained global experience by interacting with international clients (Surie, 2007). Similarly, government investments in science and technology institutions led to the emergence of the biotechnology industry in India in the 1990s, attracting multinational corporations seeking low cost research capabilities. By the late 1990s, the Indian government had privatised some public companies, increasing entrepreneurial activity in many sectors, including education. Thus, despite late entry into the global economy, India is increasingly recognised as an important location for knowledge

based industries. The success of leading firms also wrought cultural transformation, generating interest in entrepreneurship as a career of choice (Stiglitz, 2004).

3.5 The Tata Entrepreneurs

This section will present some of the leading entrepreneurs of the Tata group (Jamsetji Tata, JRD Tata and Ratan Tata) to showcase the emergence of entrepreneurial culture in India as described above. Jamsetji Tata founded the vast industrial empire that has received an identity today all over the world. Jamsetji Tata belonged to a trading family and business ran in his blood and chose to be a businessman very early in his life. Tata would be successful in redefining the concept of industries in India and would be listed as the father of Indian industry. Jamsetji Tata was the son of Nusserwanji Tata, the only businessman in a Parsi family that earned its living as Zoroastrian priests. Along with his wife Jeevanbai Tata, Nusserwanji Tata had moved out of his family to carry on his business in Bombay. Nusserwanji Tata started off as a small trader and did quite well. Jamsetji Tata completed his graduation at Elphinstone College in Bombay, where he was known as a bright student that the principal decided to refund his fees once he completed his degree. Jamsetji Tata took up trading at 14, a time when he was still studying. Jamsetji Tata became actively involved in his father's export business at a time when the business scenario in India was far from prosperous. Nusserwanji Tata sent his son on a trip to Hong Kong in 1859 to expand his business interests there, which the young Tata completed successfully. Jamsetji Tata remained in Hong Kong for the next four years, trying to fulfill and realize his father's dream of setting up a branch of the Tata & Co office there. The establishment of the new Tata & Co office in Hong Kong was the beginning of the expansion of the Tata empire throughout Asia and the first step toward the creation of Tata and Sons. By 1863, there were Tata offices not only in Hong Kong, but also in Japan and China.

Jamsetji Tata now traveled to Europe, but unlike in Asia, he faced with a drawback in the initial stages. Part of Jamsetji Tata's aims in visiting England, apart from increasing the number of contacts for his father's export business based in India, was to establish an Indian bank in London. This project, however, proved highly unsuccessful because it was not a favourable time for the banking sector, with a financial crisis hitting the markets in several parts of India. The Tata companies in India and all over Asia faced huge monetary loss after the failure of the establishment of the Indian bank. Jamsetji Tata worked with his father until the age of 29, after which he started a trading company of his own, acquiring and establishing several cotton mills. The Empress Mill set up in Nagpur in 1874 brought Jamsetji Tata huge amounts of money. The mills made large amounts of profit, later sold off by Jamsetji Tata for a higher sum of money. Jamsetji Tata's cotton mills produced cloth which were used in India and also exported to countries of Japan, Korea, China and several parts of the Middle East (Nakra, 1996). The mills were largely established to satisfy Jamsetji Tata's business interests, but the Dharamsi cotton mill which was later renamed as Swadeshi cotton mill kept the nationalistic sentiment in mind and made use of only Indian products, particularly promoting the non-use of British raw material.

Jamsetji Tata made it a point to look after the best interests of the workers in Tata & Sons. The Tata companies were then also known to provide the best working atmosphere for its workers. Policies which were unheard of during those times, like medical facilities for the sick and for women with children, provision of pensions, accident compensations and on-the-job training, were a part of the companies owned by Tata. It was Jamsetji Tata who appealed to the Japanese Steam Navigation Company to reduce freight charges, a factor which was largely diminishing his profits. Though it was for the benefit for the entire nation, Jamsetji Tata made it a point to spend his own money to get the case solved when his demands led to huge upheavals in Japan. Eventually, Jamsetji Tata did emerge successful in reducing freight charges and thereby increasing profits for Indian traders.

The cotton mills did satisfy his business interests, but to remain stuck on the production of cloth was not the aim of Jamsetji Tata. His vision was to establish an iron and steel plant, a world class hotel, a learning institution and a hydro-electric power project. Among his four wishes, only the second was fulfilled during Jamsetji Tata's lifetime when the Taj Mahal Hotel was established in 1903. In 1901, Jamsetji Tata travelled to Europe and America to educate himself on the making of steel. In addition, he made it a point to educate himself on the latest technological progress that had taken place over the years all around the world so that he may use it for the betterment of the industries under Tata & Sons.

The Tata Group was succeeded by his two sons, Dorabji Tata and Ratanji Tata. A pioneer of his field, the vision and aim of Jamsetji Tata came to life with time as his family gave wings to each of his dream projects. In fact, such was his contribution that the city of Jamshedpur in Jharkhand is today popularly known as Tatanagar, because of the many facilities that the group has endowed the city with. Today, the group boasts of being the founder of projects like Tata Steel, the Indian Institute of Science, the Tata Power Company Limited, the Taj Mahal Palace & Tower, the Tata Institute of Fundamental Research and many more.

JRD's father Ratanji Dadabhoy Tata and Sri Jamsetji Tata shared their greatness from the same great-great-grandfather, Ervad Jamsheed Tata, a priest of Navsari. JRD Tata was the second of four children. He was educated in France, Japan and England before being drafted into the French army for a mandatory one-year period. JRD wanted to extend his service in the forces but destiny had something else in store for him. By leaving the French army JRD's life was saved because shortly thereafter, the regiment in which he served was totally wiped out during an expedition in Morocco. JRD Tata had the honour of being India's first pilot, was Chairman of Tata & Sons for 50 years and launched Air India International as India's first international airline. JRD Tata was one of the most enterprising Indian entrepreneurs. He was a pioneer aviator and built one of the largest industrial houses of India. JRD Tata joined Tata & Sons as an unpaid apprentice in 1925. He has great interest in flying. On February 10, 1929, JRD became the first Indian to pass the pilot's examination. With this distinctive honour of being India's first pilot, he

was instrumental in giving wings to India by building Tata Airlines, which ultimately became Air India. His passion for flying was fulfilled with the formation of the Tata Aviation Service in 1932.

In 1938 JRD was elected Chairman of Tata & Sons making him the head of the largest industrial group in India. He started with 14 enterprises under his leadership and half a century later on July 26, 1988, when he left, Tata & Sons was a conglomerate of 95 enterprises which they either started or in which they had controlling interest. Under his guidance, Sir Dorabji Dadabhoi Trust established Asia's first cancer hospital and the Tata Memorial Center for Cancer, Research and Treatment. It also founded the Tata Institute of Social Sciences, the Tata Institute of Fundamental Research and the National Centre for Performing Arts. In 1948, JRD Tata launched Air India International as India's first international airline. In 1953, the Indian Government appointed JRD as Chairman of Air-India and a director on the Board of Indian Airlines, a position JRD retained for 25-years. For his crowning achievements in Aviation, JRD was bestowed with the title of Honorary Air Commodore of India.

In 1956, JRD Tata initiated a programme of closer employee association with management to give workers a stronger voice in the affairs of the company. He believed in employee welfare and espoused the principles of an eight-hour working day, free medical aid, workers' provident scheme and workmen's accident compensation schemes, which were later, adopted as statutory requirements in India. JRD Tata cared greatly for his workers. In 1979, Tata Steel instituted a new practice wherein a worker would be deemed to be at work from the moment he leaves home for work till he returns home from work. The company is financially liable to the worker if any mishap takes place on the way to and from work. Tata Steel Township was also selected as a UN Global Compact City because of the quality of life, conditions of sanitation, roads and welfare that were offered by Tata Steel. JRD Tata was awarded India's highest civilian honor, the Bharat Ratna. In the same year, JRD Tata was also bestowed with the United Nations Population Award for his crusading endeavours toward initiating and successfully implementing the family planning movement in India, much before it became an official government policy.

Ratan Naval Tata is presently the Chairman of Tata Sons, the holding company of the Tata Group. Ratan Tata is also the Chairman of the major Tata companies such as Tata Steel, Tata Motors, Tata Power, Tata Consultancy Services, Tata Tea, Tata Chemicals, Indian Hotels and Tata Teleservices. He has taken Tata Group to new heights and under his leadership Group's revenues have grown manifold. He received a Bachelor of Science degree in architecture from Cornell University in 1962. Ratan Tata had a short stint with Jones and Emmons in Los Angeles, California, before returning to India in late 1962. He joined the Tata Group and was assigned to various companies before being appointed director-in-charge of The National Radio & Electronics Company in 1971. Ratan Tata was appointed Chairman of Tata Industries in 1981. He was assigned the task of transforming the company into a Group strategy think-tank, and a

promoter of new ventures in high technology businesses. In 1991, Ratan Tata took over the Chairmanship from JRD Tata. Under him Tata Consultancy Services went public and Tata Motors was listed in the New York Stock Exchange. In 1998, Tata Motors came up with Tata Indica, the first truly Indian car. The car was the brainchild of Ratan Tata. Ratan Tata was honored with Padma Bhushan in 2000.

3.6 Conclusion

The experiences of China, Korea and India show that entrepreneurial activity flourishes but each country exhibits differences in terms of access to information, privacy rights and the role of the state. The Chinese economy has stunned the world with its rapid growth, but at the same time, the central government continues to resist the adoption of privatization policies that favor entrepreneurial activity. This has resulted in the co-existence of two systems of the command economy of the past and the free-market economy of the future. The Korean experience demonstrates the support of the government in private entrepreneurial development toward achieving technopreneurship. Indian business owners on the other hand thrive independently, rarely interacting with a government bogged down with bureaucratic confusion. India is a severely hierarchical society based on a caste system that dictates status with very little social mobility. However, it is governed by a democratic system that fosters entrepreneurial activity and conflict resolution that tend to be decided in favor of private rights. Unable to cultivate industries requiring factories and transportation, India has made significant strides in information technology, which has allowed its young educated population to move into positions based on their technical ability rather than family status, connections, or wealth. India's strong entrepreneurial position is further reinforced by the Global Entrepreneurship Monitor report of non-entrepreneurial adults, in which the Indian population exhibits higher perceived entrepreneurial opportunities and capabilities resulting in higher entrepreneurial intentions and eventually higher potential entrepreneurial activity than the Chinese.

Entrepreneurial performance may be a much more subjective concept, depending on the personal expectations, aspirations and skills of the individual entrepreneur. While the focus may be on the personality and traits of entrepreneurs, the performance of entrepreneurs, as evidenced by the Tata entrepreneurs requires considerable attention, besides that of the organization in which they work. Entrepreneurial career performance in terms of the number and proportion of successful new enterprise processes or the total net worth created, may be an effective means of evaluating entrepreneurial performance. Indian entrepreneurs have made commendable strides in the information technology field in recent times and the next chapter will discuss entrepreneurship development in that field.

Chapter 4

The Emergence of Indian Information Technology industry

4.1 Introduction

Porter (1990) lists four major factors that contribute to the success of a country in terms of utilization of resources toward attainment of competitive advantage. They are demand conditions, factor conditions, presence or absence of supporting suppliers and the degree of rivalry in the domestic market. Also considered are firm's structure, strategy and the degree of governmental influence. Porter contends that competitive industries can exist as part of a cluster of related industries and countries that lack natural endowments will invest in the creation of advanced factors like education, training of workforce and improvements in communication systems. India's information technology (IT) sector is an apt example appropriating Porter's demand and factor conditionalities and in establishing competitive advantage in the world market, especially when global economic activity is driven by pervasive information and communication technology, the opening of markets and global trade expansion. In this, new market opportunities consist of availability of financial support schemes from both official and private sources and many public-private partnership programmes, besides emergence of a number of private sector initiatives for supporting knowledge-intensive entrepreneurship. The *keiretsu* system in Japan and *chaebols* in Korea are examples of highly developed conglomerates with interlocking ownerships and business partnerships that developed in this manner. In addition to risk mitigation and source of funding, interlocking businesses provide a source of informal information flow, access to a broader pool of skills and resources and when well implemented, a brand name that can be leveraged across all businesses.

This chapter is structured as follows. Section 4.2 explains software development in India, while section 4.3 presents the growth of Bangalore as the IT hub. Section 4.4 showcases the prospects of Cyderabad, while section 4.5 showcases the examples of a few IT services firms like Tata Consultancy Services, Infosys, Wipro, Mahindra Satyam and Hindustan Computers Limited along with their entrepreneurial leaders. Section 4.6 concludes, describing the success factors and problems of Indian software industry.

4.2 Software development in India

In necessity entrepreneurship, one becomes an entrepreneur because there is no better option for the person involved, whereas opportunity entrepreneurship is an active choice to start a new enterprise based on the perception that an unexploited or underexploited business opportunity exists. Necessity entrepreneurship has little or no effect on economic growth while opportunity entrepreneurship has a positive and significant effect. Software services industry is an example of the latter type. A large section of the domestic software industry consists of resale

of software packages developed by the US firms overstating the extent of software written for the domestic market (Arora et al, 2001). However, there exists in-house software written by users, especially large Indian firms. A number of Indian software firms have also developed software packages aimed at the domestic market. It may be that weak intellectual property rights may be responsible for the failure of Indian firms to develop successful packages, besides lack of experience in design and marketing. Indian software exports consist primarily of software services. The activities carried out are essentially maintenance tasks for applications on legacy systems such as IBM mainframe computers, development of small applications and enhancements for existing systems, migration to client-server systems (re-engineering). Software exports can be divided into three categories based on where software is developed and how the development is managed and organized. The first category is onsite consultancy or onsite projects, where the Indian company provides the US client with software professionals with the particular technical skills asked for by the client. These skills could vary from mainframe related software to specialist expertise in UNIX and WinNT platforms with JAVA programming skills.

The second category of exports has a mix of work done offshore as well as onsite, wherein the Indian company sends its software professionals to the client's site for requirement analysis or training in a particular system. These professionals then bring back to India the specifications for the software and have a larger team develop the software offshore. If the project is large, a couple of Indian professionals remain at the customer site acting as liaisons between the project leaders offshore and the clients. To execute such projects, a firm needs not only skilled professionals, but also a software development process and methodology and an ability to manage software development. Unlike in onsite projects, the Indian firm provides technical and managerial expertise as well.

The third method of software export is in the form of an Offshore Development Centre (ODC). An ODC is an organization form especially for firms based in the U.S and Europe and who wish to take advantage of the skilled talent pool and lower wages in India. An offshore development centre involves an umbrella contract with a long-term agreement on prices for time and materials (usually standardized on a man-hour basis). In this, a large fraction of the project is executed offshore and the Indian firm is responsible for adherence to schedules for delivery.

Software exports from India have grown from \$330 million in 1993 to \$17.3 billion in 2006, employing around 878,000 professionals. In 2001, entrepreneurial firms accounted for about 38 per cent of sales revenues and 35 per cent of employment in the Indian software outsourcing sector (Athreye, 2005). The share of software industry has been 6.7 percent of GDP and its export share to total exports is about 18 percent (NASSCOM, 2010). The industry exported 77.5 percent of its output of software and services in fiscal year 2008 indicating its heavy reliance on the world market. The U S is India's principal market and absorbs about two-thirds of IT exports. However, the dependency ratio (the ratio of the region's share of India's exports to the region's share of world IT services) for North America was 1.4, indicating India's

asymmetric relationship with the USA. In contrast, the second largest IT market in the world, Japan absorbed just about 2 percent of India's IT exports. This may be due to lack of diversity in product and service markets and missed learning opportunities by not serving technologically complex markets such as Japan. Japan is known for its production engineering and its electronics industry, which demand embedded software, which goes into products such as automobiles. Japan's total IT market in 2006 was US\$146 billion (Japan Information Technology Services Industry Association, 2008) but India had a very small share of it, indicating limited engagement of India in the high-value Japanese market. India specializes in customized software and Japan's largest IT segment is customized software services. India's presence in Japan is very low due to the pull of the lucrative US market, closed subcontracting and business practices in Japan, unfamiliar Japanese cultural and language requirements and vice versa, India's technological shortcomings in hardware and Japanese reluctance to conduct international outsourcing in general due to high transactions costs (D'Costa, 2008).

The American pull can be seen from the substantial number of IT professionals hired by US-based companies. More than 100,000 Indian students go to the USA to study annually, the highest number for any country, providing not only billions of dollars in revenues to educational institutions but also highly trained professionals as a sizeable number stay in the USA. In the recruitment of IT professionals with employer-sponsored H-1B visas given out to non-US residents, in 2005, India secured 48 percent (65,000) of all H-1B visas, of which 40 percent granted to Indians were for the IT industry. According to the U S Government Accountability Office, between 2000 and 2009, 46.9 per cent of the total approved H-1B visa holders had India as their country of birth. In L1 visas used by multinational companies to bring staff from subsidiaries to their US parent firm or branches, Indians have become prominent, increasing from 4.4 percent in 1997 to 43.8 percent in 2006 (US Department of State, 2009).

The basic outsourced business services model was established in the 1970s, resulting in a new form of the model adopted in the 1990s when the offshore content of on-site delivery began to slowly increase. As prices of telecommunications access declined, the off-shoring of work became steadily cheaper, utilizing the large educated labour force toward a fine division of labour in software teams due to large scale of operations. With financial liberalization of the economy, software companies realized advantages of operating in a global market. For example, being an entrepreneurial firm, Infosys was vulnerable to periods of capital scarcity and to keep the potential of future growth, it was the first to leverage its reputation to enter international markets like NASDAQ and the New York Stock Exchange and attract new US customers. In this, the IT service providers had to adhere to corporate norms of US firms like use of more transparent accounting practices and the use of employee stock options to avoid attrition of their staff. Later, another variant of the offshore model (application of the software services delivery model to administrative functions of companies) also took shape.

According to Chaminade and Vang (2008), in respect of stage one competence building, the content of work consisted of multinationals outsource specific tasks to the indigenous SMEs, wherein the MNCs will be responsible for assembling the different modules into the final product. Competitiveness of the local SMEs is mainly based on costs. In the second innovation stage, indigenous firms start providing final products to specific market niches. In some cases, cooperation between SMEs is needed to combine complementary competences. Indigenous firms start using their integration skills, integrating modules that are being developed in different firms. As regards human capital in the first stage, the focus is on the accumulation of technical human capital. In the second stage, new skills are needed beyond technical skills and indigenous firms need have to integrate the different modules into the final product. As regards social capital, the main linkages are those established between the MNC and the local indigenous company. Few SMEs collaborate with other SMEs. Social capital seems not to be relevant in this first stage. And in the next stage, social capital starts to play a crucial role stimulating and supporting interactive learning between the indigenous SMEs. A new set of horizontal relationships may be emerging, both formal and informal, particularly in embedded software (Chaminade, 2004). In relation to entrepreneurship, not relevant in the initial phase where SMEs are only performing the tasks commissioned by the MNC. In the next stage, the search and access of new market niches requires strong entrepreneurial services and entrepreneurship is increasing in embedded software.

In the first stage, the majority of indigenous SMEs do not have direct access to international markets. Their customer is the MNC who sets the standards of the product and has the contacts with the final customers. In the second stage, the direct access to the final customer becomes critical. Local markets can stimulate innovation in the indigenous companies. In this sense, public procurement could be a good instrument to stimulate the SMEs to use their competencies and create incentives for investing more in them. The focus of MNCs in the first stage is direct access to the final customer and public procurement could be a good instrument to stimulate the SMEs to use their competencies and create incentives for investing more in them. In the next stage, SMEs and MNCs could collaborate in the provision of R&D services and traded externalities leading to spillovers and offshore R&D labs and untraded spillovers. Transnational communities are also crucial in the first stage since they contribute to the development of the regional innovation system and the indigenous SMEs by reducing institutional distance which in turn reduces transaction costs. They are relevant in the second stage as they reduce the institutional distance and facilitate the direct access of the indigenous firms to the final markets (Chaminade and Vang, 2008).

The entrepreneurial software companies are different from the conventional enterprises. They are established by a specific, very often technically trained entrepreneur. They are transparent regarding their operations and performance and all the firms operate in technology-intensive industries, being highly integrated with the global economy. Exports of these

enterprises range between 30 to 95 per cent of its total sales. Notwithstanding these phenomenal increases in venture capital funding, most Indian companies still finance their growth and expansion through internal resources. Another factor is the availability of technically trained personnel including those trained abroad and willing to return to their homeland to start technical ventures. Apart from the few famous cases of firms, whole industries such as Information Technology, Biotechnology and Aerospace industries have been jump started by the emergence of this knowledge- intensive entrepreneurship.

The first known case of a software product from India was from Tata Consultancy Services (TCS), a subsidiary of Tatas. TCS had always paid attention to tools in software writing and in the early 1980s the utilized the opportunity to sell some of those tools as products. Case Packet was launched to good reviews in the technology business press and retailed for about US\$200,000. Though TCS proved very capable of making products, it did not create the product market and that was the subtle difference. TCS invested in training engineers to learn software management skills and software languages and responded to changing technologies by negotiating with the government for new opportunities. In choosing the outsourcing path, the company recognized the potential advantages toward technology up-gradation and in 1975 partnered exclusively with Burroughs. A more recent trend is R&D outsourcing in the telecommunication sector. The off-shore delivery model has tried to utilize India's advantage of a large and educated labour force whilst at the same time making use of developments in technologies and the advantages of the global market for such services that had emerged. The model focuses on entrepreneurial energies along a narrow path of proven success.

Another wave of experimentation in the mid-1980s increased the installed capacity of personal computers in India. Firms such as Sonata and Mastek, introduced products aimed at the domestic market for software. Sonata tried to develop software products while Mastek became the first company to use tools to speed up product development for domestic market. However, these product ventures largely failed due to the small domestic market and weak intellectual property protection laws. The lack of venture capital support also made the product model a very risky one for entrepreneurial firms to adopt due to the higher up-front investment. The stimulus was the spread of distributed computing and the opportunity to write products previously constructed for mainframes around the new technology platform of local area network and interlinked computers. Ramco tried to develop an enterprise resource planning product and CITIL (a spin-off from the multinational subsidiary of Citibank, COSL) developed a financial product Flexcube on their customization of a pre-existing market product called COSMOS. Subsequently, COSL acquired the full IP rights for their package. Ramco product Marshall was overtaken by solutions by Western companies like SAP and other ERP product producers. It took longer for the company to produce the basic software infrastructure required for a successful product, while having been in the market longer, SAP could just translate to another technology

platform quite quickly. Ramco Virtual Works Flexcube emerged as the most successful product developed from India, although its ownership has been changing.

The adoption of tighter IPR norms in 1995 gave rise to experimentation with new products in the area of embedded software. Many telecom firms like Texas Instruments, Motorola and Nortel have sourced their research on digital signal processing chips in India and this gave rise to spin-off firms. Two prominent examples are Sasken (previously a joint venture with Nortel) and Ittiam, which hold patents and aim to earn revenues largely through licensing to large firms. Sasken combines outsourced R&D services with licensing and this gives the firm stable cash flows and the ability to scale. Ittiam operates a pure product model and has been endowed with venture capital financing from Silicon Valley venture capitalists. They had filed for 11 patents in the first four years of their existence and their chips are licensed to many client firms.

It may be pointed out that capital market institutions did not understand how to evaluate the finance needs of the emerging software industry. Infosys was refused a bank loan when it was set up in 1981 and had to borrow the start-up money from the wife of one of the founders. Faced with a situation where bank finance was not readily available and venture capital was not forthcoming, software firms were conservative in their own cash flow calculations but experimented with importing the use of capital market institutions in the US. Many software firms voluntarily listed on stock exchanges in the USA and in Europe with strict disclosure norms in order to raise money for investments and acquisitions. The compliance of firms to international norms was a ploy for improved corporate governance. The combined effects of liberalization and the success of the software industry drew US venture capital into India after 1993. Dossani and Kenney (2002) show that a significant portion of the sevenfold increase in funds from 1993-98 was accounted for by the entry of foreign investors after 1995, through investment divisions of foreign banks, and venture firms that had raised capital abroad. Indian Silicon Valley entrepreneurs encouraged new business plans within India and exploited the new exit routes made possible by the international listings of Indian software firms on foreign stock exchanges. Domestic and foreign venture capitalists invested \$774 million in 2003 in India up from \$590 million in 2002 (Basu, 2006).

A very important agent for institutional reform is The National Association of Software and Services Companies (NASSCOM), set up in 1988, with 38 members who collectively accounted for 65 percent of the industry revenues. Many of these members were small companies and the total industry revenue in 1988 was about \$100 million. By 2003–04, the number of members had risen to more than 800, collectively accounting for about 95 per cent of the industry output of about \$21 billion. NASSCOM operates as a collective body representing the interests of the software sector with functions of lobbying, advocacy and public relations. NASSCOM has been extremely effective in lobbying for policies favourable to the industry's

continued growth, collective marketing at a time when Indian companies did not have an international reputation for delivering quality service and providing information on the industry for insiders and outsiders.

The employment growth of these firms is high and these are efficient in the utilization of capital for the most productive use. The emergence of third party BPO activities in India led by firms such as EXL Services, 24/7, Spectramind, Daksh e-Services and Transworks, which received venture capital funding for their seed capital, has impacted on manufacturing, health care, banking and financial services, pharmaceuticals, engineering and textiles. There is a gradual convergence in India toward the US model of venture capital institutions, which was initiated and aided by the diaspora of technology entrepreneurs in India and their Silicon Valley partners. The NASSCOM model of industry-government interaction has been adopted by new sectors relying on domestic entrepreneurship. Examples include the recent Association of Biotechnology Led Enterprises and the Automotive Component Manufacturers Association, established in 1958.

Off-shoring of administrative and technical work mainly involves investments in people, office space and an infrastructure for communications and data. These investments may be significant but they are in comparison less heavy and therefore allow firms a much higher degree of flexibility in finding the right off-shoring business model (UNCTAD, 2006). This means that services off-shoring processes are prone to path dependency than manufacturing off-shoring processes and off-shoring of manufacturing usually involves rather simple tasks and production processes (Andersen, 2008). Very little of this type of off-shoring will be subject to the commoditization and standardization in the industrialized information chain. Further, the advanced nature of the tasks creates a process of knowledge transfer from home to host firm and vice versa which is fundamentally different from off-shoring of manufacturing.

Firms in India have relied on internal sources of capital and in terms of debt capital rather than equity for financing their long term investment goals. Within the external source of finance, bank borrowings are more important. While this pattern of financing, with the internal generation accounting for the larger share, may be important for existing companies, new companies may have to depend on external sources. For this the emergence and growth of the private equity market and the venture capital funding has been helpful. Over 70 per cent of the entrepreneurs relied on personal savings for their initial funding needs and about 40 per cent of them continue to rely on the same personal sources for their additional funding the external sources such as bank loans, venture capital and angel investors become very important for expansion of the scale of activity.

It is interesting to note that equity capital is conspicuous by its absence as a source of funding even at the expansion stage. Both venture capital and angel investing are market-based

solution in the financing of knowledge-intensive entrepreneurship. Venture capital focuses on investing in private, young, fast growing companies. Buyout and mezzanine investing focuses on investing in mature companies. Innovative business ideas get their funding from angel investors. If and when their business model works and they are ready for scale up, they approach venture capitalists who usually invest more money in the company in return for an equity stake. Angels invest their personal wealth as opposed to venture capitalists who mostly work as fund managers. To institutionalize this process of channeling funding from high net worth individuals to technology-oriented start-ups, the Indian Angel Network was founded in 2006. A typical investment in a start-up falls in the range of Rs 1 to 5 million and the exit duration is usually between 4-7 years. The returns can vary from 400 per cent to even zero if the investment goes bad.

Businesses in both developing and developed countries, in all sectors, are leveraging e-commerce models as way to cut overhead costs and increase efficiency. Furthermore, economic progress is becoming increasingly knowledge-driven in both developing and developed countries. Information infrastructure and knowledge assets are rapidly becoming wealth creating assets for many developing countries such as India, China and Indonesia. It is believed that advancements in e-commerce capabilities, coupled with IT knowledge, could enable developing countries to build their core competencies in IT technology. Recent evidence shows e-commerce capabilities are likely to become influential in determining developing country producers' export success of e-services.

There are a number of government programmes and institutional arrangements that are put in place to encourage technology based entrepreneurship mostly by the central government but in some cases by individual state governments as well. The establishment of the National Science and Technology Entrepreneurship Development Board (NSTEDB) in 1982 was an institutional mechanism, with a broad objective of promoting gainful self-employment among the Science and Technology manpower in the country and to setup knowledge based and innovation driven enterprises. The NSTEDB has two major responsibilities of establishing technology parks and incubators for nurturing already existing entrepreneurs. It organizes a series of training programmes to initiate freshly graduated engineers and other technically qualified students to learn the basics of entrepreneurship. Another important programme to facilitate knowledge-intensive entrepreneurship is the Technopreneur Promotion Programme (TePP) launched in 1998 to help realize the vast latent innovative potential of the entrepreneurs.

The basic objective of TePP is to transform individual innovators in technopreneurs. TePP support is provided for in all areas except software development for which there are other avenues of support. It helps the inventor to identify and network with an appropriate R&D/academic institution for guidance, technical consultancy and development of models/prototypes, besides assisting in for filing and securing of intellectual property rights and

linking with appropriate source of finances for commercialization of the product. TePP by itself provides financial support of upto Rs.1 million as a grant-in-aid to prove the idea and a similar amount for the second phase for commercialization. Technology Innovation Management and Entrepreneurship Information Service (TIME IS), a joint project of NSTEDB, DST, FICCI also strives to enhance the entrepreneurial capability. The project has taken initiatives to provide guidance and assistance to the entrepreneurs especially the technopreneurs to find technologies, projects, funding options and information about policy environment, incentive schemes and industrial infrastructure. TIME IS facilitates entrepreneurs with online interactive tools and templates for developing project profile, feasibility reports and calculating financial and profitability ratios. The DST-Lockheed Martin India Innovation Growth Programme is a two-year, nation-wide project, created to enhance the growth and development of India's entrepreneurial economy. The programme is wholly funded by Lockheed Martin Corporation and was developed with the assistance of University of Texas and FICCI. Its overall goal is to accelerate the launch of Indian early-stage technologies into the global marketplace.

Business incubators are a relatively new concept in India and unlike in other BRICS countries such as Brazil or China, even now the concept is not well developed in India as a support system for engineering technology-based entrepreneurs. There are many incubators spread throughout the country, into three types depending upon the physical location and ownership, as the incubators established: under the aegis of leading institutions of engineering technology and management, for instance within the IIMs and the IITs or within the Science and Technology Parks, for instance within the Technopark in Trivandrum or by leading private sector enterprises such as Nirmalabs. The incubation idea has received a fillip with the NSTEDB deciding to create an incubation fund with an initial corpus of Rs 50 million to facilitate the development of entrepreneurship in knowledge-based, high-growth businesses. The fund is for bridging the financing needs of a technology based entrepreneurs between the time the business venture is floated and the time to attract venture funding.

The TiE network (The Indus Entrepreneurs, established in Silicon Valley in 1992) and the Wadhvani Foundation promote entrepreneurship by organizing workshops and seminars nationally and fund various entrepreneurship education-related projects like the National Entrepreneurship Network (NEN). TiE is a network of entrepreneurs, professionals and venture capitalists active worldwide in technology-related sectors and counts over 10,000 members subdivided into 44 chapters in 9 countries. Every year TiE holds a conference in Silicon Valley attended by numerous stakeholders from the IT industry. Although TiE is not directly involved in funding enterprises, it may provide important mentoring services to its affiliates and help would-be entrepreneurs in many ways such as assistance to preparation of business plan, fund raising and strategic guidance. NEN is working to inspire, educate and support the younger generation of entrepreneurs in catalyst for the creation of technology-based entrepreneurship. Bangalore is a classic example of siliconing the valley.

For one week each year many entrepreneurs come together to celebrate Entrepreneurship Week India. Designed to build public awareness and support for entrepreneurship, E-Week India focuses public attention on today's biggest opportunities and encourages participants to reflect on their role as leaders and innovators. The weeklong campaign is fully supported by the Wadhvani Foundation and run by NEN. E-Week's activities are led by more than 500 NEN member academic institutes and 400 plus NEN student entrepreneurship clubs (E Cells). E-Week is an open platform that reaches far beyond the NEN Community, bringing together and actively involving more than 30 organizations that support entrepreneurship: corporate entities, industry captains, experts, non-profits and faculty leaders to inspire, encourage and support entrepreneurship.

4.3 Bangalore, the IT hub of India

Software sector is human capital intensive in its production process, much more than any other industry (Balasubramanyam and Balasubramanyam, 2010). In 1985, Electronics City was established in Bangalore and the International Technology Park established later was co-financed by the state government of Karnataka. Bangalore has a range of public sector research and educational institutions (Indian Institute of Science, Indian Institute of Management and Indian Institute of Information Technology), public sector establishments (Indian Air Force and Indian Space Research Organization) and high-tech manufacturers (Hindustan Aeronautics, Bharat Electronics and Hindustan Machine Tools). A large part of the total expenditures of software producing firms is made up of wages and salaries of the software engineers. Apart from buildings and hardware, the industry requires very little fixed physical capital. The firms in the industry produce a range of products including application software, system software and programming software. Also, individual firms cultivate niche markets like software for the banks, education institutions and hospitals. Firms can be segmented on the basis of both the sort of specialist software they produce and the specific segment of the industry in which they operate.

According NASSCOM-Deloitte (2008), India has an estimated share of 65 percent of the global IT services off-shoring segment and around 46 percent of the global BPO market. Bangalore has maintained its position as the dominant software clusters in India well ahead other regions in the country. Bangalore and Karnataka state are major exporters of software services, with about 34 percent of national exports in 2008-2009 (Software Technology Parks of India, 2011). Bangalore software firms are now capable of providing the most advanced IT services and some indigenous firms have started to outsource to other cheaper emerging clusters. Bangalore's dominant position can be explained as a cumulative causation process where it attracts the most talented software workers from all over India and has become the brand ambassador of software development in India. In the initial phase many small new firms specialized in the provision of body-shopping services (sending software programmers to the client to provide maintenance services). The local firms become more familiar with the work organization and requirements of the US firms, while the US firms started to outsource tasks to

be performed entirely in Bangalore. This trust between the partners was the result of the interaction and mutual learning between the multinationals and the indigenous firm providing the software services.

Bangalore is among the top five industrialized regions in India. Over the years, it has achieved much in promoting high-technology industries in key sectors like as electronics, telecommunication, information technology, precision engineering, automobiles, ready-made garments, biotechnology and food processing. Karnataka leads the rest of India in electronics and telecommunications, hosting over 300 of the world's leading companies, including Siemens, Motorola, AT&T, Alcatel, Sony, Sanyo, Samsung, British Telecom, GE, and British Aerospace. Large domestic companies, such as Bharat Electronics Limited, Indian Telephone Industries Limited, BPL Limited, and a host of others, also operate in Bangalore. In addition, there is a wide variety of SMEs located in various industrial estates across the city, notably in and around an exclusive electronic city. Bangalore is the home of several public and private R&D institutions and is the destination of a large number of multinational corporations in knowledge-based industries. Further, it is recognized as one of the top ten technopolis in the world (Athreye, 2010). It is the only global hub of technological innovation in India and in south Asia (UNDP, 2001).

The provision of highly qualified human resources together with the co-location of a great number of educational and research institutions and high-tech clusters set the grounds for the emergence of the regional innovation system in Bangalore. Although the local interactions among the indigenous firms were almost absent, SMEs developed strong linkages with the multinationals located in the region, particularly during the off-shoring and outsourcing phase. The regional advantages provided by Bangalore could explain the initial interest of the US firms in locating their outsource activities in the region. The central government has been successful in providing the required human capital in the region and in sustaining the educational effort over time. Employee attrition and wage increases has forced the firms to introduce human capital management and other advanced management techniques in the firm (Athreye, 2005). This, together with a tendency to codify procedures and improve the transfer of knowledge has increased the organizational capital of the firm and hence their absorptive capacity.

IBM set up a subsidiary in India in 1951 to manufacture accounting machine plants in Mumbai. It soon also started sourcing manpower from Bangalore and other locations through this organization. In 1970, the Indian government established a department of electronics, which was instrumental in formulating and implementing a new software export policy in 1972 aimed at providing incentives to firms exporting software services in the form of skilled manpower and encouraging investments in software services. However, a shift in the regulatory policy of the Indian government in the late 1970s meant that most foreign companies, including IBM, left India, leaving unmet demand for IT products and services as well as a glut of engineering talent. This problem ended when Texas Instruments (TI) opened a development centre in Bangalore in

1985 to leverage wage arbitrage and to take advantage of the talent pool available in India. While sourcing work to Indian service providers had been taking place in Bangalore since 1970s, entry of a multinational with a lab that aimed to produce complete software products offshore sent a strong market signal. TI began with low level software requirements and over the years, graduated to more complex R&D tasks, such as the design of the DSP chip. TI set up its own satellite link to improve communications with the US, which helped smaller firms in the region by allowing them to utilize the excess bandwidth to communicate with clients in the US (Lateef, 1997). They demonstrated the usefulness of good satellite links and leased excess satellite capacity to many leading firms like Wipro and Infosys. TI also reached out to educational institutions in the Bangalore area in an effort to tap into the local scientific talent directly. It was involved in curriculum development activities and funded laboratories, especially with the Indian Institute of Science (Athreye, 2005). The Centre for Artificial Intelligence and Robotics and the Defence Avionics Research Establishment were established in 1986 and the Centre for Airborne Systems was followed in 1991. Bangalore had started emerging as a cluster for scientific and knowledge-intensive activities. In 1991, the Indian government initiated many liberalization policy steps toward deregulating almost all industries, decontrolling the exchange rate and reforming of capital markets. This served as a trigger for US-based clients to send development projects to offshore locations in India. Often, Indian employees in US-based companies provided connections or reassurances that led to outsourcing deals with Indian firms (Saxenian, 2006).

Motorola established Motorola India Electronics Limited (MIEL), a software subsidiary in Bangalore. Despite the obvious cost advantages no product division within Motorola was willing to risk sourcing its software needs from MIEL. Many multinational development centres were started by Indian managers working in the United States and many (IBM, Google Labs, Hewlett Packard) were set up by Indian employees of the MNCs who returned to India for the assignment or by Indians (Cisco, Oracle) with international management experience who had managed similar projects before. In addition to managerial expertise, the Indian diaspora also brought highly specialized skills and knowledge about US clients' practices, market players and technology advances to Bangalore. The few R&D centres in Bangalore that were engaged in high-level research (as opposed to product design and engineering) also employed a large number of US-trained PhD graduates, most of them Indian returnees. In 2002 TI has announced a collaborative R&D programme with Wipro, Infosys and Sasken to work on the GSM standard. This co-operation would probably have been impossible if TI had not been serving a captive parent market. The rate of MNC entry grew rapidly throughout the 1990s and most IT companies continued to choose Bangalore for at least one of their subsidiaries. Oracle entered in 1994 and Analog Devices in 1995, while Philips set up its Innovation Campus in 1996 and Cisco established a development centre in 1998. Intel, Hewlett Packard and Texas Instruments followed in 1999.

Based on general satisfaction and trust accorded to the work being done in India, MNCs began to locate full-fledged R&D centres, which entailed a higher knowledge-intensity than

development and maintenance centres in Bangalore. Catering to the need for higher-skilled computer scientists, the International Institute of Information Technology was established in Bangalore in 1999. In the late 1990s, demand for software engineers in the US and other industrialized countries spiked amidst fears of the Y2K (year 2000) problem. Legions of software programmers were hired across the world to convert the date structure in various applications from a two-digit to a four-digit format. Bangalore continued to be a large source of labour during this time as local software engineers were known to be skilled at coding for legacy systems. By 1999, almost half of all engineering colleges and over half of all engineering students in India were located in the southern states. Several firms in the non-IT sector set up centres to develop embedded software for their products (General Motors technical centre in 2003; ABB's IT lab in 2002). IBM and Microsoft, which had already established Indian development centres, both opened research centres in Bangalore in 2005. Other software and hardware companies like Bell Labs (Lucent-Alcatel), Cisco, DELL and Google set up subsidiaries between 2000 and 2007. As Bangalore's reputation grew and business practices were adapted to global standards, entry into its IT cluster became much easier for MNCs. MNCs had opened over 100 such centres in India by the end of 2006. During 2006-07, MNCs announced new investments of over \$10 billion in the Indian IT and ITeS sector to be placed within the next few years. Cisco shifted many of its senior executives to the newly established headquarter East in Bangalore. This was achieved to complement government programmes and to reduce information asymmetry. If one looks at the information technology industry in India, outsourcing software and IT services from the USA and other developed economies have emerged as one of the means to reduce the cost of IT related services.

There are gradations of software firms ranging from those that produce application software to those that produce sophisticated programmes. Software firms tend to agglomerate in regions that are endowed with pools of trainable labour and entrepreneurial acumen that is required. The birth of the software sector in Bangalore dates back to the mid-1980s when Texas Instruments set up its office in the city. Factors that were crucial in the emergence of Bangalore as the Silicon Valley of India include the initiative of the Karnataka government in establishing a software technology park in 1977, later reinforced by the Software Technology Parks Scheme of the central government, the presence of a large number of science and engineering teaching and research institutions, the presence of a large number of public enterprises including Hindustan Machine Tools and Bharat Electronics, the contribution of the Indian diaspora in the Silicon Valley in California to the growth of the sector, state support for infrastructure, the cultural ambience of the city of Bangalore.

The central government organizations such as Hindustan Machine Tools, Bharat Electronics and Indian Telephone Industries Ltd were established during the 1950s and the 1960s. The choice of Bangalore for the location of these industries was dictated by strategic reasons of defence and security. There were also several hardware firms in the city, another proximate reason for software firms to gravitate to the region. Indeed, the presence of manufacturing firms

of various sorts including Hindustan Aircraft Ltd and Mysore Electrical industries date back to the 1940s. Thus Bangalore has had a history of being host to a varied set of industries. One of the main reasons for the attraction of Bangalore as a locale for industries is the large number of scientists and engineers it produces, many more than most other states. Besides the software industry, the city also hosts more than ninety of the 180 bio-tech firms in India. Bangalore is also home to a number of firms manufacturing machine tools, electronic equipment and bio-technology products.

The links between universities and the software firms are weak precisely because most, though not all, academic institutions in Bangalore lack a tradition of research and they are ill equipped to be trouble shooters or partners of software firms. But they do perform a significant service for the software firms; they produce engineering graduates that can be trained on the job. They act as a filter; they sift the intelligent and capable students from the rest. They save the software firms considerable search costs. In fact, the engineering graduates that are successful in the interviews and tests administered by the software firms may be overqualified for the jobs they are initially required to do. Their academic training in mathematics and engineering may be much more extensive and advanced than that required for the software industry. This may be no bad thing as these are the research minded graduates capable of learning by doing and pushing the frontiers of knowledge. It may not be feasible to implement the Stanford/Silicon model in Bangalore, but there may be no need to do so. Software firms especially the large and reputable ones such as Infosys and Wipro, provide the sort of training the young graduates need. The cluster has evolved because of this sort of proximity of software firms to educational institutions in the city. It is not merely the concentration of skilled labour, suppliers and information that distinguish the region.

4.4 The Hyderabad experience

Andhra Pradesh does not have a strong background and tradition of industrial development, like the neighbouring state of Tamil Nadu in terms of entrepreneurship, technical skills and infrastructure. During 1995-2004 the policy was shifted from the pursuit of equity centred on the development of agriculture to one of growth centred on IT. The software sector took birth mostly because of the zeal for spreading IT throughout the state. The World Bank provided \$266 million per annum during the late nineties and the DFID provided another £230 million spread over three to four years. Such disbursements by external agencies directly to a state government by-passing the central government in Delhi, attests to the autonomy over policy of then chief minister Naidu exercised, mostly because of the number of seats his party held in the Lok Sabha, the lower house of the Indian Parliament. Naidu also managed to lure external investors such as Microsoft to establish research centres and a business school in Hyderabad, linked to Kellogg's Business School in the US. He bought the services of the international management consultants to prepare a document titled Vision 2020 outlining the policies to be put in place to promote the development of Andhra Pradesh. The consultants accorded information

technology a major role in attaining his objective and he warmly embraced the recommendations of the consultants. The incentives provided for investment in the IT sector include non-applicability of labour laws, non-applicability of pollution control laws and non-applicability of statutory power cuts. Some of the other incentives provided are allotment of land, power tariff rebate for small and medium enterprises, rebate on cost of land, physical infrastructure such as power, water, sewerage and roads and telecommunication infrastructure (Rao, 2008). Bangalore does not obtain much state support as in Andhra Pradesh.

Hyderabad is known not only for its IT and IT-Enabled Services, but also for pharmaceuticals and entertainment industries. Many call centres, business process outsourcing firms, dealing with IT and other technological services were set up in the 1990s making it the hub of BPO firms. Ramoji Film City, the largest film studio in the world is located on the outskirts of the hi-tech city. The progress of a township with state-of-the-art services called HITEC City encouraged several IT and ITeS companies to setup operations in the city. A rapid growth of technology in this area has led to brand the city as Cyberabad. Hyderabad has also been referred to as the second Silicon Valley of India after Bangalore. There have been widespread investments in digital infrastructure within the city, which includes several multinational corporations having established centres. Hyderabad has the merit of being the software training capital. The city offers innumerable number of software courses that are taken up by thousands from all over the world. Hyderabad is on the brink to become a global city as it has been selected as the location for India's first Fab City, a silicon chip developing facility, being setup with an investment of \$3 billion by the AMD-SemIndia syndicate. In Hyderabad, Gachibowli is one of the fastest growing IT hub with MNC's like Microsoft, Wipro, Infosys, Capgemini, Polaris, Bank of America, Franklin Templeton and others. Because of this development, Andhra Pradesh records for fourth largest revenue from IT exports, amounting to Rs 240 crore, represent about 24 percent of the total IT/software exports.

The software sector in Hyderabad has registered impressive growth and its total exports of Rs 325 billion in the year 2008-09 was surpassed only by Bangalore (Rs 703 billion) and Maharashtra (Rs 423 billion). A study by NASSCOM reports that Hyderabad scores over Bangalore and in fact over other software locations in the quality of its infrastructure. Whilst Hyderabad is ranked number one amongst the various locations of software firms in the country, Bangalore ranks number 6. It is a well known fact that the infrastructure in Bangalore, especially roads and power supply are inadequate. Software, however, is not a transport intensive service and most companies in Bangalore have instituted emergency power supply facilities. The issue though is one of the capabilities of a cluster in generating externalities and promoting human capital development, without a heavy dependence on state subsidies. The software sector in the two cities, one founded and formed by entrepreneurs with a relatively low level of state support and the other with substantial state support. The number of migrants into Bangalore is relatively high and this is mostly on account of the software sector. Bangalore has an advantage over Hyderabad in many other respects including the longstanding presence of a number of higher

education institutions. The state's comparative advantage seems to rest in agro and science based industries such as pharmaceuticals, than in services.

4.5 The IT achievers

This section purports to brief a few of the information technology service providers, who have transformed India's global presence in the IT industry, TCS, Infosys, Wipro, Satyam and HCL.

Tata Consultancy Services: TCS is the largest provider of information technology in Asia and second largest provider of business process outsourcing services in India. TCS has offices in over 42 countries with more than 142 branches across the globe. One of TCS' first assignments was to provide punched card services to a sister concern, Tata Steel (then TISCO). It later bagged the country's first software project, the Inter-Branch Reconciliation System for the Central Bank of India. It also provided bureau services to Unit Trust of India thus becoming one of the first companies to offer BPO services. In the early 1970s, TCS began exporting its services and pioneered the global delivery model for IT services with its first offshore client in 1974. TCS's first international order came from Burroughs, one of the first business computer manufacturers. TCS was assigned to write code for the Burroughs machines for several US-based clients. This experience helped TCS bag its first onsite project - the Institutional Group & Information Company a data centre for ten banks, which catered to two million customers in the US and assigned TCS the task of maintaining and upgrading its computer systems. In 1981, TCS set up India's first software research and development centre, the Tata Research Development and Design Centre in Pune. The first client-dedicated offshore development center was set up for Compaq (then Tandem) in 1985.

In 1979, TCS delivered an electronic depository and trading system called SECOM for SIS SegalInterSettle, Switzerland. It was by far the most complex project undertaken by an Indian IT company. TCS followed this up with System X for the Canadian Depository System and also automated the Johannesburg Stock exchange. TCS associated with a Swiss partner, TKS Teknosoft, which it later acquired. TCS pioneered the factory model for Y2K conversion and developed software tools which automated the conversion process and enabled third-party developers and clients to make use of it. In 1999, TCS saw outsourcing opportunity in e-commerce and related solutions and set up its e-business division. During 2005, TCS ventured into a new area for an Indian IT services company Bioinformatics. In 2008, the company went through an internal restructuring exercise that executives claim would bring about agility to the organization. In 2011, the company entered the small and medium enterprises market with cloud-based offerings. As a brand, TCS is the 76th Most Trusted Brand according to The Brand Trust report, 2011.

Faqir Chand Kohli started off as an engineer with Tata Power Company and rose through the ranks to become the deputy general manager. He was offered the reigns of TCS in 1969. Over the next two decades and more Kohli shaped the destiny of TCS. He was the first to talk about Tandem, first to import an IBM 3090, to maintain that mainframes are not dead and to question the openness of open systems-even before most of the world addressed these concerns. He continues to work on projects that will spread computing in the country, and in recent years has been focusing on hardware and microelectronics. He is credited as the father of Indian software industry.

Beginning his career with TCS as a junior engineer, S Ramadorai rose through the ranks and eventually was charged with setting up TCS operations in the US in 1979 in New York, which has since grown to over 40 offices throughout the country. Since taking on the role of CEO, Ramadorai focused his efforts on building relationships with large corporations and academic institutions, planning and directing technology development and acquisitions and overseeing the company's research and development activities. He has played a pioneering role in establishing Offshore Development Centres to provide high-end solutions to major corporations. Under his leadership TCS set up Technology Excellence Centres that have acquired knowledge, expertise and equipment in specialized technology areas like IBM, SAP, AS400, DEC, HP, Microsoft, Silicon Graphics, Sun and Tandem. Recently, he led TCS in forging new partnerships and alliances with the American International Group of Companies, Citibank, Microsoft, Oracle and widening existing relationships with banks and insurance companies. Ramadorai spearheaded TCS quality initiatives, taking sixteen of its Development Centres to Software engineering Institute's CMM Level 5, the highest and most prestigious performance assessment. TCS also attained the distinction of being the World's first company to have all Centres assessed as operating at Level 5 of People-CMM.

Infosys: Infosys Limited, formerly known as Infosys Technologies Limited is a global services company headquartered in Bangalore and is the second largest IT company in India with 133,560 employees. Infosys is ranked 28th globally in the list It services provision. It has offices and development centres in 33 countries. The company offers software products for the banking industry and business process management services, besides many end-to-end business solutions. According to Forbes magazine, since listing on the Bombay Stock Exchange 1993 till 2000, Infosys' sales and earnings compounded at more than 70 percent a year. In the year 2000, President of the United States complimented India on its achievements in high technology areas citing the example of Infosys along with Wipro and Satyam Computers. Infosys invested \$100 million on establishing a 20,000-seater campus in Shanghai. In 2001, it was rated Best Employer in India by Business India. Infosys was rated best employer to work for in 2000, 2001, and 2002 by AON-Hewitt. In 2007, Infosys received over 1.3 million applications and hired fewer than 3 percent of them. Infosys was the only Indian company to win the Global Most Admired Knowledge Enterprises award for the years 2003, 2004 and 2005 and is inducted into the Global Hall of Fame for the same.

In 1996, Infosys created the Infosys foundation operating in the areas of health care, social rehabilitation and rural uplift, education, arts and culture. Since 2004, Infosys has embarked on a series of initiatives to consolidate and formalize its academic relationships worldwide under the umbrella of AcE– Academic Entente. Infosys' Global Internship Programme, known as InStep, is one of the key components of the Academic Entente initiative. It offers live projects to interns from the universities around the world. InStep recruits undergraduate, graduate and PhD students from business, technology and liberal arts universities to take part in an 8 to 24 week internship at one of Infosys' global offices. InStep interns are also provided career opportunities with Infosys. In 1997, Infosys started the 'Catch them Young Programme', to expose the urban youth to the world of Information Technology by conducting a summer vacation programme, aimed at developing an interest and understanding of computer science and information technology. In 2002, the Wharton School of Business and Infosys started the Wharton Infosys Business Transformation Award. This technology award recognises enterprises and individuals who have transformed their businesses and the society leveraging information technology. Infosys developed a corporate R&D wing called Software Engineering and Technology Labs (SETLabs) in 2000 to carry out applied research for the development of processes, frameworks and methodologies to effectively capture customer requirements and to iron out common critical issues during a project life cycle.

Nagawara Ramarao Narayana Murthy acquired a degree in electrical engineering from Mysore University and later studied computer science at the IIT, Kanpur. The Infosys legend began in 1981 when Narayana Murthy dreamt of forming his own company, along with six friends. There was a minor hitch; though he did not have any seed money. His wife Sudha then an engineer with Tatas had saved Rs 10,000. This was Murthy's first big break. The second break came in 1991 when Indian doors to liberalization were flung open. Murthy grabbed the opportunity and has never looked back ever since. Today, Infosys is the first Indian company to be listed on the US NASDAQ. While working in France in the 1970s, Murthy was strongly influenced by socialism. It was his belief in the distribution of wealth that made Infosys one of the first Indian companies to offer employees stock-option plans. Infosys now has more than 400 employees who are dollar millionaires. Heading a company with the largest market capitalization has not changed Murthy's life-style much. Sudha Murthy heads the Infosys Foundation, which channels Rs 50 million into charity every year. Simplicity, humility and maintaining a low profile are the hallmarks of Murthy.

Nandan Nilekani had been the CEO and managing director of the Infosys and along with Narayan Murthy, was one of its co-founders. He has served as a director on the company's board since its inception in 1981. The stint at IIT Mumbai transformed Nandan Nilekani from a small town boy to a confident mature man. The lessons he learnt here-meritocracy, the ability to work as part of a team, hard work and the importance of giving back to the society-have stood him in good stead. After graduating in electrical engineering from IIT Mumbai in 1978, Nandan Nilekani joined Patni Computers, working under Narayan Murthy. Three years later in 1981,

Nandan Nilekani along with Narayan Murthy and five other co-founders founded Infosys. While Narayan Murthy stayed in India, Nandan Nilekani shifted to the US to take care of Infosys' interests there. Infosys has an employee strength of 58,000, annual revenue of \$2 billion and \$21 billion capitalization. Nandan Nilekani is recipient of several honors and awards. In January 2006, Nandan became one of the youngest entrepreneurs to join 20 global leaders on the prestigious World Economic Forum Foundation Board. He figures among one of the 100 most influential people in the world by Time Magazine, 2006. In 2005 he was awarded the prestigious Joseph Schumpeter prize for innovative services in field of economy, economic sciences and politics. In 2006, Nandan Nilekani was conferred the Padma Bhushan. He left Infosys in 2009 to serve as the chair of the Unique Identification Authority of India. He co-founded India's National Association of Software and Service Companies as well as the Bangalore Chapter of The IndUS Entrepreneurs.

Wipro: Wipro Limited, a global information services company is headquartered in Bangalore. According to 2011 revenue, Wipro is the third largest IT services company in India and employs more than 219,429 people worldwide. Wipro is ranked 31 globally in 2011 in the list of IT service providers. It is 9th most valuable brand in India according to an annual survey conducted by Brand Finance and The Economic Times. Wipro provides outsourced research and development, infrastructure outsourcing, BPO and business consulting services. The company operates in three segments: IT Services, IT Products, Consumer Care and Lighting. Wipro Technologies, the global technology and consulting services division of Indian conglomerate Wipro. The company was established in 1980 as subsidiary of Wipro (Western Indian Palm Refined Oil) Limited listed on New York Stock Exchange. The company logo still contains a sunflower to reflect their original business. During 1970s and 1980s it shifted its focus and begin to look into business opportunities in IT and computing industry. Wipro was the first company which marketed the first indigenous homemade PC from India in 1975.

By 2000, Wipro Technologies emerged as the largest publicly listed software exporter in India and the first software services provider to be assessed at Level 5 in the world. Wipro won the Golden Peacock Innovative Service Award for effective service delivery using state of art technology in 2001. Wipro was awarded SVG1, the highest rating in Stakeholder Value Creation and Governance Practices by ICRA and an associate of Moody's Investor Services. Wipro was awarded the India Manufacturing Excellence Award for its factory in the large enterprises category by Frost and Sullivan. Wipro was awarded the prestigious ASTD BEST Awards for 2005 by the American Society of Training and Development. Wipro's Global Command Centre won the Marico Foundation and Business World's Innovation for India Award in 2006. The conglomerate was rated as the No.1 Network Integrator and No.1 Network Security Services Provider by Voice and Data Magazine. The majority of Wipro BPO's business comes from the US, followed by Europe. The rest of the world contributes only marginally to its top line. The company posted a turnover of \$290 million in 2008.

Azim Hashim Premji is Chairman of Wipro Technologies, one of the largest software companies in India. He is an icon among Indian businessmen and his success story is a source of inspiration to a number of budding entrepreneurs. Azim Premji was studying electrical engineering in Stanford University, USA when due to the sudden demise of his father, he was called upon to handle the family business. Azim Premji took over the reins of family business in at 21. At the first annual general meeting of the company attended by him, a shareholder doubted Premji's ability to handle business at such a young age and publicly advised him to sell his shareholding and give it to a more mature management. This spurred Azim Premji and made him all the more determined to make Wipro a success story. Wipro dealt in hydrogenated cooking fats and later diversified to bakery fats, ethnic ingredient based toiletries, hair care soaps, baby toiletries, lighting products and hydraulic cylinders. Thereafter Premji made a focused shift from soaps to software. Under Azim Premji's leadership Wipro has metamorphosed from Rs.70 million company in hydrogenated cooking fats to a pioneer in providing integrated business, technology and process solutions on a global delivery platform. Today, Wipro Technologies is the largest independent R&D service provider in the world. In 2000, Asiaweek magazine, voted Premji among the 20 most powerful men in the world. Azim Premji was among the 50 richest people in the world from 2001 to 2003 listed by Forbes. In April 2004 Times magazine rated him among the 100 most influential people in the world. He is also the richest Indian for the past several years and in 2005, Azim Premji was honoured with Padma Bhushan.

Mahindra Satyam: Mahindra Satyam is a brand identity of Satyam Computer Services Limited. Satyam Computer Services Limited was founded in 1987. Mahindra Satyam is a part of the Mahindra group. The company offers consulting and information technology services spanning various sectors, and is listed on the New York Stock Exchange, National Stock Exchange and Bombay stock exchange. In June 2009, the company unveiled its new brand identity Mahindra Satyam subsequent to its takeover by the Mahindra's IT arm, Tech Mahindra. Mahindra Satyam has offices in 32 countries and is ranked 17 in the list of IT services providers in India according to a study by CyberMedia's Dataquest Research in 2011

Ramalinga Raju was one of the pioneers of the Information Technology industry in India. He was the founder and Chairman of Satyam Computer Services Ltd. Ramalinga Raju moved away from the traditional agriculture business and set up a spinning and weaving mill named Sri Satyam. . Thereafter he shifted to the real estate business and started a construction company called Satyam Constructions. In 1987, Ramalinga Raju founded Satyam Computer Services along with one of his brothers-in-law, DVS Raju. With the launch of Satyam Infoway, Satyam became one of the first to enter Indian internet service market. Ramalinga Raju has won Ernst & Young Entrepreneur of the Year for Services award in 1999, Dataquest IT Man of the Year in 2000, CNBC's Asian Business Leader - Corporate Citizen of the Year award in 2002 and E&Y Entrepreneur of the Year Award in 2007. However, the ever-soaring share prices of Satyam witnessed a sharp decline in December 2008, following a failed acquisition attempt involving Maytas, a company owned by Raju's family. In January 2009, Raju resigned as the Chairman of

Satyam after he admitted to major financial wrong-doings and confessed of his involvement in inflating the profits of the company.

Hindustan Computers Limited: HCL focuses on the global and domestic market and provides product engineering and R&D, enterprise and custom applications, enterprise transformation services, infrastructure management and BPO services. It has operations spanning 31 countries. HCL Infosystems Ltd., a listed subsidiary of HCL, is an India-based hardware and systems integrator. It has a presence in 170 locations and 300 service centres throughout India. HCL Peripherals (a unit of HCL Infosystems Ltd.), founded in 1983, is a manufacturer of computer peripherals. Its enterprise response centre) was started to give outstanding support to its customers in 2007.

Shiv Nadar is the Chief Executive Officer of HCL, India's largest infotech conglomerate. He figures in the Forbes list of Indian billionaires. Originally hailing from Tamil Nadu, Shiv Nadar moved to Delhi in 1968. He worked as an engineer with DCM Ltd. Along with six of his colleagues he launched a firm making office products like copiers. In late 1970s, when IBM quit India, Shiv Nadar's HCL stepped in to fill the vacuum. In 1982, HCL came out with its first computer. Today, HCL derives 80 percent of its revenue from computers and office equipment. HCL has also been spreading its global reach. Its Singapore subsidiary, Far East Computers, achieved a breakthrough in imaging technology, which, among other applications, enables computers to read handwritten tax returns. HCL has adopted innovative practices to achieve growth. In the US, HCL America has reaped dividends by taking advantage of global time zones. Every morning, the company's Chennai office receives software assignments from the U.S, just after work stops there for the night. A team of Indian engineers complete the jobs and send them back in the evening.

4.6 Conclusion

India's stride in the IT industry has been phenomenal and there are many reasons for the success of the Indian software industry. India has a good supply of scientists and engineers and many of these can be trained and encouraged to become entrepreneurs. This assumption is usually substantiated by invoking the gross enrolment the undergraduate degree programmes in engineering and architecture: the enrolment has increased from 7.08 lakhs in 2002-03 to 16.68 lakhs in 2005-06 (Ministry of Higher Education, 2008). Most of the successful entrepreneurs have either studied in Tier 1 institutes such as the IITs or NITs or they have secured degrees from foreign universities. The presence of a large number of English speaking population, besides low wages when compared to west is slowly becoming a disadvantage, but it was one of the main reasons for International Software companies to outsource IT work to India.

The Indian culture is a huge contributor like parent's commitment to children's education. The importance of education is ingrained by them on their children at a very young age. They see

good education as the only means to have better standard of living. More than 60 percent of India's population is less than 25 years of age. And people in software sector normally put more than 10 hours a day in their work

Further, Indian IT Industry has grown due to off-shoring especially after 1991 liberalization policy and credit has to be given to growth of domestic companies in auto, retail, banking, telecommunication, and manufacturing. Partial privatization of the telecommunication sector also contributed to the IT revolution. The rapid growth in IT parks and SEZs (specialized economic zones), where opening of software services companies got tax subsidies attracted many companies to setup software shops. The tax breaks and sops offered by the government for upcoming software firms made India one of the most attractive markets for setting up software companies.

The existing software service exporters face two major challenges, the first being the difficulty in attracting and retaining talented software professionals and second the challenge of developing beyond competing on low costs alone in an environment with rapidly rising labour costs. Firms are moving up the value chain by accumulating knowledge about the industry segments for which they currently develop software. Indian firms provide services for the lower portion of the waterfall model and moving up the value chain involves providing conceptualization, requirement analysis and design services as well. Such a strategy, which ultimately involves getting involved in business process reengineering for overseas clients may be difficult, since accumulating domain knowledge and business expertise are not easy. Firms will have to invest in hiring, training and retaining their employees, in expanding overseas and establishing subsidiaries in many countries and in acquiring the technological and business expertise needed. These firms will also be able to execute large, complex projects on their own with little or no supervision from foreign clients. Also, they may be able to anticipate the business needs of their clients and offer them solutions. These firms can acquire other Indian software firms or their assets), or employ the latter as subcontractors. With these prospects, the Indian software companies have to establish their global business leadership. The next chapter will discuss the country's entrepreneurial travails in the sphere of biotechnology.

Chapter 5

Biotechnology Enterprising in India

5.1 Introduction

Apart from IT, it is in the field of biotechnology that India has made significant strides in research and development. Biotechnology involves collection of technologies that capitalize on the attributes of biological systems, processes and organisms along with their contributions to manufacturing industries and utilizing molecules such as DNA and proteins to work for human benefit (Singh et al, 2009). The foundations of modern biotechnology were laid in the first half of 20th century. The products of the innovative efforts need to be protected including the financial investments by strong intellectual property laws. Effective intellectual property protection and enforcement contribute to the growth, development and success of human invention involving biotechnology. With the sequencing of the human genome and advances made in plant and animal genetics and other aspects of the life sciences, these technological breakthroughs provide the building blocks for what are likely to be major industries with implications for agriculture and human health. Not only will humankind benefit from new innovative technologies but will also have the opportunity to contribute to the advancement of scientific knowledge and the development of the global biotechnology industry. Commercialized biotechnology concentrates in biotechnology clusters surrounded by universities and life sciences research institutes (Friedman, 2006). Effective technology transfer is necessary with a formal legal infrastructure for university participation and sufficient funds to file patents and the formation of new companies requires a business infrastructure in the community.

Nikkei (2012) reports that Indian pharmaceutical companies, known world-wide as generic medicine producers, have started their global marketing strategies in Japan, USA and the European Union. The companies already experienced in producing heart disease and steroid medicines will now expand their production capacity both in home and Japan to exploit ever-increasing demand for such medicines. India enjoys its comparative advantage in many generic medicines over the rest of the world at prices one tenth lower than world market. According to Nikkei (2012), the following companies will have their market presence in Japan and other countries. Times Medicare is of the opinion that the company will explore both India and Japanese markets and the company will be a potential partner in Japan. The Ipoca Laboratories will find a possibility of having a partner on a long-term basis to supply raw materials to produce high blood pressure medicines for the foreign companies operating in Japan. Ajanta Farma will explore marketing of heart disease and anti-malaria generics in the USA and will start a new factory in Gujarat, half of productive capacity being specialized for export. Abic Pharmaceuticals will expedite application for new approval (raw materials) from current two to nine medicines within two years time frame. Further, JB Chemicals and Pharmaceuticals will increase the number of approvals for more medicines every year from the current level of six medicines. These developments have enabled India to enjoy about twenty percent of world market in end-user consumption of generics (Nikkei, 2012).

Bangalore has emerged as the capital of both information technology and biotech industry, having the largest number of companies in both the sectors. This chapter discusses the major trends in the biotechnology sector in India in recent times. Section 5.2 describes the development of biotech sector in India, while section 5.3 explains the recent initiatives undertaken for its development in the areas of biopharma, bioagri and bioenergy. The section also touches upon international collaboration in this respect. Section 5.4 showcases the major barriers in biotech innovations, entrepreneurship being the major highlight. Section 5.5 describes the major biotech companies in India like Dr Reddy's, Wockhardt, Nicholas Piramal, Ranbaxy, Biocon and others. Section 5.6 is on few of the noted bioentrepreneurs, while section 5.7 concludes.

5.2 Biotechnology in India

Biotechnology constitutes one of the essential technologies of the knowledge economy, with its industrial revenue reaching \$60 billion in 2006, ten times of its 1996 level (Huggett et al, 2011). It is one of the most R&D intensive industries as global leaders of the biotech industry spent an average of more than 20 percent of their revenue on R&D, whereas other high-tech sectors, such as computer hardware and software fields spent, on average, less than 10 and 20 percent respectively (Huggett et al, 2011). Similar to their success in the ICT industry (China focusing on ICT hardware and India on ICT software), these two countries have made significant progress as world players in the biotech industry within a short time span. For instance, China's biopharmaceutical industry has witnessed 20-30 percent revenue growth annually since 2001 (Zhou, 2007), while India achieved a growth rate of 36 percent during 2005-06 (Suresh, 2009). In 2005, China and India ranked as the ninth and the eleventh in biotech revenue (Buckley et al, 2005). Although India has currently outperformed China in terms of quantity, scale of manufacturing and globalization (Buckley et al, 2005), innovative domestic firms have become essential for the expansion of the biotech industry in both countries. In India, 14 of top 20 biotech firms were 'home grown and all top 6 firms are domestic (Suresh, 2009).

The global biotechnology industry is forecast to exceed \$320 billion by 2015 (Global Industry Analysts, 2012). The economic crisis negatively impacted the biotechnology market, and brought about revenue declines in the US and the EU as a result of limited capital inflows and the delay or cancellation of projects. The biotechnology industry was further segmented in 2011, steered away from its traditional drug focus and into other fields, including clean-tech and chemical manufacturing. The global genetic testing industry is in a period of strong growth, fuelled by rising numbers of genetic disorders, better awareness and an aging population, the market being at \$1.5 billion in 2010 (Global Industry Analysts, 2012). The world genetic testing market is expected to reach \$4 billion by 2015. Global enzyme demand is expected to grow, with the market expected to exceed \$7.5 billion in 2010. Regional growth rates will be highest in markets like the Africa/Mideast region, and Central and South America. Growth will be

comparatively lower in established economies such as the US and the EU. Enzyme demand in North America will be negatively impacted by a slow switch over to biomass-based biofuel production. EU enzyme demand will be negatively impacted by the EU debt crisis (Global Industry Analysts, 2012). The US dominates the global biotechnology industry, followed by Germany, Spain, France and the UK. China and India are likely to record strong growth in agricultural and industrial biotechnology industries due to rising income levels and population. Both countries are playing an increasingly significant role in the biotech drugs market on the back of relatively low-cost investment and a high level of expertise. The US-based life sciences companies generate over \$500 billion in revenues, followed by Japan. The life sciences industry in the Asia Pacific (not including Japan) registered \$103.6 billion in 2007, growing at 13 percent. The rate of adoption of GM/biotech crops is striking. From a mere 1.7 million hectare in 1996, the cultivated area under biotech crops spread to 125 m ha in 2008 (Global Industry Analysts, 2012).

In the global biotech market, Indian share is 2 percent and the sector is fast emerging, according to a Mc Kinsey & Co study (Kumra et al, 2011). The consumption of biotech products in India was \$1.8 billion during 1999, which grew up to \$4.3 billion by 2010. It is estimated that 10 percent of researchers and 15 percent of scientists in pharmaceutical and biotech R&D in USA are of Indian origin. In the human and animal products segment of the industry, the vaccines market is valued at \$230 million and is growing at 20 percent. According to Kumra et al (2011), Indian pharma industry is poised to grow to an innovation-led \$25 billion by 2010 with a market capitalization of \$150 billion from the generic-based drug industry. Traditionally India has been a very strong player in conventional generics due to established track record of process engineering skills and capability to set up comparable manufacturing units at a fraction of the capital cost utilized overseas. Companies such as Shantha biotech, which started with just one product, are now effectively using this experience to launch other products like plasminogen activators, interferons, sophisticated vaccines etc. Shanta Biotech's Shanvac against Hepatitis B, costs \$4, less than half the price of similar vaccines marketed by multinational companies. Eli Lilly- Ranbaxy 50:50 joint venture in India has been marketing a range of biotech products such as Humalog and Huminsulin for diabetes. Hoechst Roussel Vet has developed a cow abortion IBH vaccine (Kumra et al, 2011).

Agribiotech deals with hybrid seeds and transgenic crops, biopesticides and biofertilizers. In the agri-biotech segment India is the second largest food producer after China. Transgenics of rice, brassica, moonbean, pigeonpea, cotton, tomato and some vegetables like cabbage and cauliflower would be ready for large scale dissemination. Hicks Muse will bring forth foreign investment worth \$35 million for production and marketing of hybrid and improved variety of seeds (Kumra et al, 2011). The Indian partner in this venture is Mahindra Hybrid Seeds and Bayer functions in India through acquiring New Delhi based ProAgro group of companies. Marine resource development and aquaculture also hold a great potential with India having more than 8000 kilometers of coastline. In the agricultural and allied areas India has achieved the

cloning and sequencing of at least six genes, developed regeneration protocols for citrus, coffee, mangrove species and new types of biofertilizers and biopesticide formulations, including mycorrhizal fertilizers. An impetus has been given to the plant tissue culture industry after the successful tissue culture pilot plants and micro-propagation of the technology has been started.

Bioindustrial industry deals with enzyme manufacturing and marketing companies and these enzymes are used in detergent, textile, food, leather, paper and pharmaceutical industry. Industrial biotech segment is expected to show significant growth and products for development include enzymes, bio-instrumentation and bioprocess equipment. Contract research services are focused on molecular biology, bioinformatics, genomics and stem cell research. Clinical research and trials are expected to grow exponentially over the next 5 years. Scores of large IT companies have already established bioinformatics units and Bangalore and there are opportunities for data-mining, gene annotation and the development of software interfaces. Major research has been carried out at government funded research institutes like Indian Council of Agricultural Research, Indian Council of Medical Research, Council of Scientific and Industrial Research and Department of Biotechnology under the Ministry of Science and Technology (Kumra et al, 2011).

The Indian biotech industry grew threefold in just five years to report revenues of \$3 billion in 2009-10, a rise of 17 per cent over the previous year, according to the eighth annual survey conducted by the Association of Biotechnology-Led Enterprises and BioSpectrum (2009), based on inputs from over 150 biotech companies. The biopharma sector contributed nearly three-fifth to the industry's revenues at \$1.9 billion, a rise of 12 per cent, followed by bioservices at \$573 million and bioagri at \$420.4 million. The remaining revenue came from the bioindustrials (\$ 122.5 million) and bioinformatics (\$50.2 million). Biopharma and bioservices sectors contributed 63 per cent and 33 per cent respectively in biotech exports (Kumra et al, 2011). Bioagriculture, bioindustrials and bioinformatics sectors remain focused on domestic operations. While the industry, spanning bio-pharma and agri-biotech, accounted for \$3 billion, the equipment and ancillary segment contributed around \$1 billion. India is also gaining importance as a clinical trial destination. According to a joint study by an industry body and Ernst and Young released in August 2009, the industry-sponsored clinical trial sites in India have grown by 116 per cent during June 2008 and August 2009, with the country moving from rank 18 to 12 across the 60 most active countries. India participates in 7 per cent of the global Phase III trials and 3.2 per cent in the Phase II trials with industry-sponsored trials having grown by 39 per cent during 2004-08 (Kumra et al, 2011). Biopharma deals with the production of vaccines, therapeutics and diagnostics, while the end products of the biotech industry find two different kinds of buyers include private hospitals, governments, patients and pharmaceuticals. Bioinformatics deals with creation and maintenance of extensive electronic databases on various biological systems. Bioservices market deals with clinical trial, contract research and manufacturing activities.

India's biotech action is not confined to just therapeutic products. In 2002, after a long regulatory process, the first genetically modified product, a *Bacillus thuringiensis* (Bt) cotton variety was introduced in the country. The Bt cotton seed variety, developed for the Indian market by a joint venture company of Monsanto, was a success despite several controversies. Within six years, Bt cotton seeds cover more than 90 percent of the fields growing hybrid cotton. The total cotton growing area remained unchanged but there was an increase in productivity. India has become the second largest cotton producer after the USA, overtaking China and a net exporter of cotton. The Bt cotton seeds became a \$250 million segment within the biotech industry. India's seed companies were highly innovative in adapting the transgenic technologies. Homegrown seed companies like Nuziveedu Seeds, Hyderabad and Rasi Seeds, Tamil Nadu, were stiff competitors to Monsanto in turning out quality Bt cotton hybrids. Other seed companies like JK Agrigenetics, Krishidan Seeds, Ankur Seeds and Indo-American Hybrid Seeds, are poised to make even greater dent into the bioagri market. India is taking the step in permitting the commercial cultivation of GM food crops. Regulators allowed limited field trials of India's first GM food crop, a Bt variety of eggplant (aubergine) in 2007. India is second largest global producer with 26 percent share and its consumption exceeds \$2 billion. Over 1.4 million farmers cultivate eggplant in 550,000 ha (Kumra et al, 2011).

Located in Hyderabad, the bio-valley of India, two of the three firms, Shantha Biotechnics and Bharat Biotech International are acknowledged as dedicated and innovative biopharmaceutical firms that have managed to gain significant success and recognition (Frew et al, 2007). The Indian firms demonstrate their innovation capability by a large number of their own brands of recombinant products. For instance, Shantha was the first in India to develop the r-DNA hepatitis B vaccine, followed by Bharat and others. Both Shantha and Bharat have a range of recombinant products based on their own innovations. Jupiter, on the other hand, is the leading world producer in drug intermediates (Fan and Watanabe, 2008). Innovation capability has become increasingly vital to the success of the Chinese and Indian biotech firms as well as the survival of traditional pharmaceutical companies who are struggling with declining profits. The firms are highly successful in the market due to the branded products they introduced to the market through their innovation. Indian biotech firms invest heavily in R&D for biotech products and as a result, 7 of 14 recombinant biotech products approved by the Indian government were developed and are currently manufactured by Indian firms (DBT, 2006). Faced with declining profits due to price wars, traditional pharmaceutical firms are looking into innovation in the biotech area as an alternative. For instance, Biocon and Dr Reddy's have entered the bio-drug field and traditional pharmaceutical firms in China are looking for options to overcome their present predicament through the purchase of small innovative biotech firms (Jia, 2007). Institutional factors like involvement of the government have prompted the firms to conduct indigenous R&D or to import foreign technology.

The change in the intellectual property regime and memberships in WTO and TRIPS has provided a push for domestic firms to move toward indigenous R&D. Conventional

manufacturing procedures based on reverse engineering are challenged and they are effectively barred from replicating innovations patented in the western world due to the implementation of WTO Agreement in 2005 (Mani, 2009). However, Indian firms may file patents to protect IP rights as India has become a signatory to the Patent Cooperation Treaty administered by the WIPO. TRIPS introduced three main elements of change in the Indian patent system. It banned production and sales of re-engineered pharmaceutical products. It extended product patent protection applied to all branches of manufacturing, including drugs, the period of protection to 20 years. Finally, it forbids discrimination between imported and domestic products. Further, both governments have provided crucial stimulus to starting-up these innovative firms and encouraged domestic firms to innovate through direct funding, creating new biotech governance and establishing innovation policies particularly for biotech (Fan and Watanabe, 2008).

India established Department of Biotechnology in 1986 to provide a better environment for biotech development, particularly technology transfer between research institutes and private firms. In China, the Guideline on Pharmaceutical Industry Development for the 11th Five Year Period (2006-2010) released in 2006 proposed that both public and private money earmarked for pharmaceutical R&D should be increased from the current 1-3 percent of revenue from pharmaceutical sales by the end of 2010 (Jia, 2007). The guideline also outlined greater pricing leeway to producers of innovative drugs to encourage investment in biotech research, whereas the pharmaceutical firms were forced to slash their prices (Frew et al, 2008).

Domestic biotech firms are confronted with two major challenges in developing innovation capacity, financial and human resource constraints. As limited financial resources have become the bottleneck, it is critical to reform current regulations on funding mechanisms and to attract international resources. The country has set up technology policies to facilitate funding for R&D activities due to the underdeveloped mechanism to fund high-tech ventures. As a result, currently government support has been the main avenue for financing domestic biotech firms, especially for start-up firms, although Indian firms are able to channel a quite significant portion of the revenue back to R&D due to their outstanding performance in manufacturing (Jia, 2007). To deal with limited domestic resource, Indian firms started actively seeking international funding sources, ranging from venture capital, World Bank and the IMF and the Bill and Melinda Gates Foundation. Although both India and China have a good education infrastructure and a large pool of low-cost scientists, their university education cannot meet the standards of the industry (Fan and Watanabe, 2008). To rectify this problem, the human resource plan of DBT has proposed various approaches for a quick fix of qualified biotech graduates, postgraduate doctors, and scientists in India (DBT, 2006). Both countries are looking to attracting expatriates from overseas into high-level elite positions in the hope of repeating Taiwan's success story in the electronics industry

There are over 280 companies which are involved in the biotech value chain, located in six bio-clusters, Mumbai-Pune, Bangalore, Hyderabad, Ahmedabad-Baroda, Delhi and Chennai.

The companies operate in five distinct segments of bio-pharma, bio-agriculture, bio-industrial, bio-services and bio-informatics. The biotech industry is likely to become a \$15 billion business by 2015. The industry has seen three waves of entrepreneurship in the last three decades. The last two waves took place in the past 10 years. More than 100 companies entered into the biotech industry between 1999 and 2001, prompted by the unveiling of the human genome map. The third wave happened in 2006 when over two dozen companies were set up by first-term entrepreneurs who quit their laboratories, encouraged by the success stories of the second wave of entrepreneurs (Natesh and Bhan, 2009).

There is considerable opposition to the introduction of a genetically modified food crops within the country. The regulator's decision on this crop will determine the entry of at least six other transgenic food crops. The world's largest biotech company Amgen set up Indian operations in 2007 and Genzyme has set up research and development facilities. AstraZeneca established its development centre in Bangalore and its process development division is part of its key global network. AstraZeneca is concentrating on developing cures against neglected diseases like tuberculosis. The global biotech DuPont set up a biotech research facility at its DuPont Knowledge Centre in Hyderabad and Eli Lilly, GSK and Pfizer, Roche, Novartis and Merck have also started their biological manufacturing and research facilities. India's pharmaceutical majors, Wockhardt, Panacea Biotec, Ranbaxy, Dr. Reddy's Laboratories, Cipla, Intas Pharma, Glenmark Pharma, and Piramal Life Sciences have invested in biopharma product development. Dr. Reddy's has come out with many major biosimilars products. The government launched a three-year \$70 million Biotechnology Industry Partnership Programme which will fund all innovative biotech research ideas by private companies. Under the National Biotech Policy announced in November 2007, an integrated National Biotechnology Regulatory Authority has been set up to provide a single-window clearance system for biotech products.

To reduce the burden of oil imports, the 2008 national biofuel policy seeks to promote the growing of non-edible fuel crops such as jatropha and pongamia in 30 million ha of wastelands available in the country. A 5 percent blend of biodiesel with conventional diesel has been permitted and the percentage is expected go up to 20 percent by 2017. More than 300 educational institutions are involved in training nearly 20,000 biotechnology students every year. Further, many companies are at conducting research with stem cells. Diagnostic kits based on molecular biology are the new rage and personal genomics and proteomics will follow suit soon. In sum, the comparative advantage of Indian companies is in reverse engineering and process improvements that lowers the price of generics. Since the US market is the largest market for generics in the world and along with other European markets, leveraging reverse engineering capabilities by selling to these markets would be a right step. The other strategy includes the development of new technological capabilities in new product and process. The launch of a new drug has to go through the stages of basic research, identifying the appropriate active pharmaceutical ingredients, combining these ingredients into a product, performing preclinical and clinical trials to test impact, identifying the right dosage and drug delivery system, seeking

regulatory approval through completing a number of procedures and finally marketing the new drug. From start to finish the commercialization of a new drug can take anything between 15 to 20 years. With the Patent Law of 1970 Indian firms developed skills in the middle stages and the marketing but not in new drug discovery research techniques, preclinical or clinical trial methods. For western firms, which are proficient in all the above steps but need to speed up and cheapen the drug discovery process, the presence of Indian firms proficient in reverse engineering offers outsourcing opportunities. For Indian firms aspiring to become new drug manufacturers, they have to develop absorptive capacity and technological capability in creating drugs, performing preclinical and clinical trials and seeking regulatory approval. Finally, they also have to build new capabilities to market new products through doctors in western hospitals.

5.3 Recent Initiatives

Biotechnology Information System (BTISnet-BioGrid India), envisaged as early as 1986–87 has today more than 150 bioinformatics centres located across the country (Natesh and Bhan, 2009). This acts as a distributed database and network, and has become successful as a vehicle for the transfer and exchange of scientific information, knowledge and technology packages in the country. A national facility for *in silico* drug development has been set up at the Indian Institute of Technology, Delhi. Over 150 subject-specific databases and software packages are now available on the BTISnet for open access. The private sector has also contributed to the success of the biotech sector, especially in the manufacturing and service segments. In the face of several odds like lack of financial resources, stiff competition among multiple domestic manufacturers, need to balance between doing innovative R&D and delivering affordable quality products, Indian companies commercialized a number of products. The sector crossed the \$2.5 billion during 2007-08. The past five years have witnessed a spectacular growth rate of 30 percent. The biopharma segment continues to contribute to the extent of 67 percent, followed by bioservices (15 percent), agribiotech (12 percent), bioindustrials (4 percent) and bioinformatics (2 percent). Exports constitute about 56 percent share of the sector. In 2007-08, the investment touched Rs 2750 crores, up 21 percent over the previous fiscal. Industry sources forecast that by 2015 the sector would be worth \$13-16 billion in revenue country (Natesh and Bhan, 2009).

5.3.1 Biopharma segment

The biopharma segment mainly concentrates on vaccines, non-vaccine therapeutics, other novel products and contract services. Its impact has been on promoting low-cost commodities and forcing a price reduction on multinational bioproducts. India's first domestically developed and marketed rDNA product Shanvac-B, a recombinant hepatitis B surface antigen from Shanta Biotechnics, Hyderabad was cost-efficiently produced in the *pichia pastoris* expression system in 1997. Subsequent local competition from other domestic manufacturers such as Biological E. Ltd, Hyderabad, Indian Immunologicals and Serum Institute of India, Pune, resulted in a 30-fold price reduction (from \$15 to \$0.50) over the imported product, which was then the sole Hep-B product

in the market. There are about 15 companies involved in the marketing of over 50 brands for 15 different vaccines. In 2006–07, vaccine business was worth \$745 million and registered over 30 percent growth over the preceding fiscal. Human and animal vaccines together accounted for 51 percent share of the total biopharma segment. Shanta Biotechnics now supplies 40 percent of the global requirement of Hep-B vaccine for UNICEF. The Serum Institute of India is not only the largest supplier of vaccines to the government's Expanded Programme of Immunization (EPI) but also the country's largest exporter of vaccines. Every second child in the world is vaccinated using Serum Institute's measles vaccine and DPT (diphtheria, pertussis and tetanus) vaccines. Panacea Biotec, New Delhi, supplies oral polio vaccine to EPI and UNICEF. Because of this vaccine development, newer alliances between DBT, Indian companies, public-funded institutions and global philanthropic institutions such as Malaria Vaccine Initiative, Bill & Melinda Gates Foundation, Programme for Appropriate Technologies in Health and the Wellcome Trust have emerged (Natesh and Bhan, 2009).

Biogenerics (biosimilars) represent a major future opportunity in economic terms and for products at reasonable costs because of many noted drugs going off patents. Biocon's development of a proprietary process for manufacture of recombinant insulin (insugen) forced international competitors to cut back their price by 40 percent, even before the product entered the Indian market. Insugen was priced even lower and remains the most affordable human insulin in the domestic market. Biocon is now developing recombinant oral insulin. Shanta Biotechnics marketed its recombinant interferon alpha (IFN- α) product, Shanferon at Rs 300, substantially lower than the then imported price at Rs 1200 (Natesh and Bhan, 2009).

Other innovative products include: pentavalent vaccines for protection against five infectious agents, including DPT, Hep-B and *haemophilus influenza* type B or Hib (Shanta Biotechnics and Serum Institute); single or combination vaccines against locally relevant diseases such as Japanese encephalitis, anthrax, cholera and meningitis (Panacea Biotec, Biological, Hyderabad and Transgene Biotek); vaccine against rotaviral diarrhoea (Bharat Biotech) and bacteriophages as antibacterial agents against multi-drug resistant bacteria (GangaGen Biotech), besides lysostaphin, an antiinfective multidrug-resistant *staphylococcus aureus* (Bharat Biotech) (Frew et al, 2007). The biotech companies are carrying out contract services such as R&D, clinical trials or manufacturing as a route to funding operations and building commercial capacities. India is fast becoming one of the largest hubs for conducting global clinical trials. According to a report by RNCOS, in 2007 the country conducted over 220 clinical trials, accounting for 2 percent of the global trials. Low cost, large patient pool, easy recruitment, strong government support and strengthening of the intellectual property environment may up this to 5 percent by 2012 (Natesh and Bhan, 2009). The surging clinical trials market in India is likely to create enormous opportunities for a number of entrepreneurs and associated industries, including *in vitro* diagnostics market, education sector and data management. The registration of clinical trials in India would allow implementation of quality

assurance measures. International auditing of centres will also be helpful in promoting enforcement of ethical norms and good clinical practices.

5.3.2 Bioagriculture segment

Indian agriculture faces the formidable challenge of having to produce more farm commodities for human and livestock population from diminishing per capita arable land and water resources. Biotechnology, in combination with classical breeding techniques, has the potential to overcome this challenge to ensure the livelihood security. *Bt* cotton approved in March 2002 is the first and until now the only biotech product in India that has been released for commercial cultivation after regulatory approval (Tuli et al, 2009). Most of the area under transgenic cotton features *Bt* genes sourced from Monsanto, but bred into local hybrids. From about 50,000 ha in the beginning, the area reached 7.6 m ha in 2008, occupying 82 percent of cotton area. In 2008, 30 seed companies were engaged in the production of 274 *Bt* cotton hybrids in nine states. The first indigenous *Bt* cotton variety, *Bikaneri Narma*, the first public sector genetically modified crop developed by the Central Institute of Cotton Research, Nagpur and the University of Agricultural Sciences, Dharwad was approved in 2008 for planting in 2009. Since this is a variety and not a hybrid, farmers can save seeds for planting in the following season. The yield of cotton increased from 308 kg/ha in 2001-02 to 560 kg/ha in 2007-08 season. Half of this is attributable to *Bt* cotton hybrids that have generated impressive economic gains for Indian farmers, which has halved the insecticide requirement and enabled India to emerge as a net exporter of cotton from being a net importer. The government of India's Cotton Advisory Board estimates that there has been a positive impact of *Bt* cotton on cotton-seed oil production as well in terms of 22 percent increase or 1.1 million tonnes in 2007-08, from 0.9 mt in 2006-07. According to the Solvent Extractors Association of India, recovery of cotton-seed oil is higher from *Bt* cotton hybrids, which has contributed toward increasing the production of cotton-seed oil. However, it has also thrown up some criticisms and regulatory issues which need clearer communication with the consumers and the public.

Emphasis has been laid on genomics of rice, chickpea, wheat and tomato and on tolerance to biotic (diseases and pests) and abiotic (drought, salinity) stress. A number of public-funded R&D initiatives focus on the identification of quantitative trait loci and genes and their deployment into cultivars (Tuli et al, 2009). *Bt* rice is under field-testing. Other priorities include enhancement of nutritional quality (beta carotene in rice and mustard, micronutrients such as iron and zinc in rice, wheat and maize and protein quality in potato through *ama1* gene) and improvement of shelf life in fruits and vegetables, especially through delayed ripening. There is a strong pipeline of biotech crops in India and *Bt* brinjal may become the first transgenic food crop to be introduced in India. However, private sector investments are still comparatively low.

5.3.3 Bioenergy

India faces challenges in meeting its energy needs. In order to maintain an annual GDP growth of 8 percent over the next 25 years to meet its goals for poverty elimination, the country needs to triple its primary energy supply and quadruple its electricity supply. India now imports about 65 percent of its petroleum and with demands mounting this could surely increase to 90 percent by 2025. In this scenario, renewable energy sources such as biofuels represent an attractive option. India's thrust is on producing ethanol from cellulose biomass, including agricultural and forestry waste, biodiesel from varied feed stocks, and optimally harness the energy potential of natural resources for conversion to alternative fuel. The main challenge is to apply biotech tools for improving the biomass production system, promote the bio-refinery concept aiming at the integral use of biomass and maximizing the cost-effectiveness of the final products. Biotech interventions are being used to reengineer feed stock for enhanced ethanol recovery and microorganisms for increased productivity. The Department of Biotechnology (DBT, 2006) has established an Energy Biosciences Centre at the University Institute of Chemical Technology, Mumbai to develop economically and ecologically sustainable technology for biofuel from biomass and provide a platform for evaluating bioenergy-related technologies.

5.3.4 International collaboration

In the knowledge-based economy, no country can afford to isolate itself today. Moreover, a number of problems related to health, food and agriculture, energy and environment can be solved effectively only through international partnerships. Indian biotechnology, while solidly rooted in the home soil, has to have a global outlook. International alliances are necessary with public and private sector partners for joint intellectual property rights generation toward harmonized regulatory processes and smoothened trans-boundary movements of biologicals besides leveraged markets for biotech products and processes. Companies such as Biocon, Serum Institute, Bharat, Shanta, Mahyco and others have entered into collaborative arrangements with overseas companies and agencies. DBT has forged strategic and enduring partnerships in specific R&D areas with chosen countries and institutions. Partnerships in the past were only with academic institutions, but recently, industry has been included as in the case of DBT- European Commission collaboration on food, health and well-being. Other notable partners include the Wellcome Trust, UK; Stanford University, California for bringing together medical and engineering experts for the biodesign programme for medical devices; Biotechnology and Biological Sciences Research Council, UK, for the Biotechnology Young Entrepreneurship Scheme; University of Wisconsin, Madison for exchange of doctoral scholars and PATH, BMGF and MVI for partnership on late-stage development of vaccines.

5.4 Barriers that impede innovation and discovery

From the foregoing, it is obvious that India must build on its manufacturing and service strengths. However, there is a growing realization that cost advantage which has served it well in the past will not last too long. It is time to take a crucial step toward discovery and innovation in life sciences and biotechnology. India's lead in biological sciences is relatively small and much of the high-end biology research is pursued only in a few universities and research institutes (Biospectrum, 2009). Moreover, the university system has problems of building excellence in life sciences training, coupled with deficiency of research-intensive universities. This is true of medical, agricultural and veterinary institutions, where patient burden or extension activities take a heavy toll on research. Archaic rules on faculty hiring and promotions and insufficient infrastructure further aggravate the problems. While IITs have been strong in engineering and physical sciences, they do lag behind in biological research, although plans are now afoot to rectify this omission. The brightest of students are no longer opting for a career in science, and those that do are not skilled enough to be able to take up entrepreneurial positions. Hence, while India has been successful in producing a strong scientific workforce, the system has not been good enough to generate a critical base of bioentrepreneurs.

5.4.1 Weak entrepreneurial skills

Most academic and research institutions in India are not geared to undertake innovative and translational research. While the benefits of information age are well appreciated, the basic realities of the entrepreneurial age are not. The world GDP has grown more than ten-fold since 1970 and four-fifths of that growth occurred after the developing economies and countries once behind the iron curtain began to liberalize their economies. Entrepreneurship is the driving force behind growth everywhere, including India and China. Yet, enterprise is a term wholly lacking in discussions about higher education and research intensive universities. In spite of the current economic downturn, the USA remains the guiding spirit of entrepreneurship (Frew et al, 2008). The US universities have traditionally close relations with the industry and act as economic engines rather than ivory towers, with a number of science parks, technology saloons and venture capital funds. Few Indian academics nurse entrepreneurial ambitions. This tendency has its origin in a society that hates failures, given the weak mechanisms for technology transfer between public institutions and private firms. Students emerging from this environment are least linked to businesses that can make use of their talent. There are not enough mechanisms to expose students to research openings in the private sector, thereby losing an opportunity to stimulate business interest in S&T by demonstrating the benefits of hiring highly qualified people.

5.4.2 Lack of public-private partnerships

Most of the public-funded research centres in India are not industry-friendly. Further, industries in general, including life science-associated companies do not actively seek partnerships with research laboratories, preferring instead to go abroad in search of partnerships. There is also a difference in expectations from such partnerships. Both industry and academic institutions have to meet half way in making adjustments. Institutions also lack units or structures that can flexibly handle interactions with the industry, without the barriers of bureaucracy. One outcome of this is a fragile and only incrementally increasing public-private partnership in biotechnology.

5.4.3 Risk-averse nature of industry

Indian industry is generally risk-averse. This is probably a reflection of the reluctance of Indian banks and investors to invest in biotech ventures. Industry-led R&D is still not adequate in scale or quality when it comes to innovation and discovery research. The government has provided fiscal incentives such as relaxed price control for drugs, removal of foreign ownership limits, subsidies on capital expenses and tax holidays for R&D spending, but until recently, direct investment in industry R&D has not been made available. Moreover, funding agencies have to find ways of breaking the sociologic and behavioural stronghold of the current competitive grant system that selects against risk taking. A recent survey of Indian biotech and pharmaceutical companies (Fan and Watanabe, 2008) revealed that till the end of 2007 just 15 percent of the companies held US patents. While there were 425 pharma patents, the study could identify only 19 biotech patents starting from 2001. Among the biotech patents, 11 percent were categorized as product patents, 47 percent as process patents and 37 percent as design patents.

5.4.4 Lack of venture funding

Angel funding for companies that want to pursue pure research with the intention of marketing products is still hard to come by in India. Increasing domestic and international competition requires a continuous capacity for innovation and bringing innovations to the market, not merely catching up with technology. Investment in high-tech R&D and synergy between public and corporate sector R&D is the call of the day, but the institutional framework has to be appropriate to ensure access to start-up financing and for sharing the risks and rewards of innovation. In the life sciences sector, information asymmetry between the scientist, entrepreneur and financier is the most challenging and requires a role for public sector institutions in the incubation and nurture of technology start-ups.

5.4.5 Lack of venture capital

In India no agency provides venture capital to young graduates, academics or working professionals to help turn creative ideas into viable inventions and explore the entrepreneurial potential of a scientific idea. A good example is the ignition grant mechanism of the Deshpande Centre at MIT, which enables the faculty of to take risks and explore uncharted concepts, before

they have developed proof of concept or gathered any data. DBT is in the process of developing a new scheme of ignition grants to young innovators.

5.4.6 Streamlining the regulatory process

Research and application of biotechnology has to be guided by a process of decision-making that safeguards human, animal and plant health environments. A science-based, rigorous, transparent, efficient, predictable and consistent regulatory mechanism for biosafety evaluation is vital to the growth of the biotechnology sector. In recent years, Indian biosafety regulation has become streamlined, but there is still room to prepare it to respond rapidly to changing technologies and develop more effective and transparent processes. There is an urgent need to increase the pool of dedicated regulatory experts in India with proficiency in dealing with biologicals and set up institutional mechanisms for in-service training and retraining of professionals dealing with scientific risk assessment and management of transgenic crops.

5.5 The biotech firms

The Indian biotech industry holds a 2 percent share of the global biotech industry. With the growth in the customer base and more investments taking place in the biotech sector, the biotech industry is expected to grow to around Rs 440,000 crores by the year 2020. The high demand for different biotech products has also opened up scopes for the foreign companies to set up bases and reap great profits. The biotech sector has crossed \$1 billion and there has been a high growth of the bioagri sector in the country. With the introduction of new technologies, the sector has grown to Rs 598 crore from Rs 330 crore. The government has also taken steps to boost the biotech industry in the country. Since the establishment of the Department of Biotechnology many innovations have been made in this field to combine rich knowledge along with skilled and cheap manpower. A number of research laboratories have been set up in this regard to facilitate the growth of the sector. This has led to the innovation of various drugs for the production of insulin, blood clotting, human growth and so on. Life saving vaccines and enzymes are also been manufactured.

5.5.1 Leading Biotech companies in India

There are around 350 companies in India which produce specialized products and services in various sectors of biotechnology. The leading biotech companies contribute around 27 percent of the total revenue of the sector. With the liberalization in the Indian economy, a number of foreign biotech companies have entered the Indian market. Biocon is one of the premier biotech and healthcare companies, which provides specialized services in the biopharmaceutical market. The main objective of the company is to offer health care products in the fields of diabetes, cancer, inflammatory ailments and so on. A number of medical therapies are also offered at affordable rates. Nicholas Piramal India Limited has made itself a big brand

name and ranks as fourth in the Indian healthcare market, offering a number of services like medicines and therapies. The company has also successfully launched itself in the markets of Europe, North America and Asia. Dr Reddy's Laboratories ranks among the premier biotech companies and has successfully launched into the American and European markets. The company is known for offering specialized facilities in the field of healthcare and therapeutic medicines. It also provides research facilities in areas like inflammation, metabolic disorders and infective diseases. Indian Immunologicals Ltd established in 1983 ranks among the best vaccine producing companies in the world. Bharat Serums and Vaccines Limited was founded in the year 1971 and is one of the fastest growing biotech companies, having engaged in the development and manufacturing of specialized biological and pharmaceutical products. The Pune based Serum Institute of India is the world's largest producer of MMR and DTP group of vaccines. The Institute produces several recombinant and combination vaccines (like Gene Vac-B), anti-cancer drugs, as well as anti-Sera, Plasma and Hormonal products. It is India's largest exporter of vaccines, supplying to over 140 countries. Through the UNICEF and the Pan American Health Organization, this company helps in immunization of over half the world's children against measles and other dangerous diseases. The Institute is engaged in serious research on measles vaccine on human diploid cells and rabies vaccine, industrial column chromatography and affinity chromatography for separation of immunoglobulins and human growth hormone (rDNA)-SAIZEN in pre-pubertal children with growth hormone deficiency.

Biocon is India's premier biotech company that specializes in biopharmaceuticals, custom research, clinical research and enzymes. The company is a leader in the field of bioprocessing and clinical research and development, and provides solutions/products in both domestic and international markets. Biocon launched the world's first recombinant human insulin, INSUGEN, in 2004. It has produced India's first indigenous monoclonal antibody BIOMA-EGFRTM. The company has recently divested its enzymes business and decided to concentrate on its bio-pharma business verticals that include active pharmaceutical ingredients, biologicals and proprietary molecules. The company is now focusing on several futuristic projects like microbial fermentation (both submerged and solid state), chemicals synthesis, human insulin and mammalian cell culture.

Panacea Biotech is India's leading health management company that specializes in developing innovative prescription medicines, breakthrough vaccines, peptides and monoclonal antibodies and cutting edge new drug delivery technology. Panacea produces its hepatitis B vaccine (enviseHB) in collaboration with the Centre for Genetic Engineering and Biotechnology, Cuba. The company has also developed several combination vaccines, the leading ones being Ecovac (DPT+Hepatitis B), Easy Four (DPT+HIV) and Easy Five (DPT+Hepatitis B+HIV). Vaccines for anthrax and Japanese encephalitis are under preparation. Some medicines produced by the company include nimulid tablets and gels, betaglim, glizaid range of medicines, monovalent oral polio type I and type III vaccines and Ocimix.

The Mumbai-based *Monsanto India* is credited with many revolutionary products and technological breakthroughs in agricultural sciences. The company is famous for producing the Bt- cotton (Bollgard) and genetically modified crops which play an important role in India's agrarian economy.

Rasi Seeds, based in Tamil Nadu, is known for its efforts in hybrid cotton and other insect resistant technology. The company is in the process of making rapid advances in the field of plant germplasm (collection, conservation and utilization in crop improvement); breeding for new lines with earliness, erect leaves, orange-flint and orange yellow semi dent grain colours and development of new single cross, modified single cross and three way cross hybrids for evaluation and identification of high yield hybrid combinations.

Venkateshwara Hatcheries of Andhra Pradesh is a leader of poultry industry in India. It is a conglomerate dedicated to integrated poultry development and is credited with its ability to indigenize the Babcock (layer) and Cobb (broiler) breeds. The group has made important strides in genetic research of Venco and VRB, joint ventures of the group with Cobb Vantress and ISA Breeder, especially in the field of specific pathogen free eggs in the manufacture of poultry vaccines; production of specific pathogen free eggs, manufacture of automated poultry equipment, introduction of combined and inactivated (killed) vaccines and setting up of sophisticated disease diagnostic, surveillance and monitoring laboratories.

Novo Nordisk is well known for its accomplishments in the field of diabetes care and the company has come up with revolutionary products and services. Novo Nordisk mainly produces the Novomix-30 (premixed insulin analogue) and NovoRapid (rapid acting insulin analogue) that provide that are useful to diabetes patients. Besides diabetes care, the company is also engaged in research in the fields of growth hormone therapy and haemostasis management.

Tulip Group of Companies is involved in the manufacture and marketing of *in vitro* diagnostic reagents and kits, both for domestic and international markets. The group comprises of eight independent diagnostic companies - Tulip Diagnostics (P) Ltd, Microxpress, Orchid Biomedical Systems, Coral Clinical Systems, Qualpro Diagnostics, Tulip Marketing (P) Ltd, Zephyr Biomedicals and Lilac Medicare (P) Ltd. These companies are engaged in specific areas of research, development and design systems and platforms within the assigned technological areas. At present, the company is concentrating on immunohaematology, immunology (fertility, rheumatology and infectious diseases), immunoturbidimetry, haemostasis, haematology, clinical microbiology, parasitology, virology, cardiac and cancer markers, clinical biochemistry and instrumentation.

Indian Immunologicals Limited, a wholly owned subsidiary of the National Dairy Development Board (NDDB) deals with veterinary science and medicines. The company produces a whole range of cattle vaccines, canine vaccines, sheep vaccines, etc.

Transasia Biomedicals produces clinical diagnostic equipments and reagents and has over 1700 installations all over the country, supported by a network of 25 service centres. In collaboration with leading International companies like SYSMEX, WAKO & NITTEC of Japan, BIOHIT of Finland & TRACE of Australia, the company has been manufacturing many equipments in respect of biochemistry and hematology. The company also exports to a number of countries like China, Korea, Germany, Australia, Netherlands, Turkey and USA.

5.5.2 Dr Reddy's

Dr. Reddy's laboratories (DRL) were founded in 1984 by Dr. Anji Reddy, who formerly worked in the public sector company Indian Drugs and Pharmaceuticals Ltd. In 1987, DRL launched Norilet, its first brand. Major success came with the launching of Omez, the brand name under which the generic Omezaprozole was sold. A superior process technology allowed DRL to launch it at a price 50 percent lower than that of the other brands selling in Indian market. Within a year of its inception, DRL also began to export active pharmaceutical ingredients to Europe. In 1994, it opened a state of art manufacturing facility in Hyderabad in order to increase its production capacity in generics. It filed its first ANDA for Ranitidine 75mg tablets and improving on that, in 1999 it submitted an application for Omeprazole and Rantidine. It got approval before patent expiry and without litigation for these products but lost out in subsequent court battles. In 2001, DRL became the first Indian company to launch Fluoxetine (a generic version of Eli Lilly's Prozac) with six month market exclusivity in the US. This marketing success was followed by the launch of Ibuprofen tablets 400, 600 and 800 mg in the US under its own brand name. Direct marketing under the DRL brand name represented a significant step in building DRL's fully fledged distribution network in the US market. Starting a full-fledged R&D laboratory in 1992, DRL invested about Rs. 1.12 billion in R&D over an 8-year period. It filed 55 US patents of which 19 have been granted. It licensed three molecules to foreign drug firms (two to Novo Nordisk and one to Novartis) for \$8 million in 2001. The R&D intensity has been increased from 5.5 to 8 percent.

Dr. Reddy's application strategy for generic business aimed at gaining market exclusivity was a risky and expensive strategy as it involved challenging existing patents. This strategy received a severe set-back when DRL lost the patent challenge in the case of Pfizer's drug Norvasc in February 2004. Furthermore, big pharma companies have found a loophole in the Hatch-Waxman Act and have started pre-emptively launching their own version of the generics drug which wipes out the six month exclusivity.

DRL's transition path toward new drug discovery involves targeting specialty generics products in western markets in order to transit to drug discovery capabilities. The reason that development of specialty drugs can be an important link to the development of new chemical entities is that all the elements that are involved in a new chemical entity (NCE) effort, such as innovation in the laboratory, developing the compound sending the sales team to the market are

also stages in the development of a specialty drug, except that the scales are smaller and therefore more manageable. DRL has also invested heavily in building R&D labs and remain the only Indian company to have significant R&D being undertaken overseas. Dr. Reddy's Research Foundation (DRF) was established in 1992 and is dedicated to new drug discovery. Initially, DRF's drug discovery research strategy revolved around analogue research but DRF changed its focus to work in rational drug design with a hiring strategy that targeted fresh scientists especially Indian students studying abroad on doctoral and post-doctoral courses. Though DRF wanted to introduce modern skills such as drug discovery based on genomics and proteomics, it struggled with this change as it could not find scientists in India equipped enough in these areas of research. Therefore in 2000, DRF set up a lab in Atlanta, US, dedicated to discovery and design of novel therapeutics. The lab is called Reddy US Therapeutics Inc (RUSTI) and its primary aim is to conduct drug discovery using molecular genomics and proteomics approaches for next generation drugs. Research thrust at DRL is focused towards large niche areas in western market like anticancer, antidiabetes, cardiovascular and anti-infective drugs. In terms of new drug discovery achievements, DRF currently has many NCEs in various stages of development in clinical development. The clinical development of three molecules is being undertaken by DRL (on its own) while two other molecules are developed in collaboration with Rheoscience, Denmark (Balaglitazone) and Clintech International, Germany (DRF 1042).

Although DRF's progress in innovative R&D is remarkable, it had a fair share of failures. For example in 1998 DRF signed the agreement with Novo Nordisk to develop and market pharmaceutical products of its first molecule, Ragaglitazar. However in 2002 adverse effects appeared during clinical trials and Novo Nordisk abandoned research on the molecule and decided to work on another DRL molecule. In 2003, Novo Nordisk terminated development of the molecule due to adverse effects. In 2002, DRL granted exclusive rights for the development and commercialization of DRF 4158 to Novartis Pharma AG. But in 2003 Novartis opted to replace dual acting insulin sensitizer with another follow-up compound. The most important lesson that DRL has learnt from such failures is that new drug discovery is a risky business and it is necessary to formulate and implement a strategy for risk management, both in terms of collaborative ventures and financial support. Aurigene Discovery Technologies, a contract research company was established as a fully owned subsidiary of DRL in 2002, in Bangalore, India, to gain experience of drug discovery through contract research for other pharma companies. It has acquired Trigenesis (US), a dermatological company with new molecules in its product portfolio and has taken an equity stake in Bio Sciences. DRL has entered into a venture investment type of agreement with the Indian Bank and ICICI, under which ICICI Venture will fund the development, registration and legal costs related to the commercialization of ANDAs on a pre-determined basis. On commercialization of these products, Dr. Reddy's will pay ICICI Venture royalty on net sales for a period of 5 years.

DRL's successful growth into a fully integrated pharmaceutical company in less than a decade was founded on a successful and targeted programme of inorganic growth and investments in process R&D. It chose a high risk-high gain strategy to growth by going into direct competition with existing patent holders. A major challenge for DRL is to find ways to de-risk its overall strategy. One may be in managing the cash flows from the safer active pharmaceutical ingredients (API) and formulations businesses. Another way may be to seek out more experienced partners for the R&D business or use acquisitions to boost R&D resources and revenues. DRL is still trying out various de-risking strategies and has entered into out of court settlements where a Para IV strategy appears likely to succeed. Thus, DRL has made a private settlement with Novartis to delay its launch of the generic rival to Exelon, its drug for Alzheimer's. In 2007, the new drug discovery units of DRL were de-merged from the rest of the business, a trend that was followed by Ranbaxy and several other leading firms.

5.5.3 Wockhardt Ltd

Wockhardt was started by Khorakiwala family in 1959 as a small pharmaceutical distribution and selling entity. From the early 1990s the company has spent over 20 percent of its total research budget on biotech R&D. Wockhardt's R&D Centre at Aurangabad initiated programmes in the field of new drug discovery research in 1997, a break from the past when the focus had been uniquely on biogenerics. Wockhardt has decided to concentrate its efforts on the anti-infective therapeutic segment as the main thrust area in new drug discovery R&D. It explores the biotechnology route to drug discovery and in order to gain experience in it has concentrated on the bio-generics segment. The drug discovery programme has yielded a few lead molecules, one of which, WCK 771, a broad spectrum antibacterial has completed Phase I clinical trials. The other chemical entities WCK 1152 and WCK 1457 are under pre-clinical trials. In 2001, Wockhardt indigenously produced a drug called erythropoietin for severe anemia using genetic engineering methods. However, the most important milestone in biotech R&D came with development of human insulin. In 2003, Wockhardt launched Wosulin. The company is the first outside US and Europe to develop, manufacture and market this life saving drug used in diabetes. In 2004 Wockhardt commissioned a state of the art production facility dedicated to the manufacture of biotech products. The company is also developing a generic version of the biopharmaceutical Interferon Alfa 2b, which is in the third phase of clinical trials.

From 2000 onwards, the company went through a major re-structuring, splitting the pharmaceutical business from the agro-chemical, intra vitreous fluids and hospital business to form two divisions- Wockhardt Life Sciences and Wockhardt Ltd. The aim of this restructuring was to allow Wockhardt Ltd to concentrate more on building skills and capabilities in the pharmaceutical business. Wockhardt started targeting international markets only in the late 1990s, when early entrants like Ranbaxy and DRL had already made exports of generic drugs from India credible. Wockhardt's expansion into Europe and the US is based largely on acquisitions of plants that have FDA approval. Thus, it entered the UK market by acquiring Wallis Laboratory

in 1998 and CP Pharmaceuticals in 2003. In 2004 Wockhardt acquired the German pharmaceutical company, Esparma GmbH. This acquisition has given Wockhardt increased depth in product portfolio and helped company to strengthen its presence in the European business. In 2007 it acquired Negma Laboratories, a large integrated pharmaceutical company in France. Wockhardt launched its US operation in 2003 by starting Wockhardt Americas Ltd and now has its own marketing and regulatory teams based in US. Wockhardt's US strategy is based on launching formulation products through ANDA route and in 2003 it had filed 17 ANDA applications with USFDA.

5.5.4 Nicholas Piramal India Ltd

NPIL is a part of the Piramal Enterprises with interests in retailing, textiles, auto components and engineering. In 2000, the group consisted of 26 companies (including joint ventures), with aggregate revenues of about \$500 million. The company acquired Roche Products (India) Ltd in 1993, Sumitra Pharmaceuticals and Chemicals in 1995 and Boehringer Mannheim India Ltd in 1997. This acquisition was followed by two more acquisitions, Rhone Poulenc (India) in 2000 and ICI (India) pharmaceuticals in 2002. In Dec, 2003 NPIL bought the 50 percent stake in Sarabhai Pharmaceuticals Ltd. Since most of the sellers were multinational pharmaceutical firms which wanted to quit the Indian market, NPIL acquired these firms at attractive prices and quickly synergised skills resulting in large benefits through attaining critical mass to leverage on marketing and distribution. These acquisitions also helped NPIL create strong linkages with MNC pharmaceutical firms like Roche, Boehringer, Allergan, Boots, Aventis, and Novartis. NPIL has developed a two-way approach for developing NCE that builds on their good relationships with multinational firms. The first one is inward co-licensing deals with foreign firms, custom synthesis and contract manufacturing for MNC pharmaceutical firms while the second is to undertake contract research for the development of the product patented molecules to make pharmaceutical drugs. One part of the NPIL strategy involves partnering with innovator companies worldwide across different segments of the pharmaceutical value chain. It has developed the ability to provide end-to-end solutions in a range of activities like chemical synthesis of APIs, intermediates and also dosage formulations. However, NPIL does not provide support to early to market generic product development or contract with generics companies for such work. The early to market generics involve challenging the existing patent and instigating litigation with the original innovator, whereas in late to market generics, the patent is already expired and therefore patent litigation is avoided.

In 2003, NPIL set up a subsidiary in the US, NPIL Pharmaceutical Inc. for moving the custom manufacturing business development nearer to prospective customers. In 2003, NPIL signed its first custom manufacturing contract with the US firm Advanced Medical Optics, Inc. for manufacturing select eye care products for their global markets. The second constituent of its strategy is development of product patented molecules for licensing to MNC pharmaceutical firms. In 1998, NPIL acquired the research centre of Hoechst Marion Russell located in Mumbai,

which since its establishment in 1972, was focused on new drug discovery research and herbal research. In 2002 NPIL also established a Clinical Research Organization (CRO) to strengthen its clinical trial capabilities. Aligned with NPIL's core philosophy of partnership, the aim of CRO is to serve the generic pharmaceutical industry by conducting clinical pharmacokinetic studies and subsequently, leveraging its skills by partnering with Indian as well as MNC pharmaceutical companies.

5.5.5 Ranbaxy

Ranbaxy Laboratories Limited was established in 1961 and listed on the Bombay Stock Exchange in 1973. Ranbaxy started as a manufacturer of active pharmaceutical ingredients (API) and soon began looking at international markets for securing these ingredients. In 1977 Ranbaxy established a subsidiary in Nigeria through a joint venture and in 1984 it expanded operations to Malaysia. R&D activity in Ranbaxy started in the late 1970s and early efforts were focused on formulating bulk drugs into dosage forms and on developing cheap processes to synthesize bulk drugs. Soon after Ranbaxy began to concentrate its R&D efforts towards developing a novel production process that would let it sidestep process patents of other companies with a view to entering the profitable generics market. In 1985 these efforts were successful and Ranbaxy found a novel way to manufacture the anti-ulcerant Ranitidine, the generic molecule of an original drug developed by Glaxo and sold under the brand name of Zantac. This marked the start of a strategy based on the manufacture of generic drugs, accompanied with the opening of the Ranbaxy Research Foundation in 1985. One of Ranbaxy's active pharmaceutical ingredients (API) manufacturing plants was approved by the US Federal Drugs Authority (FDA) in 1988. Ranbaxy started work on developing a new seven stage process for the production of Cefaclor in 1988 despite internal doubts about committing R&D resources to a product that was difficult to manufacture and in addition would be too expensive for the Indian market. After three years and spending nearly \$2 million, Ranbaxy emerged with a non-infringing process for the manufacturer of Cefaclor and also managed to obtain higher yields from its process as compared to Eli Lilly's original production process. From 1995, Ranbaxy stepped up its R&D expenditures from 2 percent of sales to 5 percent and established state-of-the-art multi-disciplinary R&D facilities at Gurgaon.

The company's new strategy was to establish capabilities in the areas of discovery research, delivery systems and clinical research by adopting a two stage approach, where development of capabilities in drug delivery systems would be a stepping stone to the development of drug discovery capabilities. In 1999 Ranbaxy registered its first major success, when it developed the once-a-day dosage for the Ciprofloxacin molecule. This improvement in dose administration promised greater patient compliance compared to multiple dosages offered by the patent holder, Bayer. Ranbaxy licensed the once-a-day technology to Bayer of Germany for \$10 million for further development. In 2004, Bayer successfully launched the 500mg and 1gm once-a-day formulation in the US, based on delivery technology platforms developed by

Ranbaxy. Ranbaxy had no prior experience in drug discovery research and therefore it concentrated on building a strong, well focused inter-disciplinary research team. Thereafter, it initiated an open policy of recruitment including scientists from India as well overseas. The company has also internationalized its R&D efforts mainly to fortify the developmental aspects of R&D. Ranbaxy's US R&D facility Ranbaxy Pharmaceuticals Inc. does not carry out any laboratory work but focuses on clinical research, regulatory affairs and commercial inputs on diseases, targets and compounds. Ranbaxy's new drug discovery R&D focus includes urology, anti-infective, respiratory, anti-inflammatory and metabolic disorders segments. Ranbaxy's first NCE, for Benign Prostrate Hyperplasia (BPH), was licensed to Schwartz Pharma but after Phase II clinical trials, the molecule was abandoned. Ranbaxy's other promising drug is an anti-asthma molecule, undergoing Phase II clinical trials. Besides these, the company has other molecules in its NCE pipeline, which are at different stages of clinical development.

Ranbaxy presents the quintessential example of staged growth through integration of pharmaceutical production, R&D activities and internationalization efforts. It showed great alertness and foresight in grasping the significance of the generics market opportunity long before liberalization and TRIPs and made entry into western markets for generics. In expanding its R&D capability the company has concentrated on human resource recruitment as a means to building up skills, internationalizing its R&D effort in order to stay close to regulatory market needs and lastly managed risk in undertaking new R&D through targeted small outcomes in the drug delivery. However, recognizing its limitations in the ability to test and market new drugs, Ranbaxy has also preferred to rely on licensing to multinationals for the direct marketing of its new dosages and molecules.

5.6 The bioentrepreneurs

This section presents brief profiles of some noted entrepreneurs in the field of biotechnology. Anji Reddy is a pioneer in the pharmaceutical research in India and is founder-chairman of Dr Reddy's Group of Companies. Kallam Anji Reddy did his B.Sc in Pharmaceuticals and Fine Chemicals and subsequently completed his PhD in Chemical Engineering from National Chemical Laboratory, Pune in 1969. Anji Reddy served in Indian Drugs and Pharmaceuticals Limited from 1969 to 1975. Reddy was the founder-managing director of Uniloids Ltd from 1976 to 1980 and Standard Organics Limited from 1980 to 1984. In 1984, he founded Dr. Reddy's Laboratories and soon the company established new benchmarks in the Indian pharmaceutical industry. Dr. Reddy's Laboratories transformed Indian bulk drug industry from import-dependent in mid-1980s to self-reliant in mid-1990s and finally into the export-oriented industry that it is presently. In 1993, DRL became the first company to take up drug discovery research in India and in April 2001 it became the first non-Japanese Asian pharmaceutical company to list on NYSE. By the end of 2005, DRL was India's second largest pharmaceutical company and the youngest among its peer group. Presently, Dr. Reddy is a serving member of the Prime Minister's Council on Trade &

Industry, Government of India and has been nominated to the Board of National Institute of Pharmaceutical Education and Research (NIPER). He is the founder-Chairman of Dr. Reddy's Foundation for Human & Social Development, which acts as a catalyst of change to achieve sustainable development. The awards and honours received by him include Sir PC Ray award (1984, 1992) and Federation of Asian Pharmaceutical Associations FAPA-Ishidate Award for Pharmaceutical Research in 1998. The business magazine Business India voted him Businessman of the Year in 2001 and CHEMTECH Foundation bestowed on him the Achiever of the Year award in the year 2000 and the Hall of Fame award in 2005 for his entrepreneurship, leadership and thrust on Innovation; and in 2001, he was awarded the Padma Shri by the Government of India.

Habil Khorakiwala, the Chairman of Wockhardt Limited, founded the company in the early 1960s. Under his leadership, Wockhardt has emerged as a leading biotechnology and pharmaceutical company, driven by research and global strategies. Today, Wockhardt has an annual turnover of \$650 million and a market capitalization of over \$1 billion. Khorakiwala leads a team of 7000 employees based in India, the UK, Ireland, the US and France. Khorakiwala advocates a customer-centric approach that has filtered down to every decision and action in Wockhardt's. The management process at Wockhardt is an open culture, participative management practice aimed at innovative and continuous improvement for speedy response, empowerment of individuals and enjoyment of one's job and contribution to the community. He has been the past president of FICCI and president of Indian Pharmaceutical Association. He has been awarded the Ernst & Young Entrepreneur of 2004 in Healthcare and Life sciences.

Bhai Mohan Singh is the founder of Ranbaxy Laboratories Ltd. Bhai Mohan Singh began his business career in the construction business during the Second World War. His firm bagged a contract to build roads in the North East. After Partition, he left Rawalpindi and settled down in New Delhi. He started business as a moneylender. Ranbaxy was started by his cousins Ranjit Singh and Gurbax Singh. They were distributors for A. Shionogi, a Japanese pharmaceutical company manufacturing vitamins and anti-TB drugs. When Ranbaxy defaulted on a loan, Bhai Mohan Singh bought the company in 1952 for Rs 250,000. He collaborated with Italian pharma company Lapetit Spa and later on bought it. He made his mark in the pharmaceuticals industry in the late 1960s when he launched his first super brand, Calmpose. Calmpose was an imitation of Roche's valium. But Roche had not patented it in India. He established an R&D facility at Mohali and launched many pills such as Roscillin and Cifran. Ranbaxy Laboratories Ltd went public in 1973. At this time Bhai Mohan Singh introduced his eldest son Parvinder Singh in the company, who later on became the company's Managing Director in 1982. Bhai Mohan Singh also co-founded Max India with his youngest son, Analjit Singh. With liberalization differences arose between Bhai Mohan Singh and Parvinder Singh over the expansion and professionalization strategy

of Ranbaxy. Subsequently, in 1999 in a boardroom coup Bhai Mohan Singh was forced to bow down and Parvinder took over the company. This broke Bhai Mohan Singh's spirit and he retired from active company affairs. Bhai Mohan Singh was a former vice president of the New Delhi Municipal Corporation and was awarded the Padma Shri for his contribution in civic matters. For his contribution to the industrial development of Punjab, the Punjab government had named an Industrial Township near Ropar after Bhai Mohan Singh.

Kiran Mazumdar Shaw is the Chairman and Managing Director of Biocon Ltd, India's biggest biotechnology company. After completing her B.Sc. in Zoology from Bangalore University in 1973, she went to Ballarat University in Melbourne, Australia and qualified as a master brewer. Kiran Mazumdar Shaw started her professional career as trainee brewer in Carlton & United Beverages in 1974. In 1978, she joined as Trainee Manager with Biocon Biochemicals Limited in Ireland. In the same year, Kiran Mazumdar Shaw founded Biocon India in collaboration with Biocon Biochemicals Limited, with a capital of Rs.10,000. She initially faced many problems regarding funds and banks were hesitant to give loan to her as biotechnology was a totally a new field and she was a woman entrepreneur. Biocon's initial operation was to extract an enzyme from papaya. Under Shaw's leadership Biocon transformed from an industrial enzymes company to an integrated biopharmaceutical company with strategic research initiatives. In 2004, Biocon came up with an initial public offer and the issue was over-subscribed by over 30 times. Post-IPO, Kiran Mazumdar Shaw held close to 40 percent of the stock of the company and was regarded as India's richest woman with an estimated worth of Rs. 2,100 crore.

The New Yorker cites her company's work on diseases that are prevalent in countries like India and also her philanthropic work to bring health care to the poor. Since 1996, Biocon has been developing its own drugs, in addition to generics. Biocon produces drugs for cancer, diabetes and auto-immune diseases. It is in stage-three clinical trials for both a cancer treatment drug and a variety of insulin that can be taken orally, a product that has long been the global pharmaceutical industry's holy grail. Mazumdar Shaw's Biocon Park has a 90-acre campus in Bangalore and houses 5,000 molecular biologists, technicians and employees. At the entrance is an enormous sculpture of a double helix with the words 'Recombinant Revolution' on the base. Mazumdar Shaw works a few doors down from her husband, John Shaw, who became Biocon's vice chairman in 2001, three years after the couple married. John Shaw, who grew up in Scotland, came to Bangalore in 1991 as chairman of Madura Coats Ltd.

In 2004, Biocon held an initial public offering, which brought Mazumdar Shaw's net worth to half a billion dollars. It is now almost double that, indicated The New Yorker. Not long afterward, she started the Biocon Foundation, to carry out her philanthropic work. She has spent \$15 million on her cancer hospital and the Arogya Raksha. Her 1,400-bed

Mazumdar-Shaw Cancer Centre in Bangalore treats poor patients for free or at steep discounts. What the Mazumdar-Shaw Cancer Centre is doing is similar to the Madurai-based Aravind Eye Hospital. Aravind's founders use a tiered pricing structure that charges wealthier patients more for fancy meals or air-conditioned rooms, letting the firm cross-subsidize free care for the poorest. Aravind rotates its staff at its five hospitals to deal with both paying and non-paying patients so there is no difference in quality. In addition to starting the Huskur clinic and nine others like it in Karnataka, the Arogya Raksha programme has started a micro-insurance programme and hired local women to go door-to-door offering screening services for oral cancer. Every year, Shaw donates \$2 million to support health insurance coverage for 100,000 Indian villagers. Kiran Mazumdar Shaw is the recipient of several prestigious awards. These include ET Businesswoman of the Year, Best Woman Entrepreneur, Model Employer and Ernst & Young's Entrepreneur of the Year Award for Life Sciences & Healthcare, Leading Exporter, Outstanding Citizen, Technology Pioneer, etc. Government of India also felicitated her with Padmashri (1989) and Padma Bhushan (2005).

Dr. Pratap Reddy is the founder of the Apollo Hospital Group, India's first corporate hospital group. He revolutionized the whole health care scenario of India and inspired others to follow the suit. Today, India has over 750 corporate hospitals all over the country. Dr. Pratap Reddy came to India after serving as the Chief Resident of the Worcester City Hospital in the US to start his practice in Madras with a modest earning of Rs 100 per day. The idea to establish Apollo Group of Hospitals came when Dr. Reddy lost a patient who could not make it to Texas for an open heart surgery. This inspired Dr. Pratap Reddy to create a world class medical infrastructure in India and make it more accessible and affordable to common people. Dr. Reddy's efforts bore fruit when he succeeded in setting up the first centre of the Apollo Hospitals Group in Chennai in 1983. Dr. Pratap Reddy soon followed this with India's first hospital consultancy body, Indian Hospitals Corporation and commissioned two more Tertiary Care Centres in India. Since its inception, Apollo has demonstrated that Indian skills are equivalent to the best centres in the world and has produced world class results in the most complicated Cadaver Transplant. Today, the Apollo Hospitals Group has over 22 centres in major cities in India and a combined turnover of over S 100 million. Dr Reddy is now spreading Apollo Hospitals Group to other parts of Asia. The group opened its first clinic in Dubai in 1999 and has come up with projects in Sri Lanka, Africa, Bangladesh and Oman. Dr. Reddy is currently looking at secondary health centres in semi-urban and smaller cities and has already identified 23 sites for the purpose. The latest initiatives include Med Varsity, a virtual medical university providing total access to experts in the field of medicine anywhere in the world and Mednet Hospital Systems Management package.

5.7 Conclusion

The Indian pharmaceutical industry has been one of the high performance industries after the 1990s. About one-third of its 2002 production of \$5.2 billion was exported to other countries. Among the ten entities based in India with the largest number of US patents during 1996-2001 are three Indian pharmaceutical companies. These pharmaceutical companies are seeking to move from imitative research and reverse engineering to the discovery of new molecules and drug delivery systems. Though the average R&D intensity of large Indian pharmaceutical firms is 2 percent, the intensity of the innovative companies is substantially higher. Joint R&D initiatives with multinational drug companies, licensing of new discoveries to MNCs, sponsored research projects at national laboratories with government support and the creation of international marketing networks in the hope of future exploitation of such networks to sell newly developed novel drugs are some of the developments that are taking place in this area. One of the most successful pharmaceutical companies has been Dr. Reddy's, followed by Ranbaxy, Cipla, Wockhardt, Sun Pharma and others. In this way, the Indian biotech industry has been able to contribute to the world's health. India is being globally recognised as a manufacturer of economical, high-quality bulk drugs and formulations. With a huge base of talented, skilled and cost-competitive manpower and a well-developed scientific infrastructure, India has great potential to become a leading global player in biotechnology. The role of biofirms and bioentrepreneurs in this regards had been crucial though the innovative and R&D efforts have to be firmly established in order to make India a leading biotech country similar to that of IT. The next chapter will discuss about the entrepreneurial initiatives in respect of industries other than in the IT and biotech sectors.

Chapter 6

Indian Business Houses and Development of Entrepreneurship

6.1 Introduction

India provides an example of an economy that has traditionally been associated with inefficient markets, but recently the country has pursued rapid development and economic transformation favouring a free-market system. Many business groups have exploited the changing situation and have continued to exist and contribute to its economic growth. The groups have flourished due to policy distortions, informational imperfections and entrepreneurial scarcity and in the absence of specialized intermediaries in the capital market, they have generated capital and managerial talent by creating parallel internal markets. As a result, they have maintained easy access to funding even when the external markets remained inefficient (Khanna and Palepu, 2004). In the absence of a well-functioning business market, entrepreneurs made use of political nexus to their benefit and engaged in different lines of business. After the First World War, promotion of new industries in India was accomplished mainly by traditional merchant groups who managed to accumulate substantial wealth reaping on wartime speculation. These wealth creators participated in modern industrial and manufacturing activities shortly after the war and the various entrepreneurial groups that formed out of business families like Birla, Tata, Godrej and others transformed into powerful business groups (Singhal and Tagore, 2002).

This chapter discusses about the business groups in India, characterizing their growth and development of entrepreneurship in terms of innovations, market leadership and future development. Section 6.2 introduces the business groups with reference to general business framework. Section 6.3 characterizes the major Indian business groups and those included are: Tatas, Reliance (Reliance Industries and Reliance ADA), Aditya Birla, ITC, Bajaj, Bharti Enterprises, Godrej and Boyce, Adani, Wipro, Hero, Escorts and M P Birla. Section 6.4 presents the prospects of the Indian businesses and section 6.5 concludes.

6.2 The business groups

Business groups have emerged out of entrepreneurial opportunism depending upon initial success and continued entrepreneurial drive. The growth has been facilitated by the favourable attitude of the financial institutions and markets that fund the growth and new initiatives of firms. While individual firms within a group may be publicly subscribed and listed, the group as a whole might retain its closely-held status and thereby wield influence over governance and management, amassing economic power in the process. In the case of family businesses, which account for the bulk of businesses, the economic power implies that their ownership, leadership, management and control structures and changes might have much far reaching implications than being confined to the private domain of family matters especially on account of poor corporate governance within them (Singhal and Tagore, 2002).

Indian business families are different from those in the west and most of them are part of the old joint family system. In the colonial period, only the European entrepreneurs flourished and it was only after the mid-19th century that family businesses emerged in India under solely individual funding and family-controlled managing agency system. After independence until 1991, the growth was subject to many government regulations and licence raj dirigisme. It was only after 1991 that the business groups diversified and internationalized toward global leadership. It takes time for professionals working with these enterprises before they figure out key decision makers within the family. It may be a reflection of society, wherein the support may come from family and relatives but the families may not keep their flock together for more than three generations. The Birlas split after three generations, the Ambanis in the second generation and the Bajajs in the third generation. The Jindals have divided the business empire operationally, though the control of the company is centralized. Indian business families are eager to avoid a scriptless family drama. They rather plan for the involvement of members in advance. And there may be value destruction when the news of a split catches the markets by surprise.

Family-owned businesses operate in every country and may be the oldest form of business organization. Family businesses have been described as unusual business entities due to their concern for the long-term over generations, their strong commitment to quality and its relation to their own family name and their humanity in the workplace where the care and concern for employees is often likened to that of an extended family. More than 90 percent of the companies in North America and a majority of businesses located around the world are family-owned. Family businesses provide the only setting for an unusual social phenomenon, the overlap of family issues and business issues and offer two separate but connected systems of family and business with uncertain boundaries, different rules and differing roles. They provide a number of advantages to family members, the most common being freedom, independence and control. In addition, they also offer many lifestyle benefits such as flexibility, prestige, community pride and creativity. However, family businesses are often recognized as a source of difficulty when it comes to succession issues, identity development and sibling relationships.

Family-owned businesses have a set of shared traditions and values that are rooted in the history of the firm. Family businesses typically evolve through three stages and the type of leadership required at each stage is different. In the entrepreneurial stage, the business is designed around the founder or leader. It is driven by personal and family goals and depends on the leader's direction. The business then evolves into the managerial stage, where it is more organized but still is like a family. The firm begins to require outside expertise and financial discipline, structure and accountability being established. Tension can arise as family members begin to lose some of their freedom from structure, but they recognize that a lack of structure may cause frustration. The firm finally enters the professional stage, where it is driven by what is best for the business. More goal-setting and market-driven strategic planning takes place. Often professional non-family managers are recruited to play a role in the future growth of the business. Some families operate with few or no family members in the business and simply retain

ownership. The family can retain ownership by serving on the board of directors or setting up a holding company, which may manage several companies and investments.

In 2007, the Indian family business billionaires recorded in the Forbes list included Lakshmi Mittal, Mukesh Ambani, Anil Ambani, Azim Premji, Kushal Pal Singh, Sunil Mittal, KM Birla, Shashi and Ravi Ruia. Their net worth was varied from \$8 to \$32 billion. The family business can be looked as family owned business, family owned and managed or family owned and led business. Family business governance is based on periodic assemblies of the family, family council meetings and constitution of the family.

6.3 Major business groups in India

In the post-liberalization period, some old Indian businesses have failed not able to compete globally, while newly started businesses could flourish owing to their innovativeness and efficacy. At the same time, many big business groups, in spite of second or third generation splits, were able to restructure and revolutionize their systems so as to be competitive and some to be global business leaders. Below we present the profile of some of the big business groups that have managed to contribute to the growth of Indian and global entrepreneurship.

6.3.1 The Tatas

Tata Group is one of the largest companies in India by market capitalization and revenue. Unlike most of India's big business houses, the group is not family owned and Ratan Tata is not on the Forbes list of billionaires. Tata Sons holds the bulk of shares in key companies and philanthropic trusts endowed by the Tata family own 66 percent of Tata Sons. The group has interests in communications and information technology, engineering, materials, services, energy, consumer products and chemicals. The Tata group has operations in more than 80 countries and its companies export products and services to 80 nations. It comprises 114 companies and subsidiaries in eight business sectors, 27 of which are publicly listed and 65.8 percent of the ownership of Tata Group is held in charitable trusts. The companies which form a major part of the group include Tata Steel (including Tata Steel Europe), Tata Motors (including Jaguar and Land Rover), Tata Consultancy Services, Tata Technologies, Tata Tea (including Tetley), Tata Chemicals, Titan Industries, Tata Power, Tata Communications, Tata Sons, Tata Teleservices and the Taj Hotels. The 2009 annual survey of Reputation Institute ranked Tata Group as the 11th most reputable company in the world. The survey included 600 global companies. The Tata Group has helped establish and finance educational, research and cultural institutes in India. The group was awarded the Carnegie Medal of Philanthropy in 2007 in recognition of its long history of philanthropic activities. The group gets more than two thirds of its revenue from outside India. In June 2011, based on market value Tata Group has become India's wealthiest group with \$98.7 billion.

The beginning of the Tata group can be traced back to 1868, when Jamsetji Nusserwanji Tata established a trading company dealing in cotton in Bombay. This was followed by the installation of Empress Mills in Nagpur in 1877. Taj Mahal Hotel in Bombay was opened for business in 1903. Sir Dorab Tata, the eldest son of Jamsetji Tata became the chairman of the group after his father's death in 1904. Under him, the group ventured into steel production in 1905 and hydroelectric power generation in 1910. After the death of Dorab Tata in 1934, Nowroji Saklatwala headed the group till 1938. He was succeeded by Jehangir Ratanji Dadabhoy Tata. The group expanded significantly under him with the establishment of Tata Chemicals (1939), Tata Motors, Tata Industries (both 1945), Voltas (1954), Tata Tea (1962), Tata Consultancy Services (1968) and Titan Industries (1984). Ratan Tata, the incumbent chairman of the group succeeded JRD Tata in 1991. The Tata Group has donated a Rs. 220 crore to Harvard Business School to build an academic and a residential building on the institute's campus. The recent The Brand Trust Report, 2011 has ranked TATA as the second most trusted brands of India.

One Tata project that brought together TCS, Titan Industries and Tata Chemicals was developing a compact, in-home water-purification device. It was called Tata swach which means 'clean' in Hindi and would cost less than Rs 1000 rupees. The idea of Tata swach was thought of from the 2004 tsunami in the Indian Ocean, which left thousands of people without clean drinking water. This device has filters that last about a year long for a family of five. It is a low-cost product available for people who have no access to safe drinking water in their homes. The advantage of this device is that it does not require the use of electricity. TCS also designed and donated an innovative software package that teaches illiterate adults how to read in 40 hours.

In 1912, the group included community philanthropy in the workplace. They instituted an eight-hour workday, before any other company in the world and recommend a medical-services policy for Tata employees. The company would be among the first worldwide to organize modern pension systems, worker compensation, maternity benefits and profit-sharing plans. About two thirds of the profits of the group go to charity. They founded and still support such institutions as the Indian Institute of Science, Tata Institute of Fundamental Research, the National Centre for the Performing Arts and the Tata Memorial Hospital. Each Tata group company channels more than 4 percent of its operating income to the trusts and every generation of Tata family members has left a larger portion of its profit to them.

Tata BP Solar, a joint venture company makes and markets solar panels. Solar power in villages has three benefits: delivering access to electricity, generating direct employment (through installation and maintenance work and the collection of charges), and indirect employment (through fabrication shops, outlets to sell solar-powered devices, storage, transport, etc.). Tata BP Solar estimates that about 700 people could be employed for every megawatt (MW) of solar power produced. Even if only 5,000 MW were to come from solar power, the direct and indirect employment potential for Little India could be 3.5 million jobs. Another

example comes from the work that the community-initiatives cell of Tata Chemicals did in collaboration with the International Centre for Entrepreneurship and Career Development (ICECD), which has been recognized as a center of excellence by the United Nations. The ICECD project involved training over 10,000 people, who in turn developed the enterprise capabilities of thousands. The focus was to promote enterprise, particularly among women. Using the training imparted by ICECD to its staff, the Tata Chemicals cell conducted a sort of rural MBA program in the 42 villages around two of its main facilities in India. Among the lessons learned were that local government officials can become a threat to successful entrepreneurs; the role of societal traditions determines who can do what (in one place enterprise was perceived positively, in another, caste became a constraining factor); and the need for a facilitating information center is crucial.

The Tata group partnered with Anand Bazar Patrika, the largest-selling Bengali newspaper in India, to get young people to undertake entrepreneurship projects. Called Nijer Paye Darao (stand on your own feet), the campaign, which was started in December 2007, involves bimonthly publishing of editorial content that encourages entrepreneurship. The content includes articles about the Tata Group's endeavours, success stories of local entrepreneurs, advice on how to get started in business and answers to questions from readers. Future plans include a contest in which prospective entrepreneurs will be asked to submit their business ideas, which will be evaluated by a panel of experts. The best ideas will be supported with funding leads, and the people generating them will be given the opportunity to attend an entrepreneurship training programme.

If there is one attribute common to every Tata enterprise, it is the time, effort and resources each of them devotes to the wide spectrum of initiatives that come under the canopy of social development. The Tata culture in this critical segment of the overall corporate social responsibility matrix springs from an ingrained sense of giving back to society. Since the earliest days of the group's history, the Tata tradition in community development has been defined by the values embedded in its core. It never was charity for its own sake or as group founder Jamsetji Tata put it, 'patchwork philanthropy.' Reinforcing the implicit beliefs the group brings to its mission of sustainable development is an explicit set of structures, embodied most notably by the Tata Council for Community Initiatives (TCCI). A centrally administered agency that helps Tata companies through specific processes, TCCI's charter embraces social development, environmental management, biodiversity restoration, and employee volunteering. This organization coordinates the varied and widespread community development activities of the Tata companies. TCCI has, in collaboration with the United Nations Development Programme (India), crafted the Tata Index for Sustainable Human Development, a pioneering effort aimed at directing, measuring and enhancing the community work that the Tata enterprises undertake.

Tata backing of sports has unfolded in the form of academies for a variety of sporting disciplines and the sponsorship of talented individuals. The bigger entities in the group, such as Tata Steel and Tata Chemicals, have in-house organizations dedicated to the task of social uplift. The Tata Chemicals Society for Rural Development was established in 1980 to promote community welfare in and around its facilities in western and central India. The society works to protect and nurture the rural populations in these areas and helps people achieve self-sufficiency in natural resource management, livelihood support, and the building of health and education infrastructure. Through TCSR, Tata Chemicals works to improve the quality of life of the people and communities around its operations, and to support sustainable development, a theme that is central to the company's corporate philosophy. The Tata Steel Rural Development Society (TSRDS), set up in 1979 is involved in various social development programmes aimed at helping the rural communities living around Tata Steel's operational units in eastern India. Tata Tea, Rallis, Voltas, Tata Power, Tata Consultancy Services and Titan devote considerable resources to community initiatives in spheres such as education, health, livelihoods, environment, tribal development and welfare of women and children.

Putting people over profits and remaining rooted to the milieu that created it has benefited the Tata group as much as those whose lives it has touched. The accumulation of wealth and glory by individuals is not in the Tata DNA (Gopalakrishnan, 2009). That's one reason why no Tata shows up on any of those ritual listings of India's richest people. This represents a unique business ethos, one in which 65.8 percent of the shares of Tata Sons, the holding company of the group are controlled by trusts. These trusts, established by members of the Tata family, support a wide variety of causes, institutions and individuals. What the Tata trusts do is separate from the earlier mentioned community-support initiatives of individual Tata companies. Sustainable and socially conscious business practices are not a Tata preserve. There are many enterprises, in India and elsewhere, that put a premium on blending growth with a commitment to society.

Tata Motors has carefully adapted its offerings and organization based on institutional voids, particularly with the development of a new vehicle, the Ace. By 2005, Tata Motors had become India's largest commercial truck maker but found itself squeezed amid growing foreign competition in its home market. At the top end of the market, major foreign truck manufacturers, such as Volvo, were challenging its supremacy in large trucks. Producers of pickup trucks from Japan and South Korea compete against commercial vehicles of Tata Motors. The low end of India's commercial vehicle market was dominated by three-wheelers made by domestic and foreign companies. Tata Motors responded to this competitive challenge by exploiting product market knowledge and adapting business processes with the development of the Ace, a four-wheeled mini-truck, to target a niche in the marketplace. The vehicle opened a new segment for Tata Motors, helping the company reduce the risk of dependence on its main commercial truck business, which was highly cyclical. The Ace was designed in response to market conditions in

India and an unmet consumer need identified by Tata Motors. Three-wheeled vehicles were pervasive as commercial vehicles in India, used to ferry produce and merchandise to rural markets and deliver goods in urban centers, some of which limited access to larger commercial trucks to ease congestion. Despite their low price and nimbleness, however, three-wheelers were unsafe, slow, and frequently overloaded. Reliance on the vehicles often resulted in damaged goods and delayed deliveries. Moreover, three wheelers were barred from operating on India's golden quadrilateral, the new expressway network that linked the country's largest cities.

The Ace was positioned as a replacement for three-wheelers. It had a comparable payload size and price point but offered many of the benefits of larger light commercial vehicles to serve the last mile of distribution (Gopalakrishnan, 2009). The truck was designed to be the only vehicle in India allowed on all roads. Although the initial cost of the Ace (\$5,000) was higher than that of three-wheelers, the truck was designed to be more economical after accounting for its larger payload capacity and fuel costs. Tata Motors designed the Ace to meet higher safety standards than existing requirements and norms in India. The move put Tata Motors in a stronger position than competitors if higher standards were adopted by Indian regulators and would also facilitate the vehicle's entry into international markets having higher standards already on the books. The Ace was unique not only in its concept but also in the ways in which Tata Motors adapted the execution of the project to meet the vehicle's target price point and reach its target customers. Tata Motors conducted extensive market research through interviews with potential customers to identify their needs and constraints, helping the company refine the Ace's design, pricing and features and substituting for absent market research intermediaries. The company looked at the product through the eyes of its customers, incorporating, for example, realistic expectations about overloading. Meeting the project's tight budget to enable the Ace to be positioned at such a low price point forced Tata Motors to be innovative in product development and procurement. The company employed a cross functional team for product development and adopted a Japanese-style production preparation process, which incorporated suppliers and other stakeholders. Aggregate outsourcing, e-sourcing and the use of existing production facilities also helped to lower costs. To ease concerns about the Ace's high initial cost, the company offered financing through its consumer finance arm. This action filled a void, because auto financing was a relatively new practice in India and almost unknown among customers in the Ace's target market. Tata Motors also adapted its distribution and after-sales service operations for the Ace to meet the needs of the vehicle's target customers. Many of the Ace's cost-conscious potential customers in rural areas might not be willing to travel long distances to see the vehicle, so the company deployed a new bare-bones dealership format that would bring the Ace closer to these customers without incurring the expense of a new network of full-service dealerships. Similarly, instead of building an expensive new network of service centers, the company trained local mechanics and gave them tools to take care of common problems. Vehicles would be sent to larger urban service centers only in the event of major repairs or accidents. Less than a year after

the Ace's introduction in May 2005, Tata Motors had already sold thirty thousand units even though the vehicle was available in only one-quarter of the country (Gopalakrishnan, 2009).

A survey of Ace purchasers found that more than half were buying their first commercial vehicle, suggesting that the product had expanded the existing commercial vehicle market. Because demand surpassed the capacity of the existing plant where the Ace was initially produced, Tata Motors established a new plant in northern India to produce the Ace and related vehicles with a capacity of 250,000 vehicles. The company also introduced the vehicle in Sri Lanka, Nepal and Bangladesh, with an eye to introducing the Ace in still other developing markets. Similarly, Tata Motors exploited local knowledge to target a difficult market segment with the development of the Nano, a \$2,500 people's car introduced in 2008. Tata Motors successfully exploited local knowledge in conceptualizing the Ace and adapted to institutional voids to deliver the product. However, the company's market opportunity with this product was closely tied to the state of India's infrastructure at the time of its introduction. The company's success with the Ace soon attracted other companies to develop similar vehicles for India. By filling the void of India's underdeveloped market research intermediaries for its own product development, Tata Motors served as a market researcher for its competition. Tata Motors has a head start in the segment and execution was critical to the success of the Ace. The company's innovative procurement process and investments in developing the ecosystem for the vehicle through its distribution and service operations could help Tata Motors sustain competitive advantage.

The group went through significant restructuring around 1998 and reduced the number of group affiliated firms and business portfolios by more than 50 per cent. Specifically, the Tatas shifted their focus from commodity businesses (like cement, pharmaceuticals and toiletries) to brand and services (like software) that provided a more sustainable return. The group ventured into new business areas that were not very diversified as in the case of hotel division which expanded into luxury business hotels overseas. However, the group has many unrelated businesses that prevent it from achieving the required level of improved focus and synergy of resources to compete with relatively newer groups. The group manages to generate value because reform is still taking place and informal institutions are still influential. Banking on the informal institutions, the group is continuing to leverage its already existing market presence, brand image and age-old business experience. The international brand consultancy Brand Finance has ranked the \$68-billion Tata conglomerate as 50th most valuable brand in the world. The most recent Global 500 report by Brand Finance shows that the group's brand value has soared to \$15.08 billion for the current year compared to \$11.2 billion last year in 2010. So far, the Tata group has concluded 35 cross-border acquisitions and international revenues now account for over 50 percent of revenues.

Rata Tata often leads by communication and employs a very consultative style in seeding these ideas or themes into group companies. He encourages people to open their eyes to look at an opportunity and gets them to think differently about issues.

But he will never tell them what to do. He will ask questions that will lead to the theme and this is the Tata way of socializing. Tata never imposes and never demands that people fall in line with his beliefs. The idea is floated and discussions and debates follow it and then the managers come up with what they would like to do about it. Tata has prevailed on managers to be bold in their planning. This relatively new facet is perhaps best summed by the mindset with which Tata walked into the Corus auction. Tata encourages aggression among group managers in many ways. He encourages companies to think big and be bold enough to attempt the impossible. When such thinking leads a company to a cross-border deal, he makes himself available anytime to the CEO doing the acquisition. Yet, in all this Tata never comes in the way of a manager functioning. He might step in to make a broad strategic adjustment, but he does not interfere in operational issues. Only if his help or input is sought in something specific does he come into the picture. In global acquisitions, Tata will be present as member of the leadership team and not managing the process.

Cultural compatibility is another area wherein Tata shows due diligence. A key issue that ensures cultural competency is ethics. This is where Tata has never diluted his value system. At a time when the loss in Tata finance was yet to be ascertained (ranging from Rs 500 Rs 1,000 crore), Tata announced that the holding company would pump in the required money to prevent Tata Finance deposit holders or shareholders from suffering any loss. Before a meeting with the Prime Minister of a country, a senior group official suggested Tata lobby for a specific proposal that could help the group in that country. Tata declined and unlike global CEOs, who never hesitate to lobby with governments, Tata never asked governments for specific favours. This despite the fact that Tata was an advisor to the then South African President Thabo Mbeki and advises the British government and Singapore's Economic Development Board on international investment related issues and he is on the board of Mitsubishi Corporation, American International Group and JP Morgan Chase.

Tata Consultancy Services (TCS) is Asia's largest software company. Tata Steel is India's largest steelmaker and number ten in the world. Taj Hotels Resorts and Palaces is India's biggest luxury hotel group by far. Tata Power is the country's largest private electricity company. Tata Global Beverages is the world's second-largest maker of branded tea. However, the group has problems like parochialism that afflicts big companies, where the upper management is still dominated by Indians who know only life within Tata. A second is hubris. Tata is too inclined to celebrate the great pruning of the 1990s rather than ask whether another is due. It may not be able to justify today's degree of diversification when the Indian market is growing so rapidly and

when it is doing so much business in the developed world. It needs to consider whether it is time to lop off weaker limbs such as Tata Teleservices, an also-ran in India's crowded telecoms market, and Tata Financial Service

6.3.2 Reliance group

The Reliance group is the largest business house with total revenues being more than \$22.6 billion. It is involved in oil exploration and production, gas refining and marketing, petrochemicals, textiles, financial services, insurance, power, telecommunications and information technology. Reliance has the distinction of being the first Indian company to be named among the five hundred listed in Forbes. Dhirubhai Ambani established the Reliance empire and created the equity cult in Indian stock markets. Dhirubhai started off by selling fried snacks to pilgrims in mount Girnar during weekends. After school he became a dispatch clerk at A. Besse & Company. The company became distributors of Shell and Dhirubhai was sent to manage an oil filling station at Aden. He learnt the ways of commodity trading, high seas purchase and sales, marketing and distribution, currency trading, and money management. During lunch break he roamed the souks and bazaars of Aden where traders from numerous different continents and countries bought and sold goods worth millions of pound sterling, the then global currency, during the day. He met traders from all parts of Europe, Africa, India, Japan and China. Aden was the biggest trading port of the times, a trading port where goods landed from all parts of the world and were dispatched to the farthest corners of different continents. Speculation in manufactured goods and commodities was rife all over the Aden bazaars. At the boarding house where he lived with another twenty-five or so young Gujarati clerks and office boys, he devoted long hours of the night mastering English grammar, essay writing, current affairs and a host of subjects. At that time, the Yemeni rial was made of pure silver and was greatly in demand in the London Bullion Exchange. Dhirubhai bought and melted the rials and sold it to the London bullion traders. Within three months his work came to a halt but by that time he had made few lakh lakhs of rupees. In 1958 he returned to India and he set up a textile trading company. Helped by his wife and two sons Dhirubhai diversified his interests to petrochemicals, telecommunications and information technology, energy, power, finance, capital markets and logistics.

With innovative instruments like convertible debentures Reliance became a favourite in the stock markets and it pioneered in raising funds in the international markets. In 1966 the first textile mill was set up at Naroda using polyester fibre. He branded his products Vimal and retail outlets were set up where 'Only Vimal' brands were sold. With the creation of the equity cult, nearly 60,000 investors placed their trust in Reliance in 1977. In 1982 Reliance Industries came up against a rights issue about partly convertible debentures. Dhirubhai himself provided the required cash when the bulls demanded a physical delivery of shares. The net result was that Reliance shares shot up from Rs 152 to Rs 180 within a few minutes. The bears bought Reliance shares from the market at higher price levels and most probably Dhirubhai himself supplied these

shares and earned a profit from this manipulation. Keeping its core in petrochemicals Reliance soon diversified its activities to telecommunications, information technology, energy, power, retail, textiles, infrastructure services, capital markets and logistics. Reliance has the distinction of being the only public limited company whose many annual general meetings had to be held in stadiums with more than 350,000 shareholders in attendance. Many of the provisions of the MRTP Act were discarded by Dhirubhai Ambani when the size and scale of the Patalganga, Hazira and Jamnagar complexes are considered, which encouraged business families and politicians to go very big. Despite his almost Midas touch, Ambani has been known to have flexible values and an unethical streak running through him. His biographer himself has cited some instances of his unethical behavior when he was just an ordinary employee at a petrol pump in Dubai. He has been accused of having manipulated government policies to suit his own needs and has been known to be a king-maker in government elections. Although most media sources tend to speak out about business-politics nexus, the Ambani house has always enjoyed more protection and shelter from the media storms that sweep across the country. The Federation of Indian Chambers of Commerce and Industry named Dhirubhai as the Indian Entrepreneur of the 20th century. After his death in 2002, the government of India issued a postal stamp in Dhirubhai's honour. Reliance split up into two after the death of Dhirubhai. Mukesh got Reliance Industries and IPCL and this group came to be known, as Reliance Industries Ltd. Anil became head of Infocomm, Reliance Energy and Reliance Capital known as the Anil Dhirubhai Ambani Group.

6.3.2a Reliance Industries

Mukesh Ambani is the chairman of Reliance Industries, the largest private sector enterprise in India listed in Fortune 500 magazine. His personal stake in Reliance Industries is 48 percent. In August' 2011, Reliance Industries regained its status as the most valued firm in India, after a heady contest with ONGC and Coal India Ltd., both public sector units as well as energy giants. In 2010, he was named among the most powerful people in the world by Forbes in its list of 68 people who matter most. As of 2011, he is the second richest man in Asia and the ninth richest man in the world with a personal wealth of \$27 billion. He is a member of the board of directors of Bank of America and a present member of the international advisory board of the Council on Foreign Relations.

Though the company's petrochemicals, refining, and oil and gas-related operations form the core of its business, other segments of the company include textiles, retail business, telecommunications and special economic zone development. Reliance Life Sciences participates in medical, plant and industrial biotechnology opportunities. Specifically, these relate to biopharmaceuticals, pharmaceuticals, clinical research services, regenerative medicine, molecular medicine, novel therapeutics, biofuels, plant biotechnology, and industrial biotechnology. Reliance Industrial Infrastructure Limited was incorporated in September 1988 with the objective being to build and operate cross-country pipelines for transporting petroleum

products. The infrastructure company constructed a 70,000 kilolitre petrochemical product storage and distribution terminal in Maharashtra. The company is also engaged in related activities involving leasing and providing services connected with computer software and data processing. Reliance Retail is the retail business wing which includes brands like Reliance Fresh, Reliance Footprint, Reliance Time Out, Reliance Digital, Reliance Wellness, Reliance Trendz, Reliance Autozone, Reliance Super, Reliance Mart, Reliance iStore, Reliance Home Kitchens and Reliance Jewel.

Reliance Industry is the world's largest polyester producer and as a result one of the largest producers of polyester waste. In order to deal with this large amount of waste, they had to create a way to recycle the waste. They operate the largest polyester recycling centre that uses the polyester waste as a filling and stuffing. They developed an innovative recycling process resulting in an award. Also, Reliance owns world's largest refinery in Jamnagar which is zero discharge and effluent treatment based on best available technology processes the waste release and converts waste in to usable product. Reliance has also planted more than 5 million trees around this refinery in order to reduce carbon foot. Reliance has more than 3 million shareholders, making it one of the world's most widely held stocks. Reliance Industries Ltd has continued to grow since its split in January 2006. On 30 May 2011, Reliance Industry's stock slumped four percent as due to reports that the Federal Bureau of Investigation was probing a former upstream regulator for the company's alleged favouring of private-sector energy companies.

6.3.2b Reliance ADA

Anil Ambani is the chairman of Reliance Anil Dhirubhai Ambani group and is the younger brother of Mukesh Ambani. Anil Ambani joined the company founded by his late father in 1983 as co-chief executive officer and has engineered financial innovations in the Indian capital market. He led the company into overseas capital markets with international public offerings of global depositary receipts, convertibles and bonds. He directed Reliance in its efforts to raise around \$2 billion from overseas financial markets; with a 100-year Yankee bond issue in January 1997. He has been embroiled in a dispute with his brother, Mukesh Ambani, over the supply of gas from the latter's KG basin. He recently topped Business Sheet's world's biggest loser list of business leaders who lost money in the 2000s recession, losing \$32.5 billion in 2008, which brought him out of the top ten list to number 34 in 2009.

Reliance Communication is the second largest telecom company in India in terms of customers. The Company has a customer base of 125 million including over 2.5 million

individual overseas retail customers. It ranks among the top 5 telecom companies in the world by number of customers in a single country. Reliance Communications corporate clientele includes 2,100 Indian and multinational corporations and over 800 global, regional and domestic carriers. Reliance Communications owns and operates the next generation IP enabled connectivity infrastructure comprising over 190,000 kilometers of fiber optic cable systems in India, USA, Europe, Middle East and the Asia Pacific region.

Reliance Globalcom serves over 2,100 enterprises, 200 carriers and 2.5 million retail customers in 163 countries across 6 continents. Reliance Capital has interests in asset management and mutual funds, life and general insurance, private equity and proprietary investments, stock broking, depository services, distribution of financial products, consumer finance and other activities in financial services. Reliance Mutual Fund is India's largest mutual fund. Reliance General Insurance is a general insurance company and among the top 3 private sector insurers. Reliance Money is brokerage and distributor of financial products in India with over 2.7 million customers and has the largest distribution network. Its brokerage, arm Reliance Securities is planning to invest Rs 300 crore for upgrading infrastructure, hiring staff and enhancing the capability of its online trading platform.

6.3.3 Aditya Birla group

The Aditya Birla group operates in 33 countries with more than 133,000 employees worldwide. The group has diversified business interests and is dominant player in all the sectors in which it operates such as viscose staple fibre, metals, cement, viscose filament yarn, branded apparel, carbon black, chemicals, fertilizers, insulators, financial services, telecom, BPO and IT services. The group is a \$35 billion conglomerate which earns 60 percent of its revenues from outside India. The group has been adjudged the best employer in India and among the top 20 in Asia by the Hewitt-Economic Times and Wall Street Journal Study of 2007. The origins of the group lie in the conglomerate once held by one of India's foremost industrialists Ghanshyam Das Birla.

The group is organized into various subsidiaries that operate across different sectors like viscose staple fibre, non-ferrous metals, cement, viscose filament yarn, branded apparel, carbon black, chemicals, retail (under the more brand of supermarkets), fertilizers, insulators, financial services, telecommunication, BPO and information technology services. The group consists of four main companies, which operate in various industry sectors include Hindalco, Grasim, Aditya Birla Nuvo, Idea cellular and ultra tech cement.

The group's non-ferrous metals are under Hindalco. It is a dominant player in aluminum and copper. Its manufacturing locations are primarily in India, and it owns mines in Australia. In 2007, the company entered into an agreement to acquire the Canadian company Novelis for

\$6 billion, making the combined entity the world's largest rolled-aluminium producer. Hindalco makes alumina chemicals, primary aluminum, rolled products, alloy wheels, roofing sheets, wire rods, cast copper rods, copper cathodes and several other products. The group's cement business was earlier under both Grasim and UltraTech Cement. The two entities are now merged into Ultra Tech cement to form India's largest cement company. UltraTech cement was originally the cement business of L&T, which was acquired by Aditya Birla group in 2004.

The group is the fourth largest manufacturer of Carbon Black worldwide. It operates out of facilities in Egypt, Thailand, India and China. The group is the world's largest player in the viscose staple fibre industry. It operates out of India, Laos, Thailand, Malaysia and China and owns the Birla cellulose brand. The group also owns acrylic fibre business in Egypt and Thailand, viscose filament yarn business and spinning mills at several locations all over India and South East Asia. The group has pulp and plantation interests in Canada and has recently invested in plantations in Laos. The group is also a major player in the branded garments market in India. Idea Cellular started off as a joint venture with AT&T and Tatas. However the stakes of the remaining partners was eventually acquired by the group. After an initial public offer, Idea Cellular now accounts for a third of the group's market capitalization.

The group has involved itself in several community development initiatives and supports development activities in areas like healthcare, education, sustainable livelihood, infrastructure and social causes. It works in 3,700 villages, reaching out to 7 million people annually through the Aditya Birla Centre for Community Initiatives and Rural Development. It runs 45 schools and 18 hospitals.

6.3.4 ITC Limited

ITC is engaged in fast moving consumer goods, hotels, cigarettes, paperboards, packaging, information technology, branded apparel, safety matches and agribusiness. Its turnover is \$7 billion and has a market capitalization of over \$33 billion. The company started off as the Imperial Tobacco Company and shares ancestry with Imperial Tobacco of the United Kingdom, but it is now fully independent and was rechristened to Indian Tobacco Company in 1970 and then to I.T.C. Limited in 1974. The company is currently headed by Yogesh Chander Deveshwar. It employs over 26,000 people at more than 60 locations across India and is listed on Forbes. It completed 100 years in 2010.

The company had founded-pioneered canteens for the workers, free medical care, sports facilities and paid holidays. In 1830, the company was renamed WD & HO Wills and the first brand was Bristol, made at the London factory in 1871, followed by Three Castles and Gold in 1878 and Woodbine ten years later. In 1901 Sir William Henry Wills formed the Imperial Tobacco Company from a merger of W.D. & H.O. Wills with seven other British tobacco

companies. ITC's agribusiness is India's second largest exporter of agricultural products. ITC is one of the India's biggest foreign exchange earners.

The Company's e-choupal (choupal means gathering place in Hindi) initiative is enabling Indian agriculture significantly enhance its competitiveness by empowering Indian farmers through the internet. The company places computers with internet access in rural farming villages and the e-choupals serve as both a social gathering place for exchange of information and an e-commerce hub. The effort which began to re-engineer the procurement process for soy, tobacco, wheat, shrimp and other cropping systems in rural India has generated a profitable distribution and product design channel. The e-choupal system has also catalyzed rural transformation that is helping to alleviate rural isolation, create more transparency for farmers and improve their productivity and incomes. The initiative leverages information technology to set up a meta-market in favour of India's small and poor farmers, who would otherwise continue to operate and transact in un-evolved markets. In 2010, services through 6500 e-choupal across 10 states, reach more than 4 million farmers. Its potential is being tested through pilot projects in healthcare, educational services, water management and cattle health management with the help of several service providers including NGOs.

ITC has launched 'classmate', a programme called classmate ideas for India challenge. The programme is a part of the company's centenary initiative. The nation-wide programme would invite ideas of the youth, who have the potential to transform India. Classmate Ideas for India challenge plans to reach out to 25 lakh students across 30 cities, 500 schools and 200 colleges across the country.

ITC is the first from India and among the first 10 companies in the world to publish its Sustainability Report in compliance at the highest A+ level. ITC is the first Indian company and the second in the world to win the prestigious Development Gateway Award. It won the \$100,000 Award for the year 2005 for its e-choupal initiative. The Development Gateway Award recognizes ITC's e-choupal as the most exemplary contribution in the field of information and communication technologies. ITC has won the inaugural World Business Award, the worldwide business award recognizing companies who have made significant efforts to create sustainable livelihood opportunities and enduring wealth in developing countries. ITC is the first company to receive the annual FICCI Outstanding Vision Corporate Triple Impact Award in 2007 for its invaluable contribution to the triple bottom line benchmarks of building economic, social and natural capital for the nation. ITC has won the Golden Peacock Awards for Corporate Social Responsibility (Asia) in 2007, the Award for CSR in Emerging Economies 2005 and Excellence in Corporate Governance in the same year.

ITC Hotel Royal Gardenia, Bangalore is the first Indian hotel and world's largest, to get the LEED platinum rating, the highest global green building certification. The Stockholm Challenge award 2006 for the e-choupal initiative was for using information technology for e

rural development. United Nations Industrial Development Organisation Award at the international conference on Sharing Innovative Agribusiness Solutions 2008 at Cairo was given for ITC's initiatives in agribusiness through the e-choupal initiative. The Corporate Social Responsibility Crown Award for Water Practices from UNESCO and Water Digest was given for its work carried out in the water sector and it received the National Award for Excellence in Water Management 2007 in the beyond the fence category from the CII Sohrabji Godrej Green Business Centre for its leadership role in implementing water and watershed management practices. The watershed programme also won the Asian CSR Award 2007 for Environmental Excellence given by the Asian Institute of Management. The Award recognizes and honours Asian companies for outstanding, innovative and world-class projects. The group received the Ryutaro Hashimoto Incentive Prize 2007 for Environment & Development from the Asia Pacific Forum. The Corporate Award for Social Responsibility 2008 from The Energy and Resources Institute was given in recognition of its initiatives in implementing integrated watershed development programmes across 7 states in India. The Enterprise Business Transformation Award for Asia Pacific, instituted by Infosys Technologies and Wharton School of the University of Pennsylvania was accorded for its celebrated e-choupal initiative.

6.3.5 The Bajaj group

The Bajaj group was founded by Jamanalal Bajaj in 1926 and the group comprises 34 companies. Its flagship company Bajaj Auto is ranked as the world's fourth largest two and three wheeler manufacturer and the other companies include Bajaj Electricals, Mukund and Bajaj Hindustan. The group is involved in automobiles (2 and 3 wheelers), home appliances, lighting, iron and steel, insurance, travel and finance. Jamanalal's foresight in picking the right business at the right time that generated phenomenal growth. However, his business interests were the means to a larger and holistic end. Very active during freedom struggle, Jamanalal was a philanthropist who donated most of his wealth for worthy causes. From the beginning, Jamanalal was always more involved in social and philanthropic activities rather than business. He was a follower of Gandhiji and assisted in Gandhiji's activities and was increasingly involved and committed to the Mahatma's programmes and India's freedom struggle.

Kamalnayan Bajaj, the eldest son of Jamanalal Bajaj, started shouldering family responsibilities from an early age. After completing his education from University of Cambridge, Kamalnayan returned to India to assist his father, both in business and in social service. He had earmarked a large portion of the income from his family business for public causes and social service programmes. He always had a sense of a larger social mission, transcending the dictates of business and the bottom line. With foresight and a spirit of zestful enterprise, Kamalnayan acquired ailing industrial units and then miraculously turned them around. He went on to expand

the business by branching into manufacture of scooter, three-wheeler, cement, alloy casting and electrical manufacturing.

Ramkrishna Bajaj, the younger son of Jamanalal, took over after the demise of his elder brother Kamalnayan Bajaj in 1972. In addition to shouldering business responsibilities, Ramkrishna's energies were directed towards the social service and social welfare programmes of the group. He was elected as the Chairman of World Assembly for Youth (India) in 1961. He also held the office of the managing trustee of the Indian Youth Centres Trust, which conceived and created the Vishwa Yuvak Kendra in 1968.

Rahul Bajaj, the current chairman and managing director of the Bajaj group, is respected for his business expertise and entrepreneurial character. He is the grandson of Jamanalal Bajaj. He pursued his studies from St Stephen's College, Delhi and Harvard University. He took over control of the Bajaj Group in 1965 and successfully established one of India's best companies. His net worth is estimated to be at \$1.6 billion. He is currently listed 34th on the Forbes list of richest people in India. His sons Rajiv Bajaj and Sanjiv Bajaj are involved in the management of his companies

Under Rahul's leadership, the turnover of the Bajaj Auto has risen from Rs.72 million to Rs.46.16 billion. Rahul Bajaj created one of India's best companies in the difficult days of the licence-permit raj. He established factories at Akurdi and Waluj. In 1980s Bajaj Auto was top scooter producer in India and its Chetak brand had a 10-year waiting period. The slump in the sale of scooters and the downfall of the stock market of 2001 hit the company hard. It was even forecast that Bajaj industries would have to shut down soon. But without losing hope Rahul Bajaj with his business expertise re-established the battered company. He established another factory in Chakan, invested in R&D and came up with Bajaj Pulsar Motorcycle. Bajaj Pulsar is presently a leader in its sector. In June 2006, Rahul Bajaj was elected as a Rajya Sabha MP from Maharashtra.

The group is involved in a variety of welfare activities, which are carried out with the support of its companies and trusts. Shiksha Mandal, Wardha was established in 1914 by for educating the youth of India and was a part of the national. Kamalnayan Bajaj School was established in 1976. The group also started management schools in Bombay and upgraded three industrial training institutes. The company enabled education of eligible bright backward students has helped many backward students achieve academic excellence.

A hospital and a HIV were established by the group. A village development institute was created to empower women and it has been doing so by training women in using improved technology for storage of food grains and initiating goat rearing projects owned and managed by women, emphasizing the importance of family planning particularly tubectomy operations and securing loans for women members for both consumption and income generation. An award was

instituted for outstanding contribution women entrepreneurs for rural development. The Institute of Gandhian Studies, established in 1987, promotes long-term and short-term study courses on Gandhian thoughts and methodology.

The rural development activities were aimed at improving the living conditions of the rural population via income generation, training for self-employment, improved health and sanitation, supply of drinking water, improved agricultural and land maintenance practices such as horticulture, social forestry and reclamation of waste land. Other activities include distribution of solar-lanterns and solar cookers, installation of bio-gas plants, deepening and widening of wells and drinking water scheme, tree plantation, veterinary services like insemination, vaccination and distribution of cattle feed, watershed development and building of model villages, distribution of agricultural equipment and building a centre of child labor welfare.

6.3.6 Bharti Airtel

Established as a start-up by Sunil Mittal and with more than \$5 million in annual sales by 1992, Bharti Airtel grew into one of India's largest telecommunications providers, with a market capitalization of \$31.8 billion by 2008. The company's partnerships with a range of foreign firms over the course of its history were central to Bharti Airtel's ability to grow in a capital-intensive industry and take on tough competition from state-owned enterprises and well-funded offshoots of powerful business groups. Bharti partnered first with Compagnie Generale des Eaux of France, Mauritian cell operator Emtel, and Mobile Systems International of the United Kingdom in a successful joint bid for India's first cellular service licence. Soon after Bharti launched cellular service in Delhi in September 1995, it faced competition from Sterling Cellular, which was controlled by Indian steel giant Essar. Bharti quickly learned how to compete against rivals having more resources. The company targeted small business owners and retail customers instead of the corporate market, where larger business groups would have an advantage. Italian state-owned telecom operator STET invested \$58 million in Bharti in 1996, and, from 1997 through 1999, British Telecom made \$250 million in equity investments.³⁰ BT also helped Bharti improve its operations by providing assistance in corporate communication, lending technology support, and extending procurement benefits to Bharti through its own vendor network. Importantly, Bharti maintained management control in the partnership. In 1995, a second tranche of cellular service licenses came up for auction, but Bharti did not bid high enough for the desirable locations. Winning bids turned out to be too high and unsustainable for some new entrants. Bharti wanted to expand through acquisitions, but it needed more capital. In 1999, Warburg Pincus purchased a 20 percent stake in Bharti for \$60 million. The following year SingTel invested \$400 million, and in 2001, Warburg Pincus and SingTel each invested an additional \$200 million. Bharti received smaller investments from New York Life Insurance, Asian Infrastructure Fund Group, and International Finance Corporation. Bharti was still a relatively small operation when it attracted these major investments.

As the only profitable cellular service provider in a market tipped for stunning growth, Bharti presented investors with significant upside potential. Partnering with investors such as Warburg Pincus and SingTel offered Bharti more than just capital. The business groups with which some of Bharti's toughest competitors were affiliated had access to capital, political support, and deeper wells of management talent, as well as valuable reputations. Investments from global players offered signals of credibility that helped Bharti neutralize some of these advantages. Warburg Pincus and SingTel offered other resources and advice that helped Bharti build its business. Three representatives of SingTel and two Warburg Pincus partners sat on Bharti's thirteen-person board. Bharti and SingTel jointly built an underwater cable network linking Bharti's domestic voice and data network to SingTel's global network. Warburg Pincus offered significant strategic advice on Bharti's geographic expansion, acquisition approach, financing, and operations. Warburg Pincus helped persuade Bharti to acquire existing operations—even those not fully meeting the company's high standards—and to look beyond northern India to craft a pan-India strategy to tap in to opportunities in the wealthier south. Bharti went public in 2002, listing 10 percent of its shares on the National Stock Exchange, and subsequently has raised capital through loans and other facilities. By 2005, Warburg Pincus had earned \$1.1 billion by selling two-thirds of its stake in Bharti. Bharti's early foreign partnerships helped nurture its growth with much-needed capital, resources, and strategic advice. Risk capital is important to the development of any young company. Bharti's partnerships were particularly valuable because of the institutional voids in its home market and the deeper expertise and richer resources it gained from foreign partners than would be possible to access locally. These capabilities and resources helped Bharti combat the inherent advantages of state-owned and business group-affiliated rivals and grow into one of India's largest telecom service providers. These foreign partnerships signaled credibility to the outside world, but accessing them required Bharti to demonstrate not only a highly promising business model and successful track record but also credibility in its management and corporate governance.

6.3.7 The Godrej group

The Godrej group is among the largest family-owned businesses in the country. The group was founded by Ardeshir Godrej and Pirojsha Godrej in 1897. Its seven major companies have interests in real estate, FMCG, industrial engineering, appliances, furniture, security and agricare and its turnover crosses \$2.6 billion. Its products include locks, access control systems, security systems and safes, typewriters and word processors, rocket launchers, refrigerators and furniture, outsourcing services, machine tools and process equipment, cosmetics and detergents, engineering workstations, medical diagnostics and aerospace equipment, edible oils and chemical, mosquito repellents, car perfumes, chicken and agri-products, material handling equipment like forklift trucks, stackers, tyre handlers, sweeping machines, access equipments etc. The group's Godrej Industries (chemicals, FMCG, agriculture and services) is headed by Adi Godrej and Godrej and Boyce manufacturing company by Jamshyd Godrej. Adi Godrej is 130 on Forbes list of billionaires. He is the second richest person of *parsi* descent in the world after

Pallonji Mistry. After his MBA from MIT, he joined the family business. He modernized and systematized management structures and implemented process improvements. In the early 2000s, the group completed a 10-year restructuring process through which each business became a stand-alone company with a chief executive from outside the Godrej family.

In 1897, Godrej introduced the first lock with lever technology in India. In 1902, the group made the first Indian safe. In 1920, it made soap using vegetable oil and in 1955, it produced India's first indigenous typewriter. In 1989, Godrej became the first company to introduce polyurethane foam and introduced India's first and only 100 percent CFC, HCFC, HFC free refrigerators. The group owns vast land in Vikhroli, Bombay occupying 3500 acres. In 2001, Godrej Consumer Products was formed as a result of the demerger of Godrej Soaps Limited. Godrej Soaps was renamed Godrej Industries Limited. In 2003, the group entered the BPO solutions and services space with Godrej Global Solutions Limited. In 2004, Godrej HiCare Limited was set up to provide a safe environment to customers by providing professional pest management services. In 2006, the foods business was merged with Godrej Tea and Godrej Tea was renamed Godrej Beverages & Foods Limited which was later renamed as Godrej Hershey Foods & Beverages Limited. In 2011, Godrej & Boyce shut down its typewriter manufacturing plant, the last in the world.

Godrej is major supporter of the World Wildlife Fund in India. The group has built schools, dispensaries and a residential complex for their employees. Trusts established by Godrej continue to invest in education, healthcare and upliftment of the underprivileged people. It was adjudged as the highest ranked Indian FMCG in Asia's Hot Growth Companies' List by Business Week. Godrej Consumer Products has been ranked 14th in The Best Companies to Work For study. Godrej Consumer Products Ranks 6th in ET-Hewitt Best Employers of India survey. Godrej Consumer Products Limited was adjudged as a Business Superbrand by the Super Brands Council. It also features in the top 25 list of Great Places to Work for four years in a row.

6.3.8 The Adani group

The Adani Group is a Gujarat based company having Gautam Adani as its CMD and promoter. The core business of the group includes commodities trading, edible oil manufacturing, Mundra port operations and distribution of natural gas. The Adani group has more than 50 companies and is now in the power sector with a 4620 MW thermal power project in Mundra, Kutch district. When completed, Adani Power will be the largest private company having largest power production on coal-based power. Adani Energy is one of the largest natural gas distributors in India. Adani Enterprises bought a coal mine in Australia for about Rs126 billion in a cash and royalty deal. It will invest \$6.9 billion in developing its recently acquired Australian coal mines. The group will develop mine, rail and port projects in its Galilee Basin coal mine in Queensland, Australia to produce up to 60 million tonnes of coal a year. Adani Enterprises is the largest trading house of India in importing coal with a market share 60 percent. It also supplies

coal to National Thermal Power Corporation. The group became India's largest private coal mining company after Adani Enterprises bagged Odisha mine rights. The group manages one management college and a medical college at Ahmedabad. Adani Enterprises was placed among the top 50 Asian Companies by Forbes Asia in the year 2009 and its rank is 1865 in Forbes Global 2000 in 2010.

6.3.9 The Wipro group

Wipro started in 1945 with the setting up of an oil factory and remained largely unheard of in the pre-reform era. During 1990s, the group had diversified into various product lines like soaps, baby products, hydraulic cylinders, personal computers and software services. After liberalization, it has transformed into a global group and derives most of its value from information technology services. In a sense, synergistic market offering by Wipro (i.e., high PR) has rendered its phenomenal growth. Wipro is a symbol of transformed group that has utilized the opportunities that liberalization, deregulation and globalization have offered. For the group, internal business development through core competencies is more important than maintaining excellent relations with dominant institutions. Thus despite having low IR, Wipro has exhibited high value creation.

6.3.10 The Hero group

In 1956, Munjal brothers founded this group with Hero Cycles as the flagship company. The group had focused on manufacturing automobile parts and other related goods. Now the group comprises of 19 companies, 300 ancillary suppliers and has market penetration with over 5,000 outlets. The group could not transform itself to suit the changed Indian business scenario in reform era when national economy opened up considerably, thereby enhancing business competition. Further, the market for bicycles and related products did not appreciate as compared to other markets like pharmaceuticals and software.

6.3.11 The Escorts group

The Escorts group has played a pivotal role in the agricultural growth, especially in farm mechanization. It offers a range of tractors (about 45 variants starting from 25 to 80 HP) and Escort, Farmtrac and Powertrac are some of the popular brands. The group manufactures and markets a wide range of cranes, loaders, vibratory rollers and forklifts. The group is the world's largest pick-n-carry hydraulic mobile crane manufacturer. Escorts has been a major player in the railway equipment business, offering brakes, couplers, shock absorbers, rail fastening systems, composite brake blocks and vulcanized rubber parts. In the auto components segment, Escorts is a leading manufacturer of auto suspension products including shock absorbers and telescopic front forks. Throughout its evolution, technology has contributed to its growth. Over a

million tractors and over 16,000 construction and material handling equipment have rolled out from the facilities of Escorts. With technological and business collaboration and with competitive indigenous engineering capabilities and 1600 sales and service outlets and footprints in over 40 countries the group is truly a multinational. At a time when the world is looking at India as an outsourcing destination, Escorts is rightly placed to be the dependable outsourcing partner of world's leading engineering corporations looking at outsourcing manufacture of engines, transmissions, gears, hydraulics, implements and attachments to tractors, and shock absorbers for heavy trailers. The group is on the path of an internal transformation, which will help it to be a key driver of manufacturing excellence in the global arena. For this we are going beyond just adhering to prevailing norms, we are setting our own standards and relentlessly pursuing them to achieve our desired benchmarks of excellence.

6.3.12 The M P Birla group

It was in 1862 when Shiv Narain Birla moved out from Rajasthan to Mumbai and set up a trading house. The group has operations in over 12 countries and a turnover that exceeds \$8 billion. In the initial years, the group was only involved in commodity trading and in exports and imports. In 1918, the group diversified out into manufacturing and set up its first jute mill. The Group was involved in the manufacture of a vast range of textiles made from jute, synthetics, cotton, wool and fibres. Each unit is an independent public limited company listed on the stock exchange. The Birlas, in fact, pioneered the concept of public holdings and professional management.

The group owns over 500 factories in a wide range of industries such as textiles, man-made fibres, cables, woollens, automobiles, industrial and textiles machines, sugar, paper, shipping, cement, jute, aluminium, copper, fertilizers, chemicals, power plants, non-ferrous semis, etc. The Group also has over 40 joint ventures and management contracts in several countries such as Nigeria, Kenya, England, Philippines, Indonesia, Thailand, Uganda, Ethiopia and Egypt. The group's Universal Cables manufactures cables and capacitors by the brand name 'unistar'. Vindhya Telelinks manufactures jelly filled telephone cables in technical collaboration with Ericsson Cables AB of Sweden. Birla Ericsson Optical has technical and financial collaboration with the same company and produces optical fibre cables. The company also produces polyurethane jelly filled insulated cables. Optic Fibre Goa manufacturers of optical fibre. Hindustan Gum and Chemicals manufactures guar gum and exports to various countries. Birla DLW, a 50:50 joint venture with DLW Aktiengesellschaft, Germany produces linoleum flooring for exports. Birla Financial Corporation limited is involved in the financial sector.

Birla Corporation Limited is the flagship company of the group, which was incorporated as Birla Jute Manufacturing Company Limited in 1919. Madhav Prasad Birla transformed it from a manufacturer of jute goods to a leading multi-product corporation with widespread activities. Under the Chairmanship of Priyamvada Birla, the Company crossed the Rs. 1300 crore turnover

and the name was changed to Birla Corporation Limited in 1998.

The group runs several institutions, including the M. P. Birla Planetarium, Belle Vue Clinic, South Point School and the M. P. Birla Foundation Higher Secondary School in Kolkata, Bombay Hospital, Birlapur Hospital, West Bengal and Birla Vikas Hospital in Madhya Pradesh. The M. P. Birla Eye Clinic was established in 2001.

6.4 Prospects of Indian business groups

Entrepreneurship development has enabled the business groups in identifying and using the opportunities that exist in the market and convert the ideas into action and striving for excellence. Entrepreneurship has created many innovative responses. The state also plays the role of the entrepreneur in encouraging the groups and there has been a significant increase in entrepreneurship in the country in the post-liberalisation period. Entrepreneurship has helped the formation of capital, besides providing large-scale employment opportunities, promoting balanced regional development in the country and helping to reducing concentration of economic power. Entrepreneurs of the major business groups have wide knowledge of the economic and non-economic environment of business and the willingness to assume risk, besides having open mind, optimistic outlook, adaptability, self-confidence and strong leadership qualities.

Before 1991, Indian business success was a function of ambition, licences, government contracts and an understanding of the bureaucratic system. Decisions were based on connections, rather than the market or competition. Business goals reflected a continuation of the swadeshi movement, which promoted import substitution to attain economic freedom from the west. Pre-1991 policies were inward looking and geared towards the attainment of self-reliance. During this period, entrepreneurship was subdued, capital was limited and India had very few success stories. As well, society was risk averse and the individual looked primarily for employment stability. In the post-liberalization era, family businesses faced competition from multinationals that had superior technology, financial strength and efficient managerial resources. For the old business houses, success had come from the close-knit joint family structure that fosters family values, teamwork, tenacity and continuity. Under this structure, generations lived and worked together under one roof, reaffirming the Weberian values and trust that have built successful businesses. Wealth from the businesses supported the joint family by providing a social safety net for members. In the structure, businesses and families were intertwined though they were also distinct entities with separate rules. Hence, survival of the family became synonymous with the survival of the business.

Liberalization changed the very nature of the joint family. If large Indian businesses were to succeed, the family would have to re-orient itself to compete in a global, competitive environment. Post liberalization, businesses succeeded because they were customer focused and professionally managed. The old, family-managed businesses, which formed the backbone of the

economy, needed to evolve and become more institutional, if they were to extend their life cycle. The businesses had to move from an entrepreneurial-driven, unstructured culture to one dominated by professional managers. Sunil Mittal of Bharti, a first generation entrepreneur, indentified an opportunity in mobile telecom. In 1994, Mittal successfully bid for a telecom licence, and services were launched under the brand name Airtel (a post-liberalization venture). The business model was innovative and IT management services and hardware (telecom towers) were outsourced to vendors. Fixed costs were converted to variable costs. Mittal was able to professionalize the organization early, something that helped him build a larger institution. As a result, India now has one of the lowest-priced telecom services in the world. As Indian businesses became professional, opportunities to acquire global businesses increased. In 2006, Corus, an Anglo-Dutch steelmaker accepted \$7.6 billion bid by Tata Steel, to enable it to become a global leader in the steel business instead of continuing to remain a large domestic steel manufacturer. Once an acquisition target, Tata Steel has itself grown into an acquirer.

6.5 Conclusion

Family business has different characteristics in different economies and differs in outlook and has been influenced by sociological and economic and political factors. A study by Ward (2004) of 200 successful manufacturers in Illinois between 1924 and 1984 shows that less than 20 percent had survived over 60 years, with 65 percent of these remaining with the same family. Only 25 percent had grown significantly. The study also shows that 80 of the 200 companies closed within 30 years and the same number within 60 years. In Indonesia and the Philippines family businesses control more than half of each country's corporate sector in terms of market capitalization (Dutta, 1997). Less than 10 percent of Japanese companies are controlled by families, while nearly 80 percent are widely held. In Korea and Taiwan families control 48 percent of corporations. In Thailand family control is 62 percent and in Malaysia 67 percent.

Chinese culture is centred on Confucian values, which are built around family, social ethics, education, centralized authority and conformity. In China, family-centred extended networks support a cultural orientation of relationships or connections called 'guanxi' which literally means 'relationships' and the Chinese are obliged to do business with close family, extended family, neighbours and former classmates, in that order and only then, reluctantly, with strangers. Family is instrumental in helping to establish the business but also is a significant factor in the growth of the firm (Pistrui, 2006).

In India prevalence of joint family system and traditional caste system wherein vaishya (bania) caste people are engaged in trade and business, have led to strengthening of family businesses. The family business sector was small in 1946, but currently dominates the private corporate sector, constituting 80 percent of the 500 biggest companies. Many new business groups have emerged after 1991 liberalization measures as a result of foreign collaborations, cross border acquisitions or business restructures as a result of family split. About 75 percent of

the largest companies are family businesses. There is some variation in the number of family firms in the biggest companies (Dutta, 1997). The top 17 private business groups by market capitalization, Tata group, Mukesh Ambani, Aditya group, Bajaj group and Vijay Mallya have increased or maintained their stakes in at least 55 companies out of the total of 91 over the past year. Changes in the financial system and take-over threat are some of the reasons for the increase in the stake by the promoters, though in the old days, promoters relied heavily on foreign investors for support. For example, Tata Steel has increased its stake from 30.26 percent in December 2006 to 33.77 percent in June 2007 after the takeover of Corus and Tata Tea has increased its stake from 28.95 per cent in June 2006 to 35.40 per cent in June 2007.

According to the 1972 Dun and Bradstreet study, 70 percent of family firms either close or are sold after the founder retires or dies (Lansberg, 1988). In India, the survival rate has been 54 percent. Of the 200 big companies, 16 are more than 75 years old and about 80 percent continue to be with the same ownership. The comparable figure in the US was 65 percent (Ward, 2004). In Korea, only 30 percent of the Chaebol are listed on the stock exchange and the biggest four Chaebol contribute 50 percent of the country's GNP. Indian businesses are subject threats of splits, succession-planning, takeovers, transnational competition and lack of focus (Piramal, 1998). Of these, the transnational competition poses the biggest danger followed by splits in the family. The three major dilemmas faced by family businesses include how to find and hire the best managers a group can afford; how to ensure that the next generation is able and capable of taking over the baton; how to encourage each business unit within the group to become focused and to maximize its core competencies to best advantage.

The groups founded by Tata, Godrej and others have promoted and maintained a typical kind of culture over the decades. There are other firms, which have evolved from being culturally embedded through being market driven. The groups belonging to this category are Wipro, Ranbaxy and Sundaram Fasteners, which have used organizational culture for business growth, market capitalization and market leadership. Following these examples, SMEs have drawn on organizational culture and achieve competitive advantage in a niche market. The next chapter discusses entrepreneurial development initiatives in the small and medium enterprises in India.

Chapter 7

Entrepreneurship in Small and Medium Enterprises

7.1 Introduction

Entrepreneurship in India was traditionally less organized, based on the unique caste and economic systems. The enterprise activities were in textiles, handicrafts and woolens and manufacturing activity was based on traditional methods, the mercantile communities being involved in marketing and financing. Entrepreneurship in the modern sense began with the entry of the East India Company during the 18th century, but the colonial rulers never encouraged local entrepreneurship, being interested only in the export of raw material and the import of finished goods to Britain. Trading operations were greatly influenced by traditional business communities like parsis and banias. During and after World War I, owing to increasing demand for several commodities, self-made entrepreneurs started setting up enterprises in spite of the unfavorable climate of the colonial rule. After independence, a systematic approach to developing entrepreneurs was adopted through five-year plans of the union and state governments.

The dynamics of business is undergoing a major transformation in the wake of globalization. The liberalization efforts pursued by India have opened new doors of opportunity and have posed new challenges in a knowledge-based economy (APO, 2007). Therefore, a knowledge assessment must include not only economic parameters, but also other important aspects, such as education, health, emancipation of women and an improvement in overall standard of living. This, if achieved, will ensure sustainable entrepreneurship. Emerging markets and emerging technologies present both challenges and opportunities for businesses and individual entrepreneurs in focusing on competitive advantages for their firms.

This chapter enumerates the achievement of small and medium enterprises to the growth of entrepreneurship in India and how the sector has been able to sustain the pace of development in the economy. Section 7.2 briefs about the SMEs, while section 7.3 discusses the prospects SMEs in the auto industry. The growth of entrepreneurship as evidenced by establishment of

various entrepreneurial institutions is discussed in 7.4, while section 7.5 characterized the growth through technology and information-based institutions. Section 7.6 briefs about the diffusion of entrepreneurship in SMEs and section 7.7 presents five SME case studies, three in Hyderabad, two in Bangalore and one in Tamil Nadu. Section 7.8 concludes.

7.2 SMEs in India

While many countries place entrepreneurial firms in the category of small and medium-sized enterprises (SMEs), in India they are termed as micro, small and medium enterprises (MSMEs). The Micro, Small and Medium Enterprises Development Act, 2006 provides for a definition of these enterprises besides paving way for a statutory national board exclusively for them. SMEs have an important role to play in integrating their operations with other small businesses and ultimately with global firms to justify their own existence and realize their growth. A strategy of vertical integration and horizontal cooperation would enable the local SMEs to work with global transnational corporations for the production of intermediate goods and also for networking link up with global firms for the production and marketing of consumer goods (Bala Subrahmanya, 2007). Economic size of an entrepreneurial unit may be measured by employment, output, fixed capital investment and export variables and its economic performance may be indicated by output to capital ratio, output to labor ratio and labour to capital ratio.

Small enterprises are the engine of growth in countries like India. They are able to create jobs, foster entrepreneurship, utilize local skills and resources and strengthen the industrial base of the economy. This sector has contributed to the overall growth of the GDP, to employment generation and to exports, consistently outperforming large industry on parameters like production and employment. The SSI sector accounts for 90 percent of industrial enterprises, 40 percent of total industrial output, 34 percent of exports and 8 percent of GDP, with a manufacturing range of 7,500 products (Bala Subrahmanya, 2007). The sector accounts for nearly 35 percent of gross value of output in the manufacturing sector and over 34 percent of total exports. It accounts for about 40 percent of value added in the manufacturing sector. Most of the owners are first-generation entrepreneurs who act as owners, managers and employees. The result is that the enterprise suffers from excessive engagement (both positive and negative) by these entrepreneurs. Most of them suffer from lack of experience, seasoning and entrepreneurial maturity and vision.

In analyzing the proliferation of small scale family farms in India, Das contends that widespread involuntary unemployment in the rural economy may be considered a problem of failure to coordinate and such a problem can be overcome through planned, investment promotion by the state or regional administrations through reducing unemployment and inducing the entry of capitalist farmers (Das, 2009). The US has served as a model for other countries to emulate in applying technology in the economy and of directing finance to smaller but innovative companies. As many technology companies are becoming rapidly globalised at early

stages of their development by transferring or outsourcing part of their activities to emerging markets, Israel, China and India are experiencing rapid growth in risk-capital investments (OECD, 2008). SMEs have improved their performance and presence through industrial cluster approaches. Suitable cluster interventions are necessary for enhancing competitiveness and sustainability of the SME sector.

7.3 SMEs in Indian automobile industry

The Indian automotive component industry is highly fragmented and there are nearly 6,400 players in the sector, of which only about 6 per cent is organized and the remaining 94 per cent comprises small-scale, unorganized players. In terms of value-added, the organized sector account for nearly 77 per cent of the output in the sector. During the colonial period, the country had no automotive industry and all automobiles were imported from the global manufacturers such as General Motors and Ford Motors. In the 1940s, Hindustan Motors and Premier Motors were established by Indian entrepreneurs, by importing know-how from General Motors and Fiat. In the 1950s, a few other companies such as Mahindra and Mahindra, Ashok Leyland and Bajaj Auto entered the market for commercial vehicles and two-wheelers. Most of those companies either imported auto components or produced them domestically under import substitution programme. This development, followed by the L.K. Jha Committee's recommendations in 1960 to develop an indigenous ancillaries sector, resulted in the evolution of a separate auto component sector. From a pre-1980s highly-protected segment, the auto component industry in India has gradually emerged as an important industrial sector. Until 1991, the phased manufacturing programme, under which domestic original equipment manufacturers had to increase their proportion of domestic inputs over a specific period, laid the foundation for the Indian auto component sector. The policy initiatives have ranged from excise duty, concessions and tax incentives for investment in the sector, to incentives for promoting R&D, measures for export promotion and the reduction of import duties on components. Apart from the central government, several state governments also have focused on attracting investments in the auto sector.

While in the advanced countries, the typology of SMEs tends to be homogeneous mainly in term of firm size and technology, the developing countries are characterized by low industrialization, with co-existence of both very small enterprises in the informal and SMEs in the organized sectors. Modern SMEs are capable of adopting state of the art technology, relatively big with larger market share, quality conscious and export-oriented. With the establishment of WTO and its conditionality many of the existing support structures would vanish and SMEs would have to struggle on their own. SMEs would not be able to compete with

MNCs due to their inherent weaknesses such as obsolete technology, uncompetitive prices, poor quality of goods, costly credit, weak infrastructural facilities, plethora of labor legislation, lack of cohesion among SME units, ineffective associations, lack of up-to-date information, lack of international exposure to its products and lack of standards conforming to international standards. With the removal of quantitative restrictions (QRs), SMEs are subjected to global competition. Removal of QRs will affect most of the sectors in SMEs. The removal of QRs would imply that raw material is available cheaper rates which will in turn, reduce cost of a product thereby making it more competitive in terms of pricing. There is vast market potential for the products for the products of small sector in the neighboring and other developing countries as removal of QRs is also applicable to these countries. SMEs should adopt an aggressive export policy towards the optimum utilization of the opportunities available by removal of QRs. There are certain areas where MNCs would not be able to supply goods. SMEs have very good opportunity to provide such products at cheaper rates. The government has established sub-contracting exchanges which maintain data about the SMEs to match the requirements of large scale industries which will become increasingly knowledge intensive.

The Indian auto industry is highly competitive with a number of global and Indian companies present. Foreign companies are present through joint ventures, equity participation or with technology tie-ups. India ranks eleventh in car production and thirteenth in commercial vehicle production. In the pre-1983 period, the development was characterized by closed market, market growth limited by supply and outdated models. The 1983-03 period was characterized by joint venture between Suzuki Motors and Maruti Udyog and other joint ventures for manufacture of commercial vehicles and auto components. The sector was delicensed in 1991 and imports were allowed from 2001 onwards. Japanese and American car manufacturers start Indian assembling and Indian Auto Industry crossed the sales landmark of 10 million units in 2006-07. Domestic sales and exports of the auto industry had grown from 5.51million units in 2001-02 to 11.12 million units in 2006-07 at compound annual growth rate of 15.5 percent. This growth had been driven by a buoyant economy, increasing purchasing power of Indian middle class, new product launches and attractive finance schemes from automobile manufacturers and financial institutions. The auto parts industry has emerged as one of fastest growing manufacturing sector. The industry has adopted a three pronged strategy of product portfolio enhancement, market expansion and efficiency improvements to achieve this stature. Enhanced capacity and higher capacity utilizations have contributed significantly to this growth.

In regard to automotive components, 55 percent is the vehicle industry for the original equipment. Replacement demand constitutes 35 percent of the domestic production, exports accounting for the remaining 10 per cent. Exports mostly serve the replacement market abroad. The Indian automotive components are a low volume and fragmented industry. It has nearly 400 firms in the organized sector and more than 5000 firms in the unorganized sector. The growth of auto industry depends on increasing demand for vehicles, stable economic policies adopted by government, availability of low cost skilled manpower, high quality standards and growth

forecasts as per automotive mission. The financial demands arise due to working capital requirements and demand for new investment. Investment demand can be for replacement of obsolete machinery or technological up-gradation and modernization, expansion, quality improvement, new ventures and diversification, introduction of labour saving devices, R&D to constantly upgrade global competitiveness and environment related investments. Part investment demand will come from the factory sector, because of technology up-gradation and modernization, expansion and quality improvement. The demand will also come from the transformation demand of the unorganized sector like workshops and household industries and their subsequent entry into the factory sector. Though R&D is not yet significant, the competitive pressure and the urge to grow will prompt many small factories to go for setting up their own R & D facilities.

The major problems faced by the SMEs not only in the auto but in general relate to availability of loan without collateral, delay in getting the loan, high cost of funds, delayed payments, marketing problems, WTO related issues and sickness (Kamesam, 2003). Over 10 percent of the SSIs are identified as sick and when the sickness prolongs, it leads to the closure of units and unemployment. This trend has wider implications, including funding assistance from the lending institutions turning non-performing assets. It also leads to a loss of scarce material resources and loss of existing employment. Continued diversification of export basket, improvement of export quality and productivity, increased technology intensity in production, enhanced R&D activity, reduction of cumbersome regulatory environment, adding flexibility to the existing labor laws, and removal of infrastructural bottlenecks are certain to make the SSIs more innovative and participating (Trivedi et al, 2011).

The various programmes undertaken by the government promote SSIs by ensuring adequate credit from financial institutions, funds for technology upgrading and modernization, integrated infrastructural facilities, modern testing facilities and quality certification laboratories, access to modern management practices, entrepreneurship development and skill upgrading through appropriate training facilities, assistance for better access to domestic and export markets and cluster-wide measures to promote capacity-building and empowerment of the units.

7.4 Growth of entrepreneurship in SMEs

During the 1970s various strategies and models were developed and tested for cultivating entrepreneurship in various parts of the country. Many institutions adopted the EDP strategy for creating MSMEs during the 1970s and 1980s. In 1969, Gujarat state established the first Centre of Entrepreneurship Development (CED) in Ahmedabad, which conducted a number of EDPs to attract first-generation entrepreneurs within the state. Entrepreneurship Development Institute of India (EDI) developed a general EDP model for developing first-generation entrepreneurs nationally. The success story of CED, Gujarat led to the establishment of entrepreneurship development institute (EDI) in Ahmedabad in 1983 with the support many financial institutions.

The establishment of EDI has facilitated the growth of entrepreneurship through its activities of entrepreneurship education, training, and research (Awasthi, 2011).

Prior to the 1960s, entrepreneurship in India was a topic of academic and philosophical discussion by economists and other social scientists. McClelland (1965) conducted a pioneering study on entrepreneurship along with NISIET, Hyderabad in the early 1960s, disproving the popular belief that ‘entrepreneurs are born,’ but entrepreneurs are not necessarily born and can be groomed and developed with systematic training and pro-business interventions. Any person, irrespective of caste, religion and region of origin, can learn to be a successful entrepreneur. Based on these findings, the National Institute of Small Industry Extension Training (NISIET) has developed the first Entrepreneurship Development Programme (EDP) model to develop first-generation entrepreneurs. This integrated model indicates that a support mechanism beyond training intervention is necessary to develop entrepreneurs. Promotion of entrepreneurship can be viewed as a cyclic process associated with activities like stimulatory, supportive and sustaining. Stimulatory activities are those that stimulate entrepreneurs in any community. Supportive activities help entrepreneurs in establishing and running their enterprises, while sustaining activities ensure continued, efficient and profitable functioning of an enterprise. NISIET, set up in the year 1960 with the support of Ford Foundation, has been the forerunner of entrepreneurship development in India. It was the first Indian institute to provide training to officers dealing with small industries as well as entrepreneurs. The institute undertook entrepreneurial research in the 1960s through experiments on achievement motivation, which led to the first entrepreneurship development model. Later, other models and approaches were developed, heralding the concept of growth centres. At present NISIET is involved with promotion and development of SSIs through a cluster approach.

Indian Institute of Entrepreneurship (IIE), Guwahati began as a branch institute of NISIET, located in Guwahati, to promote entrepreneurship in the northeastern states. IIE activities include identification of training needs, designing and organizing training programmes for entrepreneurs and concerned agencies, evolving effective strategies and methodologies, organizing seminars and workshops, undertaking research in entrepreneurship and documentation and dissemination of information on self-employment and entrepreneurship. National Institute of Entrepreneurship and Small Business Development (NIESBUD) was established in 1983 in Delhi to promote, support and sustain entrepreneurship and small business through training, education, research, consultancy and other interventions in India and other developing countries. Its main activities include evolving effective training strategies, standardizing model syllabi for entrepreneurship training, organizing trainers’ training programmes, and undertaking research in entrepreneurship development.

In addition to the national institutes, there are 14 state-level Centres of Entrepreneurship Development (CEDs) and Institutes of Entrepreneurship Development (IEDs), being established under the scheme for strengthening the training infrastructure of existing and new

entrepreneurship development institutions. A few institutions with women as their focus have been established through private initiatives to develop women entrepreneurs in various parts of the country. Association of Women Entrepreneurs of Karnataka (AWAKE) was established in 1993 in Bangalore with the mission of empowering women through entrepreneurship development. AWAKE develops, guides and extends assistance to potential women entrepreneurs in Karnataka through counseling, training, handholding, and peer group support. Association of Lady Entrepreneurs of Andhra Pradesh (ALEAP) was established in 1993 at Hyderabad by several women entrepreneurs with the aim of empowering women to establish small and medium enterprises. Its major activities are identification of projects, guidance for finance, training, organizing exhibitions and creating industrial infrastructure for developing women entrepreneurs. In 1997, ALEAP set up a centre for entrepreneurship development, with financial support from central and state governments to promote women entrepreneurs. Consortium of Women Entrepreneurs of India (CWEI) works for the economic empowerment of women through entrepreneurship strategy. Its main activities are participating in trade exhibitions, organizing training programs, providing escort services and handholding and export marketing for the benefit of first-generation women entrepreneurs. CWEI widely uses e-governance, e-commerce and other services. Rural and tribal women with traditional skills have been greatly motivated towards entrepreneurship by CWEI. CWEI has recently started networking with women entrepreneurs of other countries to market the products manufactured by women entrepreneurs in India.

National Entrepreneurship Development Board (NEDB) is the apex body for entrepreneurship development. It devises and recommends government schemes for the promotion of entrepreneurship through self-employment or setting up SSIs. Grants are provided to reputable organizations engaged in entrepreneurship development for organizing workshops and seminars and conducting research in entrepreneurship development. Programmes under Entrepreneurship and Business Development Centres (EBDCs) are being implemented through selected organizations and educational institutions. It is initially in operation for two years with an extension of two more years in deserving cases. After four years the host institution assumes the responsibility of continuing the scheme and arranging the funds for it. Under Scheme of Surveys, Studies and Policy Research, the MoSSI provides funds for organizing surveys and research studies on topical issues in the SSI sector. Training institutes, universities and colleges, NGOs, and other industry associations conduct surveys and studies on various issues of entrepreneurship development and problems of first-generation entrepreneurs that are published for wider dissemination. Technology infusion and/or upgrading of MSMEs, their modernization, and promotion of exports are the principal objectives of assistance under the scheme of international cooperation. It covers activities like participation of entrepreneurs in international exhibitions, buyer–seller meets, deputation of business delegations to other countries for technology upgrading, facilitating joint ventures and improving the markets. It also holds international conferences and seminars of topical interest.

Small Industries Development Organization agency advises, coordinates and formulates policies and programmes for the development and promotion of the small-scale sector. It also maintains liaisons with central ministries and other government agencies and organizations, including financial institutions. Under the Ministry of Agro and Rural Industries, Khadi and Village Industries Commission (KVIC) and Coir Board implement their respective schemes to develop rural entrepreneurship. The Prime Minister's Rozgar Yojana was launched in 1993 to assist educated unemployed youth in setting up small enterprises and is implemented by state industries departments through district industries centres and other government organizations. KVIC launched the rural employment guarantee scheme in 1995 to generate employment in rural areas under the KVI sector. This scheme promotes entrepreneurial culture particularly in rural areas, and entrepreneurial development training is important for the selected entrepreneurs. In addition, KVIC also extends fund assistance to public and private institutions for organizing EDPs in the KVI sector. The Coir Board facilitates EDPs through public and private institutions to develop entrepreneurs in the coir sector. Their programmes focus primarily on skill development with entrepreneurship input.

The Department of Science and Technology (DST) under the Ministry of Science and Technology has made efforts to tap the talents of the country's science and technology students through entrepreneurship strategy. National Science and Technology Entrepreneurship Development Board (NSTEDB) help promote knowledge-based, technology-driven entrepreneurship. The board aims to convert job seekers into job generators through science and technology interventions. The main objectives of NSTEDB are to promote an entrepreneurial culture among science and technology individuals, to facilitate and launch promotional services for developing entrepreneurship and to network with various supporters, including academic and R&D institutions, in fostering entrepreneurship. With a view to educating students and faculty at S&T institutions, Entrepreneurship Awareness Camps are conducted by specialized institutions. The DST organizes Entrepreneurship Development Programmes based on the NISIET model with the aim of training S&T graduates and diploma holders in the essentials of successfully conceiving, planning, initiating and launching an enterprise. Through faculty development programmes, S&T faculty are trained in entrepreneurship development to motivate S&T students toward entrepreneurial careers. The Open Learning Programme in Entrepreneurship has been initiated with the help of EDI for S&T personnel to speed up the process of entrepreneurship promotion by training a large number of beneficiaries in a short time. This 11-month distance education programme provides potential entrepreneurs in different parts of the country not only with study material, but also with guidance from resource experts during the contact sessions.

7.5 Technology and information-based growth of entrepreneurship

Technology-based Entrepreneurship Development Programme is designed to develop and motivate entrepreneurs in specific products, technologies and processes developed by CSIR labs and other R&D institutions (Awasthi, 2011). This is based on the EDP concept, with a more

technical focus. In addition to training programmes, NSTEDB has created Entrepreneurship Development Cells (EDCs) to generate entrepreneurial culture in S&T academic institutions, foster techno-entrepreneurship and encourage enterprise startups. Science and Technology Entrepreneurship Development (STED) aims to bring about socioeconomic development in the selected area through S&T intervention. The project envisages matching the material and human resources of the district to create enterprises based on S&T processes. Science and Technology Entrepreneurship Parks (STEPs) help create an atmosphere for innovation and entrepreneurship through interaction between academia and industries in sharing ideas, knowledge, experience and facilities for the development of new technologies and their rapid transfer to the end-user. They also promote innovative enterprises by techno-entrepreneurs. There are many STEPps and many new products and technologies have been developed, besides skill training. Technology Business Incubators (TBIs) provide services to new and existing entrepreneurs and offer a congenial atmosphere for their survival and growth.

Since liberalization, food processing and agro industries have been accorded high priority. The Ministry of Food Processing Industries is facilitating EDPs through nodal agencies to attract potential entrepreneurs for the creation of food processing enterprises. The nodal agencies function at the national level, implementing agencies at the field level. Through this project enterprise development inputs are shared by these agencies in a comprehensive way to promote the maximum possible number of enterprises in the food processing sector. Besides the public sector organizations, private institutions like Confederation of Indian Industries, Federation of Indian Micro and Small and Medium Enterprises, Associated Chamber of Commerce and Industry, All India Manufacturers' Organization and World Association for Small and Medium Enterprises actively are involved in the development of SMEs and the entrepreneurial culture in them.

Department of Scientific and Industrial Research promotes R&D among the industries, support small and medium industrial units to develop state-of-the-art globally competitive technologies of potential, catalyze faster commercialization of R&D, enhance the share of technology-intensive exports, strengthen industrial consultancy and technology management capabilities and establish a user-friendly information network to facilitate scientific and industrial research. It provides a link between scientific laboratories and industrial establishments for transfer of technologies through the National Research Development Corporation (NRDC) and facilitates investment in R&D through Central Electronics Limited. The National Research Development Corporation has the objective of developing, promoting and transferring the technologies emanating from various national R&D institutions. It provides services to improve the manufacturing base with innovative technologies and acts as an effective catalyst translating innovative research into marketable industrial products. NRDC's repository of indigenously developed technologies includes drugs and pharmaceuticals, biotechnology, metallurgy, electrical and electronic technologies instrumentation, building materials, mechanics and food processing. It also exports proven technologies to both developed and developing countries.

The Techno-Entrepreneur Promotion Programme (TEPP) promotes supports and assists individual innovators in becoming technology-based entrepreneurs. TEPP also assists technopreneurs in networking and forging linkages with other constituents of the innovation chain for commercialization of their developments. It provides financial support to selected and screened individual innovators to convert original ideas into working models and prototypes. Central Electronics Limited emphasizes on indigenous technology, inducted both from its in-house developments and from national laboratories, for its production programme in diverse high-technology areas. The Council of Scientific and Industrial Research (CSIR) provides scientific industrial research and has a country-wide network of many laboratories and field centres converting fundamental and applied R&D in all areas of science and technology (except atomic research). It develops and nurtures S&T human resources through extramural support and promotes scientific talent through awards and fellowships.

Information and communication technology plays a crucial role in enhancing the export competitiveness of Indian SSIs. The Kakinada experiment, under the guidance of David C. McClelland, was an important effort in the area of entrepreneurship research and training in the early 1960s. McClelland (1965) opined that the need for high achievement (n-ach) was an essential ingredient for the emergence of entrepreneurs and that it could be taught in order to stimulate economic growth. He speculated that external resources (materials, markets, trade, trade routes, etc.) were as important as the entrepreneurial spirit that exploits those resources. He believed that economic activity could be increased through training of prospective entrepreneurs. McClelland's theory of achievement motivation moulded entrepreneurship training and education in India and many other developing countries. The theory was put to use to motivate poor, illiterate, disadvantaged and other non-business communities to empower themselves through creation of enterprises. NISIET developed an integrated model with appropriate training modules to develop entrepreneurs through pre-training, training, and creating a favorable climate in the area. This model was tried in Assam, Jammu and Kashmir, Karnataka, Maharashtra, Nagaland and Orissa in 1970. NISIET has also pioneered trainers' training programmes to develop potential trainers in local areas.

7.6 Diffusion of entrepreneurship

The EDP mainly focused on entrepreneurial stimulation through a training-cum-counseling package that includes motivation, project guidance, managerial orientation and information, preparation of a project plan and implementation of the project (Awasthi, 2011). The duration of the EDP varied from a few days to three months. The EDI combined NISIET's entrepreneurship model and its own academic resources for active participation in entrepreneurship development activities. Its programmes are aimed at special target groups, such as rural entrepreneurs and women. NIESBUD offers accelerated programmes for developing model syllabi for various target groups, as well as manuals and tools for spreading the

entrepreneurship movement. NIESBUD organizes EDPs and related activities to create an entrepreneurship culture in the northeastern states of India. In the 1990s entrepreneurship development became a national movement.

Small Industries Service Institutes organize EDPs to benefit technical graduates, educated unemployed youth, women and other rural entrepreneurs at the state level. The National Productivity Council is engaged in organizing EDPs, seeking sponsorship from national and state-level support institutions. The Rural Development and Self-Employment Training Institute with support from Syndicate and Canara banks, organizes training programmes to develop skills and assist in entrepreneurial activity. Their training modules are focused mainly on rural youth and function in many locations around the country. It provides technical know-how and familiarizes potential entrepreneurs with the steps required for establishing and managing enterprises. District Industries Centres support the organizing of EDPs at the district level in collaboration with regional resource institutions. In addition to these public efforts, non-government organizations are also participating in organizing programmes with entrepreneurship concepts. They are mainly participating in organizing Prime Minister Rojgar Yojana scheme and state-level programmes for developing entrepreneurs and supporting them in creating SSIs. The National Small Industries Corporation sponsors EDPs through various training institutes. The Industrial Technical Consultancy Organization, jointly sponsored by financial institutions organizes EDPs and creates a satisfactory climate in the respective states. CEDs/IEDs also strive to promote entrepreneurship through training, research, and consultancy and by providing information in respective regions.

The success rate of EDPs is influenced by target groups, training organization, and enterprise climate in the selected area, including access to finance, infrastructure and other facilities. However, many entrepreneurship development programmes sponsored by certain organizations lack quality and do not create an entrepreneurial culture. Entrepreneurship is now introduced as a subject in postgraduate courses at engineering, management and technical institutions. These courses approach entrepreneurship like other academic subjects, as if it were based on a settled body of knowledge. Their aim is to create awareness on self-employment avocations among the students. A few institutions arrange interaction with local entrepreneurs and visits to enterprises run by them. The present curricula on entrepreneurship do not evoke interest among students or attract them to opt for the subject. There is no balance between motivation development, enterprise launching, and management with a practical outlook. The courses started by training institutions have a different approach. They do talk about entrepreneurship and cover a wide range of topics in entrepreneurship, but lack a focus on creation of enterprises.

The potential of clusters as a vehicle for economic growth is well established in the global policy agenda. The National Resource Centre for Cluster Development was established at NISIET with fund assistance from SIDO and has been working on manufacturing, service and

traditional clusters. McClelland's theory of achievement motivation is the basis for the Indian entrepreneurship movement (APO, 2007). Achievement motivation is essential for entrepreneurial success and that it can be imparted through training to stimulate economic growth. EDPs are developed as packaged solutions consisting of helping entrepreneurs to learn business by actually doing it in incubation facilities. Empirical studies on the growth of entrepreneurial activity in India (Global Entrepreneurship Monitor research) shows that the level of entrepreneurial activity increased from 9 percent in 2000 to 12 percent in 2001 and 18 percent in 2002, doubling in the next few years. The study also states that in 2002 entrepreneurial activity in India stood second among 37 countries studied, next only to Thailand (19 percent). The analysis affirms that awareness creation, counseling, guidance, handholding and other services have been on the rise in recent years, thus accelerating entrepreneurial activity.

7.7 Case studies

Case studies 7.7.1 to 7.7.3 refer to Andhra Pradesh-based entrepreneurs and are sourced from Kondaiah (2007). 7.7.4 and 7.7.5 refer to Karnataka entrepreneurs and are sourced from D'Costa (2011), while 7.7.6 referring to Tamil Nadu is sourced from FAO (2006).

7.7.1 *Anuja electronics*

B. Vijayalakshmi is the first-born of six children in a middle-class family without a business background. Her father, who was the inspiration behind starting her venture, has been an employment officer. Her husband, a mechanical engineer and industrialist, supported and encouraged her to start up and run the enterprise. Vijayalakshmi is a graduate in electronics and communication engineering from Kakinada Engineering College, Andhra Pradesh. After graduating, she joined a polytechnic college as assistant lecturer. From her childhood she had a strong desire to do something on her own and never liked working under someone in controlled conditions. Thus the dominant entrepreneurial trait of a desire for independence was evident in her behavior even at that early age. She got an opportunity to start an ancillary industry to Andhra Pradesh State Road Transport Corporation. She experienced a dilemma in trying to choose between her job and the enterprise and subsequently decided to quit the job. She started supplying solder sticks to all the depots in Andhra Pradesh as a rate contractor. She was in this business for 16 years. In 1989 there were heavy power cuts during the summer and she realized that there was a demand for electronic generators. She decided to develop inverters for the open market, starting Anuja Electronics and began marketing under the brand name Anu generators. Anu Generators grew in size and in 1996 the company started manufacturing power-saving electronic ballasts and lighting fixtures with electronic ballasts.

Anticipating a slump in the industrial market and heavy competition from other parts of the country, Vijayalakshmi decided to reduce the production of solder sticks and started looking for other products. She looked at soft plastic products, such as insulation sleeves and dust-proof

covers, produced with a new process called dip moulding, which was not very popular in India and not available domestically. She went to South Korea to obtain it. In 1997 she started another company Chaitanya Dip Moulding Works to manufacture these soft plastic PVC products, which are an import substitute and supply them to automobile and electrical industries all over India. After crossing many hurdles, the company has now achieved a commanding position in the dip moulding industry in India and has reached a position to cater to multinational companies.

Vijayalakshmi is inquisitive, creative and innovative and enjoys solving problems. Driven by a need for achievement, she prefers an independent career. Though she is an introvert and has only a few close friends, she admits that she is a consistent goal setter and results-oriented individual. She does not make decisions in haste and once a decision is made she will follow through on it. She can totally handle the mental load but experiences some physical constraints. Despite coming from a non-business family, she appears to be totally committed and dedicated and believes in her own ability to reach her goals. She is vice-president of ALEAP, always ready to help other aspiring women entrepreneurs. She believes in giving employees complete freedom provided they also take responsibility. She is enthusiastic, imaginative, and tenacious and does not believe in keeping her ideas only to herself. She likes to share her knowledge and experience in the field with other entrepreneurs.

Vijayalakshmi, with 28 years of experience has acquired sufficient knowledge to enter into franchises, joint ventures, technical collaborations and strategic alliances. She is well-informed about different government and non-government programmes supporting the SSIs and uses her knowledge to guide the new generation of women entrepreneurs. Her company keeps in touch with buyer preferences and modifies its products accordingly through continuous R&D efforts. Products are manufactured against advance orders and sold directly to all auto part vendors throughout the country. The primary buyers of the products are Hero Honda, Bajaj, and Maruti. With an annual turnover of the company over Rs 50 million, the inherent strengths of the company are a large installed capacity, a spacious shop floor, an in-house tooling facility, experienced and vibrant staff, vision and commitment and the ISO 9002 quality system. The firm uses total quality management, quality circles and just-in-time techniques for productivity improvement.

The company values training and exposure. Wherever there is an opportunity the employees are sent to relevant training, seminars or workshops. Employee performance is reviewed monthly and annually. Incentives and rewards are based on a performance appraisal. Vijayalakshmi has received awards and appreciation from the government for her excellent performance. She attributes her success to her hard work, commitment and self confidence, to the cooperation and support of family and friends and to devoted and committed staff and workers, quality consciousness, technical knowledge, timely diversification of the product and market assessment. Her advice to upcoming entrepreneurs is that 50 percent of profits should be reinvested for upgrading the enterprise. All these qualities make her a successful entrepreneur.

She was named best woman entrepreneur of 2000 by CII. When she started her venture, she had absolutely no business knowledge. She started with a small loan from Andhra Pradesh State Finance Corporation plus her personal investment. In 1977, through NISIET's three-month entrepreneurial development programme, she acquired the knowledge and skills necessary for starting up an enterprise. Today, she is confident of her proficiency and can handle all functions of management, from planning to implementation and evaluation.

7.7.2 *ELICO*

Electronics and Industrial Instruments Co (ELICO), the first electronics company in the state of Andhra Pradesh, was incorporated in 1960 at Hyderabad and started with the manufacturing of pH meters for the first time in India and kept on adding several firsts in the areas of spectrophotometry, electrochemistry, flame photometry, water quality analysis and gas analysis. In 1970, the name of the company was changed to ELICO Pvt. Ltd and in 1995 it was converted into a public limited company. In 1976, ELICO diversified into manufacturing professional-grade switches and introduced a wide range of toggle and push-button switches for use in the consumer electronics and telecommunication industries. These switches were accorded approval by defense and telecommunication sector.

Ramesh Datla was hired as senior test development engineer by Cirrus Logic Inc., USA, a semiconductor company, where he was responsible for design evaluation, prototype debugging and device characterization of advanced graphics and datacomm products used for notebook and desktop PCs. For a brief period he worked as research assistant in Indian Institute of Science, Bangalore. He then joined his father's company as works manager and held various positions before becoming its managing director. Besides his schedule as MD, he personally takes care of the design, development and manufacture of electronic analytical instruments and software development and services. A second-generation entrepreneur, Ramesh comes from a middle-class family with a business background. He possesses the qualities of a successful entrepreneur: he is inquisitive, creative, innovative, energetic, enthusiastic, imaginative and also aggressive at the same time. He enjoys solving problems, makes very quick decisions on his own, and does not depend on external influences. Always taking up challenging tasks, and making things happen, he believes in taking moderate risks, whether personal or financial. He believes that failures are a steppingstone to success. He knows that networking is a must for the success of an enterprise and enjoys moving around. He is actively involved in decision making analysis of many institutions.

Having been in the business for the last 25 years, Ramesh has the confidence and knowledge necessary to enter into a franchise, joint venture, technical collaboration or strategic alliances. He has a flair for exploring new technologies, markets and business opportunities and in recognition of this, he was honoured with the best new product brought into commercial

production for the first time in the state by a small scale industry award for the year 1996–97 from the Federation of Andhra Pradesh Chamber of Commerce and Industry, Hyderabad. ELICO is an ISO 9001 company manufacturing electronic analytical instruments, professional-grade switches and software development and services. In 1988, ELICO expanded into software, providing microprocessor-based embedded solutions to its customers. Since 1992 graphical user interface based instrumentation software has been offered as a bundled solution. In 1999 ELICO established a 100 percent export-oriented software division for software development and services and IT-enabled services in healthcare for its US and European clients. The company has established its own R&D wing and has won a number of awards for its R&D efforts like the award for excellence in electronics R&D 1997 from the Department of Electronics, Government of India. The firm is keen to progress in the areas of chromatography, spectroscopy, electrochemistry and life sciences. ELICO exports its products to more than 25 countries. In 1996 the company obtained ISO 9001 certification for design, development, manufacturing and servicing of analytical instruments and obtained ISO14001 certification. In 1999 the company received a national award for quality in small scale products from the MoSSI. To improve productivity, the company uses Kaizen and 5S TQM and 6 sigma activities have been initiated. A department-based quantification matrix is used to quantify performance levels. In order to control production costs, the company has devised its own methodologies for in-time delivery, inventory management, reduction of re-works and rejects and improvement in communication and customer satisfaction.

The company plans its manpower on the basis of periodic business demands and market trends. Employee performance is rated annually and salaries, rewards, incentives and promotions are based on performance. Employees enjoy annual bonuses and medical benefits. The company gives top priority to employee training and development and plans an annual training calendar for all areas. A separate budget allocation is made for training. The technical education Ramesh acquired in India and the US has helped him keep pace with the latest developments in electronics. His dedication, commitment, determination, self-confidence, inquisitiveness, creativeness, interpersonal strengths, concern for his staff; quality consciousness and ability to keep abreast of trends in the market have all contributed to the success of the enterprise.

7.7.3 Cheminnova Remedies

M Seshagiri Rao was the resident director of the Hyderabad unit of American Remedies Ltd. After its merger with Dr Reddy's Laboratories, the unit was taken over by Cheminnova Remedies by Rao. Its initial investment was Rs 300,000 and the entire project cost was financed by the State Bank of Hyderabad under its scheme for technocrats. It is the largest manufacturer of oral liquids and solid dosage forms of pharmaceuticals. The company has ventured into backward integration and started a Clinical Research Organization (CRO) with state-of-the-art facilities and equipment, offering services such as product development, process development, formulation development and analytical process development with a technical team of

doctorates, production specialists, microbiologists and regulatory personnel. Rao as the M D has been in the field for the past 40 years and is well recognized in the pharmaceutical industry. Before starting the enterprise he worked for 15 years at Biological Evans, Bio-chemical Enterprise and Nath Laboratories and American Remedies Ltd., before its merger. He was instrumental in the smooth functioning of American Remedies while it was in existence. He is deeply committed to social service and believes that service to mankind is service to god.

The theory that entrepreneurs could be made was shown to be valid in the case of Rao. With no business background, he is the managing director of three companies. Over time he has developed and enjoys the skill of solving the most critical problems. He has a strong belief in what he does and does not seek advice from external sources. He does not depend on luck and destiny and he enjoys taking personal and financial risks. He strongly believes that hard work pays off and finds time for socializing and networking. He is the deputy district governor and zone chairman of Lions Club International and chairman of Navya Nataka Samithi, which promotes cultural activities. Rao has thorough business knowledge and can enter into a franchise, joint venture, technical collaboration or strategic alliance for business growth. Even though the company has a competent person to handle current business, tax laws, regulations and policies, Rao has a thorough knowledge of all aspects and can handle them with ease. He was vice-president of the Indian Pharmaceutical Association and has many more laurels to his credit.

The company's mission is to keep the lifeline vibrant and believes in teamwork and management by objectives and all the department heads are involved in setting goals. Each employee is made responsible and the reward to good performers takes the form of increases. The company also believes in human resource development and organizes induction training for new recruits. A few officers are also sent to other reputable institutions for seminars and training programmes. The company is ISO-9001-2000 certified by AQA USA and also WHO-GMP certified. Quality aspects of the products are looked after by a manager for quality, assisted by quality executives and analytical chemists. The firm believes in innovation and creation of new ideas and is in the process of establishing a separate R&D department. It has developed a multivitamin tablet for Novartis. The company is in the business of contract manufacturing for firms like American Remedies, Dr. Reddy's Laboratories and Ajanta Pharma Ltd. The company has two granulation areas for manufacturing products of various batch sizes with separate AHUs and all the other requirements as per GMP. It has the capacity to manufacture 2.5 million tablets per day and also manufactures several liquid products/syrups. Cheminnova treats employees as its valued assets and their welfare is of paramount importance. It makes efforts to retain talent by maintaining a good management-employee relationship. Equipped with sophisticated state-of-the-art machinery, Cheminnova has joined global efforts for preservation of the environment. No harmful chemicals are released that could damage land, water or air. Every precaution is taken and diligently executed in pursuit of the larger goal of environment protection. The company has its own effluent treatment plant situated on a 60-acre site where the water is treated and used for irrigation, setting an example for pharmaceutical units with regard to environmental concerns.

7.7.4 *Ducom*

Ducom is a first generation enterprise and is engaged in the production of custom-designed laboratory equipment, specifically electronic instruments for industries, defence and academic institutes like Indian Institute of Science, Indian Institutes of Technology and other engineering institutions. When completing his Master of Engineering in Mechanical Engineering at IISc, the Ducom entrepreneur responded to an advertisement of Karnataka Small Scale Industries Development Corporation inviting applications for industrial sheds. When he obtained an allotment, he had virtually no finance to start an enterprise. His father was a school teacher from whom he could not seek the needed financial support. Such support was given by one of his professors in IISc who paid him on the basis of invoice to supply products on a later date. Thus, he started his enterprise with Rs 8,000 and three employees. The first product manufactured by Ducom was an X-ray diffractometer, the product line expanding gradually and steadily.

Ducom supplies wear and friction meters, journal bearing test rigs, photo resistance spinners, dry abrasion testers, metallurgical sample saws, spin on discs, four-ball testers and reciprocating friction meters. The technological innovations sprang from initiative to manufacture and supply customer-specific products. To acquire sufficient product development capability, the entrepreneur visits IISc frequently to discuss with professors in the departments of physics and metallurgy and to conduct research at the IISc library. In addition, Ducom has established its own exclusive technical library for the acquisition of technical journals and books. The major factor responsible for the company to acquire technological capability was the government's protective industrial policy, which was pursued until 1991. During this period, in the absence of threatening competition, Ducom could develop product development capability gradually and engage itself in import substitution successfully. While the entrepreneur is the prime factor responsible for technological product innovations, he gradually developed an organizational setup at Ducom to facilitate innovation processes further. The design department consists of mechanical, design, computing and final design sections. This department has been made part of the marketing department and it is also well integrated with the fabrication shop. Some of the early new product development efforts made by Ducom are spin-on-disks developed in the mid-1980s to eliminate noise using an exclusive software; a major product related to fusion reaction for the Institute of Plasma Research in 1986; a highly automated four-ball tester in 1991 and a scratch tester in 1995.

During 1977 and 1996, Ducom focused on the domestic market only. The turning point came in 1995 when the entrepreneur attended an International Exhibition on Tribology in Boston, USA. His product advertisements in the *Tribo-testing* journal, along with a stall set up in the international exhibition, attracted many visitors. Inquiries about his products arrived. However, there were no orders because of the poor credibility of Indian high-technology products. In 1996, Koelher Instruments of New York exhibited Ducom products under the

Koelher brand name. Subsequently, Ducom products started to sell under the Koelher brand. Such entry into the international market helped Ducom learn about attending to minute details in terms of quality, finishing, certifications and environmental requirements. Its initial entry into the international market through Koelher in the US has enabled it to secure a foothold in many other countries, including Austria, France, Greece, Italy and Poland, South Africa, Malaysia, Malta, Saudi Arabia, Taiwan and Vietnam. The major products exported are four-ball testers, air jet erosion testers, abrasion testing machines, multi-specimen testers, scratch testers, wear and friction monitors and reciprocatory friction and wear monitors.

Ducom's design department is an organizational component of its marketing department. The marketing group has the major role of projecting its technical capability to potential customers, including mostly scientific and technical educational institutions and R&D organizations and manufacturing industries. When a customer requirement is communicated to Ducom, the entrepreneur interacts initially with the design and marketing departments to clarify the product idea. He interacts with IISc and browses the internet for relevant product information. Through in-house brainstorming sessions, the product idea is developed. A prototype is then developed based on several interactions with concerned customers. After customer evaluation, the design is finalized. The newly fabricated instrument is then subjected to trial runs before it is finally standardized. This involves close interaction with customers before embarking on the design, manufacture and installation of customized equipment to ensure customer satisfaction. At the course of the interactions, considerable technical knowledge is obtained by Ducom from its customers. Along with the products, comprehensive product details, instruction manuals and calibration kits are provided by the enterprise. Comprehensive post-warranty services with several combinations, tailored to the needs of individual customers are provided.

The entrepreneur has developed a formal organizational link between the product design and the marketing departments by making the design section part of the marketing arm. The objective is to facilitate close interaction with customers in the product design phase. Both product design and manufacturing design functions are empowered by a suitable organizational climate, adequate compensation and the challenging nature of the work. The necessary financial support is provided by the banking sector. The product innovations implemented by Ducom are largely incremental and the processes involved are facilitated by new technology, quality and computer software, in tune with product design functions. The central strategy is composite or a mix of technological excellence, innovation and customer satisfaction derived from interactive product designs. In short, technology and the niche market led to the overall growth of the company.

7.7.5 Micro FX

Micro FX represents a case of entrepreneurial emergence from an engineering institute.

The entrepreneur of Micro FX has always been fascinated with electronic merchandise since his childhood days. Soon after obtaining a degree in electronics Bangalore, he joined a small-scale instrumentation enterprise as a design engineer. After a year, he shifted to another enterprise involved in the manufacture of uninterrupted power supply equipment where he worked as head of the design section. Although the work did not provide him opportunities for learning, he was able to develop an electronic alarm system for cars. The absence of job satisfaction led him to plan his own enterprise and to widen his technological initiative and abilities. Hence, he started Micro FX as a partnership enterprise to produce uninterruptible power supply systems. Micro FX manufactures handheld electronic ticketing machines for public transport bus corporations. With only a million rupees, along with just two partners as employees, Micro FX started its operations. The partners were able to forge a contract with Industrial Process Automation at the Peenya industrial estate of Bangalore and began making electronic weighing instruments for IPA. In 1995, the entrepreneur's partner decided to venture into textile trading instead because a technology-oriented industry was not to his liking. Thus, Micro FX became a proprietary firm. Until 1999, Micro FX focused only on IPA orders by designing, developing and supplying electronic weighing machines.

In the beginning, Micro FX was engaged in customer-focused product development. However, this monotonous line of work, with the same product being developed led the entrepreneur to seek newer challenges. A friend from Dubai returned to Bangalore and joined Micro FX as a partner without any investment. His only responsibility was product marketing, an area from which the entrepreneur distanced himself. With this, he gained more time to concentrate on new product development. In response to one of his customer's casual inquiries, he designed a cash register or a billing machine. In 1998, his partner won a deal with their first customer, a beverage corporation for this new product. The corporation ordered 13 cash register machines, with each having two components, one keyboard and one printer. In 1999, they set up another unit in Kottayam, Kerala with just one employee. In the following year, they had orders from the Consumer Federation of Kerala. In 2002, one of the employees of Bangalore Water Supply and Sewerage Board approached the entrepreneur to know whether he could produce handheld billing machines. This urged the entrepreneur to design and develop such device, which was immediately accepted by BWSSB. They placed an order for 60 machines. The Karnataka Electricity Board placed orders for two districts but the company lost this market very soon due to the copying of their design and the production of similar machines by a larger company based in Hyderabad. Nevertheless, the company got orders for electronic handheld ticketing machines from Kerala Road Transport Corporation for its buses. In 2003, the Karnataka State Road Transport Corporation placed an order for 2,000 ticketing machines and another request for 600 ticketing machines came in 2004. In the following year, Micro FX supplied 5,000 more machines to the corporation. In 2006, 6,000 machines were supplied to North East Karnataka Road Transport Corporation and North West Karnataka Road Transport Corporation. As explained by the entrepreneur,

Micro FX has established itself in the market as a supplier of handheld ticketing machines. These are used by bus conductors for issuing tickets to passengers on a continuous basis during a bus journey. The SME's position was achieved despite two major competitors in the market, one in Hyderabad and another in Bangalore. The reputation that Micro FX has built over the period has helped it sail through the competition. An important achievement of Micro FX in the process of developing handheld ticketing is its entry into the international market. In 2004, it exported a few machines to Sri Lanka, which resulted in exporting another 500 machines in 2007. In 2008–2009, the entrepreneur expected an order for another 10,000 machines from Sri Lanka and Dubai. Recently, they have sent some samples to Malaysia and businessmen from Nigeria and Dubai have visited Micro FX to know more about the SME's products and to forge business deals. The entrepreneur anticipates a huge potential in the Indian market itself because, so far, road transport corporations have introduced ticketing machines for their buses in only some states. Currently, the company is in the process of developing point of sale machines. Shops, canteens and restaurants will be targeted for the potential application of these machines in different forms because they are usable in multiple situations. Even filling stations have made use of their billing machines. The entrepreneur is working on adding a biometric sensor to the handheld ticketing machine. He is developing a new version of this machine for the specific use of traffic policemen. The company has made e-ticketing machines viable and is ready to develop spot billing machines for mobile banking.

The Micro FX case represents an entrepreneur who is highly motivated technologically and his dynamic and ambitious nature proved instrumental to the enterprise's continued success. His childhood fascination with electronic goods and his subsequent technical education have transformed him into a technopreneur who targets and creates technological innovations. The process began when he became an employee in an instrumentation enterprise where he developed an electronic alarm system for cars. However, to widen his perspective on technological product innovation, he established his own enterprise. His attention to technological concerns, rather than to managerial ones, is reflected in his company's current organizational setup, in which marketing is looked after by his partner. His approach to innovation involves initial interaction with customers. After this, he himself carries out innovative/developmental tasks with the help of a designer and two design assistants. He again interacts with customers at the stage of product acceptance through ongoing experiments and trials. The company does not emphasize repeated interactions and this could explain its failure in the electronic weighing machine. Most of the innovations are characterized by new technology being incorporated into a product without altering much of the product's features. Most of these could be considered novel innovations because they have been introduced for the first time in the country.

7.7.6 Safety match industry

Food and Agriculture organization has been sponsoring many Indian agriculture and agro industries projects since 1970s. One such project relates to safety match production in Tamil Nadu. Wooden match production is split into three sectoral categories, the mechanized large-scale sector, the handmade small-scale sector and the cottage sector. About 82 percent of total match production is in the handmade small-scale (67 percent) and cottage (15 percent) sectors, where technology has remained relatively simple. These two non-mechanized sectors of the match industry are distinguished primarily by output size. The industry directly employs an estimated 250,000 people, with only 6,000 of these in the mechanized sector. The cottage sector, which involves totally manual operations and produces less than 75 million match sticks per year and is often household-based, accounts for about 50,000 workers. Thus, small-scale, factory-based match production units employ by far the largest number of people (195,000 workers) involved in the match sector. Manufacture of wooden matches is best suited to handmade and household-based production. For every worker employed in the mechanized sector, four workers may be employed in the non-mechanized sector. Men, women, children, the elderly and partially handicapped persons are employed. Match making by hand is labour-intensive and requires low levels of technology and relatively small capital investments. A number of operations in the production process can be easily undertaken at home. Future expansion of the match industry is reserved for small sector, with particular emphasis on the cottage sector. The veneering and splint industry in the adjoining state of Kerala is an important ancillary industry, providing nearly 90 percent of the wood used in Tamil Nadu.

The origin of the safety match industry in India goes back to the beginning of this century. Around 1910 immigrant Japanese families who settled in Calcutta began making matches with simple hand and power-operated machines. Local people soon learned the necessary skills and a number of small match factories sprang up in and around Calcutta. These small match factories could not meet the total requirements of the country however, and India began to import matches from Sweden and Japan. During the First World War, when Swedish matches could not be imported, the Indian market was fed mainly by imported matches from Japan and by the locally made ones which followed the Japanese pattern introduced in Calcutta. After the war, factories in Calcutta were unable to compete with imports and handmade match production shifted to southern India, especially in the Ramanathapuram and Tirunelveli districts of Tamil Nadu State. This shift was due to the pioneering efforts of P. Iya Nadar and A. Shanmuga Nadar who went to Calcutta to learn the process from Purna Chandra Roy, a local businessman, who had learned the trade in Germany. The Nadars set up a number of manual match production units in extremely poor regions of Tamil Nadu, where a combination of the dry climate, cheap labour and availability of raw materials from nearby Kerala created ideal conditions for match production. The first sulphur match that would bum when brought into contact with a rough surface was produced in South India in 1923 and the first safety match in 1932.

Mechanization came to the Indian match industry in 1924 when Wimco started operations in 1924 as a unit of the multinational Swedish match company. Wimco is still the only representative of the large scale sector in wooden match manufacturing and is the only fully mechanized match factory in the country. Government policies protected Indian matches by placing protective tariffs on imported products and specifically favoured the expansion of the handmade, small-scale sector through the use of differential excise taxes. There are now 12,000 units in the small-scale, non-mechanized sector, of which 75 percent is situated in Tamil Nadu. In 1943 a major change in policy was introduced with the differential excise levy. The rate remained unchanged at Rs 3.00 per gross for units producing over 100 gross per day while it was lowered to Rs 2.87 per gross for units producing less than 100 gross per day. Over the next ten years, further classification resulted in 5 levels of production with progressive concessions to smaller units. In 1967 the basis for differentiation was expanded to include the mode of production as well as the volume produced. This decision further strengthened the small-scale enterprises and remains as a main plank of government policies in the present. In 1979 an even more dramatic spread in excise duties was mandated, raising the duties of the mechanized sector and lowering those in the handmade sector. Most recently, production limits on the middle and cottage sectors have been removed with an excise duty of Rs 3.50 per gross established on both. Additional incentives to hand-made match production units have been given by state governments in the form of sales tax exemptions. To further insure that the hand-made sector continues to expand the central government has frozen the capacity of Wimco, the only large-scale mechanized match producer, at 695,000 cases (one case 7,200 boxes) per annum.

Between 1926-28 and 1949 the number of factories increased from 27 to 192. Since that time there has been a continuous expansion of the hand-made sector whose share of the market has shot up from 22 percent in 1949-50 to 50 percent in 1969-70 and now constitutes 82 percent. With Wimco's production level frozen and growing population fueling an increase in demand estimated at 6% per annum, the handmade sector will clearly increase even further in the future. The cottage sector under the coordination of the Khadi Village & Industries Commission (KVIC) has been selected to be the major growth sector in the future. There are a number of match producers who have fragmented their units to get the benefit of concessions, but at the same time there is a growing trend towards centralized ownership of many smaller units. In Shivakasi and Kovilpatti, 18 families (match kings) control almost two thirds of the total match production in the country.

Safety matches manufactured in the country are of the standard type with wooden veneer or cardboard boxes and wooden splints, each box containing 50 splints. Other types of matches produced include book matches containing 10 to 20 sticks and fancy or advertisement matches made to the buyer's specifications. Most of the raw materials are the same regardless of the level of production, but the process is slightly different in the mechanized and hand-made sectors. The major raw materials used in the production of safety matches are soft woods used to make the

match sticks (splints) and boxes and chemicals for the match heads and the friction surface of the boxes. With the exception of sulphur, all the basic raw materials are produced within India. Both the quantity and quality of matchwood are determinants for quality products. The Indian match industry depended on imported wood including aspen from Sweden, Canada, America, and Russia, cotton wood from Canada, balsam poplar from Manchuria and linden from Japan. But the government quickly moved to encourage the use of indigenous woods by restricting the import of foreign poplars. One result of the early use of poplar wood has been that the consumer continues to associate good quality matches with light coloured wood, placing further limitations on the selection of indigenous species. Wood supplies have drastically declined in the last 25 years and the demand for matches continues to grow. Further, prices of other materials such as match wax, potassium chlorate, potassium bichromate and blue match paper have risen dramatically.

In mechanized match manufacture the entire process of match making takes place under one roof from log to match. In the hand-made sector veneer for match boxes and splints are produced separately. The remaining stages are all done manually, often as piecework at home and then assembled or boxed at small factory units. The technology of match making is relatively simple and involves a number of stages, whether they are mechanized or not. Processing timber logs into outer and inner box veneers and splints is the first stage. This process requires power operated machines but these can be simple, locally made, slow speed log peelers or the high speed Swedish made peeling lathes, splint choppers, and splint dryers used by Wimco. In the mechanized sector the cut splints and box veneer are fed directly into box making machines and match dipping machines. In the small-scale and cottage sectors the cut splints and box size veneer are transported from producers in Kerala, across the border to factories in Tamil Nadu.

Box making is done both by machine as well as manually. In the hand-made sector outer veneers are issued to workers either at the factory or at their homes along with blue match paper cut to size. Tapioca flour-paste is used to assemble the outer boxes by hand. Although rates are currently under revision an average worker can make 40 to 50 gross boxes per day, at little more than @ 0.10 paise per gross. Inner boxes are prepared the same way, usually by women, at home, with 35 gross a day at 0.15 paise per gross being an average worker's production. Dipping and filling in the handmade sector begins with the distribution of the cut and cleaned splints to workers along with wooden frames consisting of 50 laths, each with 50 grooves. These frames must be filled by hand; each splint fitted into a separate little groove and is the most labour-intensive of handmade match operations. The filled frames are first dipped in wax and then into the head chemical composition which includes potassium chlorate. The dipped matches are now dried atmospherically in racks. This is where the dry climate of match districts is so essential. Once dry the splints are filled in boxes at the rate of 50 per box and put into side-painting frames and levelled. Thereafter, a mixture of red amorphous phosphorous, glue and bichromate of potash is manually painted with a brush on one side. This side painting is usually done by

monthly paid adult workers, mostly men.

Labelling and packing come next, once the side painting dries. Workers take the painted boxes from the frames and affix labels and excise stamps to them. The labelled boxes are then packed into dozen packets and 12 dozen packets are packed into a one gross box. Five gross boxes are made into a bundle containing 60 dozen match boxes, and finally shipped to market. Handmade match production technology has a definite edge over mechanized manufacture in being able to accept more kinds of tree species for splints as well as boxes. Also, being made by hand, losses are negligible in this sector compared to those in highly automated mechanized units. The handmade sector, with its low wages, is far more flexible in accepting a wider variety of low girth logs. Handmade box making and filling operations are slow and the conditions enable the handmade sector greater freedom to absorb non-standard wood species in match manufacture. The handmade sector is supported by an ancillary veneer and splint industry where the selection of logs is primarily guided by the consideration of the end product. The quality of the matches produced out of these splints is good and can be consistently maintained. However, the rapidly declining availability and quality of wood has now also affected the handmade sector which has been called upon to take over the leading role in the industry.

The production of box veneer and splints is relatively simple and very labour-intensive. All of the machinery used in the process is produced locally within Kerala. A typical unit produces both splints as well as box veneers and runs from September to April/May, for about 200 days during the dry months. Veneer and splint enterprises are recognized as small-scale industries by the government, and once they are registered, are entitled to receive a special share of match wood annually from government forests. Log peelers and saws used in small-scale veneer and splint making are small, work at slow speeds and accept logs as small as 8 cm circumference. After peeling, the splints and veneers are dried for 8 to 10 hours in the open on cement platforms. The drying, packing and storage of the products is done manually. Work is normally suspended during the monsoon, although a few units have improvised semi-automatic drying chambers for splints, which can be fired during the monsoon with wood waste.

Rigorous standards of quality and safety have been adopted by the Indian Standards Institution. Splints used must be of good quality so that they do not break while striking. Match heads should ignite without spurting and match head particles should not fly when the head is struck against the friction surface of the box. Matches should not catch fire under impact. Because of the rigid nature of the standards, neither Wimco nor most of the match kings carry the ISI markings on their matches.

The handmade, middle sector is confident that the entire requirement of safety matches for the nation can be met by them in the near future. They lobby vigorously for the total exclusion of Wimco from match production and complain about lower excises levied on cottage level units. The sector asserts that its technology of using manual labour is as good as Wimco's,

if not better. However, this assertion raises a number of questions. Since the development of a major fireworks industry in the Shivakasi region, labour is presently not as easily available as it once was. Moreover, thirty percent of these middle level factories now use cardboard boxes, so these are actually semi-mechanized relying on power driven machinery to form these boxes. Finally, operating in an extremely poor region, the match kings are frequently accused of exploiting women and child labourers, paying extremely low wages under poor working conditions. The middle-level hand-made sector has helped the growth of ancillary industries for the manufacture of splints and veneers, potassium chlorate and factories producing glue and paper. The small-scale sector also produces non-glowing deluxe matches, book or strip matches and wax matches.

The Khadi and Village Industries Commission, a corporation owned by the government, entered the picture in 1977 to create opportunities for new entrepreneurs to set up small-scale match units in rural areas of India. The intent of this effort was to increase employment, reduce exploitation by traders, stabilize the market price at a reasonable profit level and raise the wage levels of workers in both cottage and small-scale sectors of the non-mechanized units. Small-scale units have several distinct advantages. They may be household-based, are often more efficient in their use of a wide variety of materials, produce less wastage and distribute benefits to a deeper labour pool. The KVIC cottage match industry programme emphasizes technical, financial and marketing assistance. It endeavors to offer a total assistance package from the opening of the unit to the marketing of the completed matches. However, the substitution of wooden match boxes by cardboard, pioneered by Wimco, has introduced a definite technological and material improvement in the industry. But along with this change, a degree of semi-mechanization of operations has also been introduced. Cardboard skillets used mainly for manufacturing outer box match manufacture are printed in central, automated printing machines and are purchased by small match manufacturers. This innovation has naturally resulted in lowering the employment rate, much against the planned concept of promoting employment-oriented technologies. Another approach to the raw material problem is substituting wax instead.

7.8 Conclusion

Companies in the electronics industry are able to aim, plan, strategize and implement technological innovations successfully in terms of new product developments. Entrepreneurial motivation is the primary factor responsible for the emergence and implementation of innovations. Small entrepreneurs play an instrumental role in recognizing market opportunities, building crucial in-house technological capability, supplementing it with appropriate external assistance, putting in place technological innovation processes, including their modifications to suit customer requirements and finally delivering innovations to the market. The innovation process is marked by a built-in mechanism for continuous customer interactions. The outcome of innovations is reflected in the overall growth experienced by the companies not only in terms of factor inputs, but more importantly in terms of sales turnover.

To conclude, the SME sector has been performing under institutional framework but under stress. However, efforts have to be made in order to assist the sector in many more respects so that it contributes to the core of entrepreneurial growth in the country. Project profiles and feasibility on behalf of entrepreneurs have to be effectively. Undertaking of industrial potential surveys has to be with a view to provide first hand information regarding raw material, required labour and other critical inputs to the entrepreneurs. This has to be followed by proper identification of potential entrepreneurs and providing them with adequate technical and managerial assistance. Market researches and surveys for specific products have to be done so that in future the units may not take any difficult in marketing products, besides providing them with consultancy for export oriented projects. Many entrepreneurship development programmes have to be conducted with a view to make aware, create and groom new entrepreneurs. Procurement and distribution of scarce raw materials as and when required and supply of machinery on hire purchase system, besides rendering marketing assistance to SMEs to effectively sell their products have to be properly ensured so that there are no leakages in the system. Further, provision of consultancy and trading services to strengthen their competitive ability and gain advance knowledge in the field and helping them in development and up-gradation of technology and implementation of modernization programmes by replacing old and outdated equipments require utmost attention of the institutions. They are also required to undertake the mass construction of industrial estates with all basic facilities and provide infrastructure and accommodation facilities to the entrepreneurs.

The next chapter will discuss about the prospects of social and public entrepreneurship, besides briefing the emergence of women entrepreneurs.

Chapter 8

Development of Social, Ecological, Public, Institutional and Women Entrepreneurship

8.1 Introduction

Entrepreneurship may have supply-side or demand-side perspective, wherein the former focuses on the availability of suitable individuals to occupy entrepreneurial roles and the latter on the number and nature of the entrepreneurial roles that has to be met (Thornton, 1999). The demand-side perspective suggests a number of ways to examine the context of organizational founding, such as the generation of new ventures by organizational hierarchies. Individuals and organizations affect and are affected by their social context and as Weber (1930) has shown, religious doctrine provides the cultural justification needed to shape the economic behaviour of individuals which leads to the rise of capitalism. We can characterize the supply-side perspective to expose the non-profit objectives and how culture and personality can empower individual entrepreneurship, wherein their chances of success are determined by the structure of their networks.

This chapter presents the various aspects of entrepreneurship in its social, public, ecological, institutional and gender perspectives to showcase some of the recent deliberations on the subject. Section 8.2 deliberates on social entrepreneurship, while section 8.3 briefs about ecological entrepreneurship. Section 8.4 discusses public entrepreneurship in its various dimensions, while section 8.5 touches on institutional aspects. Section 8.6 characterizes women entrepreneurship from its developmental aspect, as profiles have been provided in other sections of the book. Section 8.7 concludes the discussion leading to the emergence of innovativeness that is the bedrock of entrepreneurial development.

8.2 Social entrepreneurship

Social entrepreneurs play the role of change agents in the social sector by adopting a mission to create and sustain social value (not just private value), recognizing and relentlessly pursuing new opportunities to serve that mission, engaging in a process of continuous innovation, adaptation, and learning, acting boldly without being limited by resources currently in hand, and exhibiting a heightened sense of accountability to the constituencies served and for the outcomes created (Dees, 1983). When entrepreneurs exhibit goal-setting and problem-solving qualities, social change takes place. Entrepreneurial quality does not mean the ability to lead, to administer or to get things done; instead, it refers to someone who has a very special trait, who, in the core of personality, absolutely must change an important pattern across whole society. Social entrepreneurship extends the definition of entrepreneurship by its emphasis on ethical integrity and maximizing social value rather than private value or profit. Grameen Bank of Bangladesh and the Self Employed Women's Association of Gujarat banking institutions, owned and governed by the poor themselves and their innovation is figuring out a viable way to substitute traditional collateral requirements for other forms of social collateral. While they organize people in groups, their loans and other financial products and services are to individuals. In this way, social entrepreneurs attempt to create alternative financial services and models of funding social ventures.

Bill Drayton, the founder of the world's first organization in promoting social entrepreneurship, Ashoka Innovators for the Public, (founded in 1980 and global headquartered in Arlington, VA, USA) describes social entrepreneurs as practical visionaries who possess qualities associated with leading entrepreneurs - vision, innovation, determination and long-term commitment, but are committed to systemic social change in their field (Ashoka innovators for the Public, 2000). Drayton fashioned criteria to hunt for these types of people who were obsessed with realizing their vision. This need makes the entrepreneur persist for years and decades thorough all these steps, despite the resistance of many forces that would frustrate others. They instinctively reject solutions that depend on local circumstances that would not work universally. They are listening carefully and realistically for problems and openings. Ashoka's central hypothesis is that the most powerful force in the world is a pattern changing big idea in the hands of an entrepreneur. Each such major pattern shift results in follow-on innovations, adaptations and local applications. A social entrepreneur is someone who recognizes a social problem and uses entrepreneurial principles to organize, create and manage a venture to make social change. Whereas a business entrepreneur typically measures performance in profit and return, a social entrepreneur assesses success in terms of the impact on society as well as in profit and return. While social entrepreneurs often work through nonprofits and citizen groups, many are working in the private and governmental sectors and making important impacts on society.

Social entrepreneurs are individuals with innovative solutions to society's most pressing social problems. They are ambitious and persistent, tackling major social issues and offering new

ideas for wide-scale change. Rather than leaving societal needs to the government or business sectors, social entrepreneurs find what is not working and solve the problem by changing the system, spreading the solution and persuading entire society to take new steps. The main aim of social entrepreneurship and social enterprise is to further social and environmental goals for a good cause. Although social entrepreneurs often are associated with nonprofits, this need not be incompatible with making a profit. Social enterprises are for ‘more-than-profit,’ using business models that combine a revenue-generating business with a social-value-generating structure.

According to Raman (2010), the first phase of social entrepreneurship was around 1980, represented by the founding of Ashoka by Bill Drayton to develop and legitimize the field. The second phase occurred soon after and the two were part of the same wave of the early 1980s with the response to the increasingly growing gap between the haves and the have-nots. Social entrepreneurs, like many other people who came together to address public sector shortcomings, responded to these gaps. But the difference between social entrepreneurs and others wanting to do good to society is the way they go about it. Unlike the latter, social entrepreneurs rather than just offering simple responses to basic needs in addition, provide practical, transformational solutions to change the systems and patterns that keep people poor. They also offer solutions instead of merely joining the protesters advocating change. Social entrepreneurs become the new social architects drawing up and testing the blueprint for a different way of creating a new world and proving that it can be done.

The third phase of evolution of social entrepreneurship is related to Corporate Social Responsibility (CSR) in the early 1990s that holds that the business of business is not just increasing shareholder value; rather, companies must embody transparency and ethical behaviour, respect for stakeholder groups and a commitment to add economic, social and environmental value. CSR was much less the result of an internal decision on the part of companies as it was a response to the popular movement led by the organized citizen sector and consumer groups and empowered by internet technology that forced business to acknowledge that its shareholder value was tied to its ability to measure and reduce negative environmental and social impacts and to maximize positive impact. Another related to some social entrepreneurs turning the concept of CSR and rather than setting up a business to generate profit first and then trying to make it socially and environmentally responsible, they felt it would be a great idea to start out with the premise that the bottom line is social and environmental transformation and then build for-profit activities around making that happen. Many social entrepreneurs have done that paving the way for the social corporation.

The fourth phase began in the early 1990s (Raman, 2010). The search to prove that one non-profit was a more effective investment than another was best accomplished by the establishment of clear measurable goals, benchmarks and outcomes so that such comparisons could be made. This occurred among foundations, philanthropists and not-for-profit ventures influenced by business approaches drawn primarily from the world of venture capital, which the

social entrepreneurs embraced this challenge.

By the end of the 20th century, the term social entrepreneurship had started to become synonymous with development. The earliest example of social entrepreneurship in India is that of Vinoba Bhave, founder of the Bhoodan movement, which caused the redistribution of more than 7,000,000 acres of land to aid India's landless. Other notable entrepreneurs are JRD Tata, GD Birla, the Godrej family and Dhirubhai Ambani. Some examples of entrepreneurial ventures include Barcamp, an international network of user generated conferences and DARE, a media platform for the Indian entrepreneurs. The latter is an interactive platform for enabling entrepreneurs to start and run their own business. It analyses what businesses need to do, rather than report on what businesses are doing. The George Foundation's Women's Empowerment programme empowers women by providing education, cooperative farming, vocational training, savings planning and business development. In 2006 the cooperative farming programme, Baldev Farms, was the second largest banana grower in South India with 250 acres under cultivation (Raman, 2010). Profits from the farm are used for improving the economic status of the workers and for running the other charitable activities of the foundation. 'By Stupid Common Man' is a volunteer online association of business professionals for revival of declining industries in Andhra Pradesh. This is an open forum with free membership and seeks the participation of a broader intellectual population. South East Asia Pacific based Global Indian Foundation which is headquartered in Singapore runs schools for tribal students in Gujarat, India. The public private partnership project aims to lift the education standards of the tribal students and make them employable in public or private sector.

While business entrepreneurship deals with application of entrepreneurial energy primarily for generating wealth for a commercial business group and its shareholders by producing and supplying products and services, social entrepreneurship deals with application of entrepreneurship for addressing social and environmental and causing social and environmental change through non-violent, non-coercive methods by generating significant impacts in the target. The social entrepreneurial strategies and activity plans usually include elements of positive, life building and socially and ecologically enriching values, attitudes and behaviours. Entrepreneurial energy is the capacity of certain individuals for spotting high-potential opportunities for intervention, generating innovative products, services and approaches for solving problems and resource mobilization, risk taking and sustained striving for achieving their goals in an ethical manner. The profit earned by these ventures is used mainly for social development activities and for reinvestment in the business itself.

Many of the public sector enterprises (Housing Development Corporation, Agro-Industries Corporation, Irrigation Development Corporation and so on) were established with primarily social goals in view. However, most of them have turned bureaucratic, ineffective and loss-making units over the years. There is considerable scope for injecting entrepreneurial energy and passion for social development in many of these enterprises through collaborative

arrangements or through outsourcing of works to NGOs. In order to be successful in developing such collaborations, the support from policy-makers is often required. In recent years, micro-credit, micro-enterprises and self-help groups have emerged as major tools for development of poor people. NGO sector has been playing a major role in these fields. In many areas, mutually aided cooperative societies and linkages with banking institutions have been formed to provide sustainable structure for these initiatives. Such initiatives have also infused some degree of business discipline, leadership and entrepreneurship among a section of poor people (participants in these initiatives) as well as among the NGOs. Many leading social entrepreneurs are working in these fields.

Another important aspect of social entrepreneurship is microfinance. In 2008, Rajnish Sinha and Siva Cotipalli started Bangalore-based Dhana-X, fascinated by microfinance and the idea of clubbing it with person to person (P2P) lending. Dhana-X is a platform where people contribute small amounts online as loans. NGOs take up the task of disbursing these loans to needy communities in their areas of operation. Richa Pandey was a media professional in New Delhi for eight years, but her calling was rural India. The retail and BPO sectors were creating job opportunities and she focused on vocational training for rural youth in these areas. In 2007, she approached the Rural Technology Business Incubator at IIT Madras with a business plan outline, resulting in the emergence of e-Jeevika, a programme connected with designing course content and online training in the areas of retail sales, data entry and security services. e-Jeevika subjects candidates to psychometric tests to determine where they would fit in best and trains them accordingly.

One of the best examples of social entrepreneurship will always be Amul. Amul was created by government initiative and by the passion of people like Verghese Kurien. It wanted to bring out change in the way milk was produced and distributed on a massive scale. Other examples include Scojo Foundation Vision-Spring, founded in 1999 by Jordan Kassalow as a spin off from Scojo, a distributor of high end glasses in the US which seeks to provide through an effective supply chain and economies of scale, high-quality reading glasses, previously unavailable to the communities where they worked, at an affordable price. Scojo Foundation, because of its relationship to Scojo Vision is able to source glasses at low cost and that low cost is passed onto the Scojo Vision Entrepreneurs, which in turn, sell the glasses to customers in their communities thereby enabling the women to earn a sustainable source of income (Raman, 2010). The Schwabb Foundation does not help anybody with money, instead it helps social entrepreneurs with their resources and they connect interested investors and social entrepreneurs through technology. They have also connected with schools all around the world, which train social entrepreneurs for them. Muhammad Yunus of Bangladesh is the founder of microcredit and the Grameen Bank. Maria Montessori developed the Montessori approach to early childhood education and Margaret Sanger founded the Planned Parenthood Federation of America and led the movement for family planning efforts around the world. Florence Nightingale founded modern nursing and established the first school for nurses and fought to improve hospital

conditions. John Muir, the naturalist and conservationist established the National Park System and helped in the founding of The Sierra Club. Jean Monnet was responsible for the reconstruction of the French economy following World War II, including the establishment of the European Coal and Steel Community.

8.3 Ecological Entrepreneurship

Ecopreneurship is a recent field of study, wherein green or ecological entrepreneurship plays a crucial role in business development. Future sustainability driven activities of business and industry are driven by innovative market based mechanisms which might make these sectors profitable apart from achieving the objective of sustainable development. Such mechanisms offer vast scope for various players including SMEs (Trivedi, 2012). The recently established PAT scheme (Perform, Achieve and Trade) of the government of India through the Bureau of Energy Efficiency is one such step which is likely to provide not only a major impetus to strengthening energy efficiency practices across many industries, but also provide a market based trading mechanism for high achievers in the forms of energy saving certificates. Similarly, the concept of Renewable Energy Certificates is also an attempt to involve industry at providing market based incentives to project developers in renewable energy to develop clean technologies and increasing the overall share of renewable energy in the energy mix. These organizations include mining, manufacturing, farming, utilities and communication.

Several of NGOs have made major contributions and innovations in implementing natural resource management projects such as watershed management, wasteland development, and participatory irrigation management. Implementation of these projects has included strategies for empowerment of poor people in rural areas and for encouraging them to set up micro-enterprises. The quality of people's participation in development programmes has improved significantly in India during the last two decades and the credit for this goes to ecological entrepreneurs in NGO sector. Another field where NGOs like MSSRF and BAIF have made significant impact is promotion of rural eco-entrepreneurship. Many international organizations (Ford and Ashoka foundations) have made important contributions by supporting innovative endeavours.

The Centre for Environment Education (CEE) has been working on model programmes in villages around Rajkot district of Gujarat to demonstrate approaches to sustainable development in environmentally fragile rural areas (Krishna et al, 2007). Village level institutions have been established to mobilize savings and credit. Having been exposed to aspects of education for sustainability, communication and managerial skills through CEE, these micro institutions espouse thrift system backed by ecological initiatives. This has resulted in the creation of an eco-entrepreneurship initiative called *gram nidhi* with the help of Eco-Enterprise Fund (EEF) which generates the means to working capital investments for eco-enterprises. The funds are channelled through Narmada Trust, a local NGO. The eco-enterprise produces goods

and services that are economically efficient and viable, ecologically sustainable and socially acceptable using local resources and appropriate technology from substantially modified market mechanisms that account for full-cost pricing and social impacts. Eco-enterprise options spring from indigenous creativity in response to local needs and possibilities aiming directly to improve the quality of their lives (Ashby et al, 2009). They derive maximum leverage from local cultural and natural environment, by drawing upon existing managerial and technical skills and developing a cadre with social sensitivity and environmental concern providing a basis for extending them.

The fund will be a one-time grant managed by an Eco-Enterprises Investment Committee (EIC) that will oversee its operations. The break-up of the fund comprises of EEF and Technical Assistance Fund for Capacity Building and Information Servicing. The EEF will generate the means to working capital investments for eco-enterprises in villages channelled through the EIC. Preference is given to eco-enterprises that are unable to secure financing from conventional sources due to their small size, innovative nature of business and financial risks involved. The EIC will then grant approval to eco enterprises after rigorous screening employing sound environmental practices, provide financial benefits to community and strict standards for biodiversity conservation, sustainable use and community involvement. The areas studied for venture capital initiatives include sustainable and alternative agriculture, horticulture, agro-forestry and herbal farming, agro-processing, sustainable forestry and non-timber forest products and eco-friendly cottage industry.

The portfolio of ventures will work in partnership with EIC and use market principles to achieve conservation goals. Preliminary venture specific training modules will give clear cut implementation project cycle guidelines to entrepreneurs. The EIC committee will administer venture capital and monitor activities with continuous technical assistance and capacity building. A formal mid-term monitoring and evaluation workshop will provide interim support and checks and balances for fund flow. Effective documentation will disseminate the learning and experience at a regional level and reports distributed to wider audience. *Gram Nidhi* has an orientation to replication in similar socio-ecological conditions. The scheme has an inbuilt process of organizational and financial sustainability. The repayments to the capital and interest earned by the Trust will continue to be a revolving fund for future operations. The success of the programme will help leverage funds from other sources. In this way, sustainable development of a region is inherently linked to the ability of its communities to generate livelihoods on a sustainable basis. Ecological niches are better able to achieve stability if their human populations and communities achieve sustainability in their livelihoods. This is particularly true for those ecological areas that are fragile and are witnessing degradation or transformation due to human pressure. Since rural communities traditionally have no access to micro-credit, with greater needs for training and technical assistance, in order to be able to meet the credit needs of eco-enterprise with reduced operating costs, increased revenue, reduce risks and organizational adaptation.

While credit is a necessary for promoting SMEs, it is not a sufficient condition. A variety of other inputs and services are required to complete the package, including systematic identification of livelihood possibilities, motivating and training potential rural producers to take up those livelihoods, ensuring the supply of raw materials and inputs, equipment, infrastructure and technology, establishing linkages with marketing channels and seeking changes in regulations and policy. Environmental and ecological sustainability is an approach which utilizes already existing pool of groomed village institutions and developing a cadre of environmental professionals at the rural level.

8.4 Public entrepreneurship

Schneider and Teske (1992) define public entrepreneurs as individuals whose policy proposals and political positions represent a dynamic change from existing procedures. They maintain that a theory of political entrepreneurship depends on some concept of economic profit, which cannot be easily employed in the study of political entrepreneurs. As political actors do not produce goods and services that are bought and sold on markets, political gains cannot be measured in monetary terms, in the same way as economic profit and political entrepreneurs cannot use strict monetary calculation to measure the success of their efforts (Mises, 1944). Therefore, political entrepreneurship requires subjective measures of benefits and costs from the actor's point of view (Penrose, 1959). Examples include perceptions by the electorate of fairness and subjective valuations by special-interest group members affected by political actors.

Political entrepreneurship may be defined as the identification and exploitation of political profit opportunities, which are identified as gains from trade analogous to those resulting from market exchange and the theory takes a Schumpeterian perspective focusing on creative political innovations that modify the way that public entities operate (Kuhnert, 2001). They may be characterized as helping to start dynamic policy change in the communities. However, public entrepreneurship may be driven not by the pursuit of profit, but the fear of loss imposed by existing political institutions (Ostrom, 1990), wherein a negative externality problem like over-exploitation of ground water basins in California was successfully solved via public entrepreneurship by the decentralized water companies themselves, but only after a judge issued a credible threat to enforce a solution that would have disadvantaged all decision-makers involved. In this instance, public entrepreneurship by the judge involved the shaping of incentives in a way unanticipated by Schumpeter's (1934) approach, which treats entrepreneurship as *sui generis*, not as a response to market or institutional incentives. Yet despite some of these differences, the relationship between the entrepreneur and the institutional environment may be similar across the private and public sectors (Ostrom, 1990) and unlocking the human potential of individuals requires an opening of both public and private institutions to

mobilize collective action and to attenuate opportunism. Effective public entrepreneurship requires the co-evolution of an active public enterprise system together with a vigorous private enterprise system (Ostrom, 2005). Public entrepreneurship can bring together unique combinations of public and private resources to take advantage of social opportunities. Political entrepreneurship can also be conceived as the creation or definition of property rights in ways that make political action more effective (Barzel, 1989), subject to the perception by the political actors that this will confer to them personal gain.

As noted by Teske and Schneider (1994), political entrepreneurship theory can benefit from more precise conceptualizations of objectives, benefits and costs and efficiency. Holcombe (1992) opines that if political goals are not implemented in the least-cost way, there is a profit opportunity from restructuring the nature of the government activity so that the goals are achieved at least cost and the cost savings are a political profit that the entrepreneur can then apply toward the satisfaction of other goals. Such goals relate to re-election (promotion or expanded authority) and in cases even to private appropriation of pecuniary benefits. If the political actor is a private entrepreneur or group of entrepreneurs seeking to use the political system to achieve economic goals like an industry association lobbying for an import tariff or a firm seeking regulation that raises rivals' costs, then the goals may be strictly pecuniary. Therefore, one opportunity for the development of the theory of public entrepreneurship is in integrating a conception of value-capture seeking private and public entrepreneurs with a framework that accepts the complexity of the private and public institutions deployed to frame and pursue the public interest (Kaplan and Murray, 2009). Besides the issue of measuring gains from trade in politics, there is another important distinction between market and political behaviour, where allocation of resources through politics is based on forced transfers rather than through voluntary consent. Therefore, political actors can benefit from forcibly transferring resources from one individual or group to another. In Baumol's (1990) terminology, political entrepreneurship can be productive, unproductive or destructive. Destructive political entrepreneurship includes not only forced wealth transfers resulting from regulatory capture or other forms of rent seeking but also the discovery or creation of new forms of moral hazard, the creation of holdups, increasing transaction and information costs and similar activities and problems that can arise in private organizations (Foss et al, 2007). Thus, political actors whether elected officials, government bureaucrats or civil servants or individuals and organizations seeking to use the political process to accomplish private objectives can be using entrepreneurship theory, though not always perfectly. Like Kirznerian (1973) entrepreneurs, political actors seek to create or discover opportunities for gain, whether private or social. Like Knightian (1921) entrepreneurs, they invest resources, tangible and intangible (time, effort, reputation), in anticipation of uncertain future rewards. Like Schumpeterian (1934) entrepreneurs, they can introduce new products and processes. Unlike the entrepreneurial firm they cannot use privately appropriated benefits as a criterion for success and the selection mechanism for allocating resources over time towards more successful political entrepreneurs is

complex. Political entrepreneurs are only likely to undertake actions that foster economic value if they personally benefit from these actions in ways other than the mere private appropriation of value created. An important challenge facing political systems is finding ways to encourage productive political entrepreneurship while discouraging its nonproductive and destructive characteristics.

Political entrepreneurship has to consider the institutional environment or the rules of the game (constitutions, laws, norms, property rights and regulatory systems), while commercial entrepreneurship aims at creating economic value for the purpose of private appropriation within a given set of (shifting and non-immutable) rules (Lee et al, 2007). Such arrangements are included in a particular institutional environment and any change in the institutional environment brought about by public-sector entrepreneurship changes the setting in which private-sector entrepreneurship takes place. As Baumol (1990) emphasizes, the legal political and institutional system establishes the general constraints concerning political entrepreneurial behaviour. Public and commercial entrepreneurial processes evolve in ways that are mutually reinforcing, challenging and legitimizing. Kaplan and Murray (2009) maintain that private entrepreneurship in biotechnology was influenced by the co-evolution of public institutions, private corporations and scientific discovery. Analysis of major phases of the biotechnology industry's development since the 1970s shows that the commercial viability of the biotechnology industry rested on the resolution of questions about public safety, the legitimacy of private ownership of the human genome and rules for private use of findings from publicly-funded science. Entrepreneurship in the public domain to resolve these questions is a hallmark of the effectiveness of successful commercial entrepreneurs. In established industries, private-sector entrepreneurship involves communication of shared visions, alignment of interests, monitoring, and governance. Private-sector entrepreneurial firms have to work within and sometimes inform and shape, the design of public institutions such as regulatory bodies, though this process can involve not only cost saving innovation but also rent-seeking and other forms of wealth transfer.

In modern industries like automobiles, banking and healthcare, the mal-alignment of public and private interests has created failures in both private and public institutions. Yet entrepreneurship occurs frequently in the pursuit of public interests and many public servants have worked to improve the efficiency and effectiveness of public institutions. Individuals and groups also work continually to reshape public institutions to create and extract economic rents and it can be difficult to distinguish the former set of activities from the latter, when the pursuit of private gain is in public interest (Yandle, 1983). The growth of private military companies such as Blackwater since the end of World War II is an example of public-sector organizational innovation (Avant, 2005). The growth of these industries depends on the interplay between the resolution of public concerns, development of public institutions and relative effectiveness of private organizations over public agencies at fulfilling public interests. In the case of private-military companies, some public figures have even gone as far as to divert the pursuit of the

public interest toward private companies to favour the achievement of the public's efficiency goals even over other elements of the public interest. Other political entrepreneurs focus on process, not particular programmes or activities.

As a successful serial entrepreneur, Howard Jarvis gained fame and was featured on the cover of the June 19, 1978 cover of *Time* magazine for advocating Proposition 13 in California, which cut property taxes by 57 percent and inspired a national debate over taxation. Entrepreneurs such as Jarvis often arrive into public life with agendas, accumulated skills, relationships and capabilities that become the cornerstones of their impact. Private organizations also have an impact on public debate through hybrid structures in which their agendas are temporarily or only partially aligned with public interests. Examples include multinationals that provide goods and services to public agencies and in the public interest for private gain (IBM, General Electric and General Motors). Other firms, including Nestle and Coca-Cola have sold products both to the government and private purchasers concurrently but with controversy, wherein Nestle's baby milk products have been promoted as a healthful alternative to breast milk, contrary to the advice of many physicians (Sethi, 1994) and Coca-Cola has been cited as an inappropriate consumer of precious clean water in India (Kaye, 2004). Dominance of multinationals in private and public life has become so great that global firms operate across national boundaries with sovereign authority. Hertz (2002) opines that the culture of commerce has become so dominant and prevalent that private life has taken over public interests in a way that while often benign, is sometimes pernicious. The interplay between public and private interests is important and political mechanisms seem to be increasingly constrained by private organizations.

8.5 Institutional entrepreneurship

Both the institutional theory and institutional economics perspectives conceptualize institutional entrepreneurs as innovators or agents of change who promote new institutional arrangements (Pacheco et al, 2010). The institutional theory perspective does not require economic self-interest and institutional entrepreneur becomes an institutional innovator, whereas, institutional economics restricts the entrepreneur to one of self-interest with economic purpose in the pursuit of institutional change. The institutional economics approach is more consistent with entrepreneurship theory that focuses on economic opportunity as a fundamental determinant of entrepreneurial action (Shane and Venkataraman, 2000). Within the institutional theory perspective, institutional entrepreneurs recognize the obsolescence of institutions, design new institutional arrangements and engage in a variety of strategies (e.g., garner resources, mobilize constituents, frame issues to their advantage) to implement institutional change (DiMaggio, 1988). Hence, institutional entrepreneurs reflect on the institutional status quo and are able to challenge existing rules and practices and institutionalize the alternative rules and practices they are championing.

The institutional theory perspective of institutional entrepreneurship characterizes the entrepreneur as an institutional innovator or agent of institutional change, driven by a wide range of motivations (Oliver, 1992) and operating in a variety of contexts. These entrepreneurs may be motivated by functional or economic pressures but also by political or social forces that may deem existing institutions obsolete. In pursuing their motives, these entrepreneurs find opportunities for institutional restructuring within their organizations, organizational fields, or more macro settings. Endogenous institutional change occurs wherein the bounded rationality acts in pursuit of economic self interest to change the rules that determine economic behaviour and reward (Coase, 1974). The entrepreneur is more than an institutional innovator and is an individual that is alert to the potential for capturing economic value from new institutional arrangements. Hence, differences in institutional entrepreneurship activity are determined by differences in the alertness of individuals toward profit opportunities that may arise from institutional change.

Studies of institutional entrepreneurship centre around on researches on private arrangements and conventions, changes in professionalized practices and the sponsorship of common technological standards (Garud et al, 2007). As institutional forms move from individual-firm or industry-level practices to state-level policy, they evolve from micro-variations to macro-regulations. Because practices can vary within firms and even within work groups, they can be conceptualized as the most approachable level for institutional change. In the area of practices, scholars have looked at how variations in standard practices have led to change in the area of accounting, mutual funds and corporate social responsibility (Dejean et al, 2004). Standards represent the organization of practices into voluntary sets of rules that can direct the evolution of industries. The creation and adoption of standards has been shown to influence the development of the high-tech industry (Garud et al., 2007). Standards can be affected through industry-level trade associations or through the actions of outside stakeholders such as activists or industry watchdog groups (Rao, 1998).

Recent work has focused on institutional entrepreneurs at the corporate firm or trade association level, where they may seek to influence state-level policies. Ingram and Rao (2004) detail the efforts of chain store owners to influence the legal environment and legitimize the chain store model. Regulatory prohibitions brought about largely through the efforts of anti-alcohol activists not only increased the failure of breweries but also increased the founding of soft drink producers. Through the efforts of dispersed individuals collaborating, institutional entrepreneurship has been foundational to influencing country-level (Weik, 2011) and global environmental policy. While institutions comprise both formal written rules (such as constitutions, laws, and property rights) and informal constraints (such as conventions and codes of conduct (North, 1990), there is no common structure utilized to categorize these institutions. Williamson (2000) categorizes them into four types based on level of social analysis and ranges

from underlying norms, traditions and customs at the highest level to organizational governance structures at the lowest level. These levels include social embeddedness, institutional environment. Social embeddedness consists of informal institutions such as norms, cultural factors, customs, codes of conduct and traditions. These institutions are highly inertial and tend to change only over long time frames (DiMaggio and Powell, 1983). Institutional economics scholars are increasingly studying the role of institutions such as ideology, culture, cooperation, and the emergence of group norms (Ogilvie, 2007) and there is a growing interest in game theory research on the emergence of group or social norms, such as cooperation (Greif, 1998).

At the intermediate level, the institutional environment consists of formal rules such as property rights and government functions, including policy (Williamson, 2000). The institutional environment has the historic focus of institutional economics and is particularly evident in institutional economics-based institutional entrepreneurship research. Formal property rights define the privileges, obligations and duties of individuals with respect to an asset and generate expectations in society that are necessary for the existence and functioning of markets (Barzel, 1997). For instance, the market for land is subject to the expectation that owners are able to exclude others from the land, use the land and transfer its ownership. The emergence of government policies focus on the determinants, the process of change and the outcomes derived from government legislation (Binswanger and Deininger, 1997).

Institutional entrepreneurs may act in response to functional, political or social pressures that challenge existing institutional structures (Oliver, 1992). Functional pressures arise when individuals perceive issues associated with the performance or utility derived from existing institutions. These pressures may be related to environmental changes, such as competition and demand characteristics. On the other hand, political pressures originating from changes in power and interests may also prompt individuals to question the legitimacy of the institutional status quo (Oliver, 1992). In this case, the source of change may be political in nature. For example, entrepreneurs may force change in a direction that portrays them (or their organizations) as more competent or better aligned with public preferences. In contrast to functional purposes, these political forces do not seek change toward greater efficiency (Beckert, 1999). In addition, institutional change can be induced from social pressures arising from changes in social norms and expectations and from social conflict. For instance, when individuals interact in a group with diverse beliefs, experiences, and assumptions, they are more likely to question the validity of institutional arrangements (Oliver, 1992). This divergence in social expectations creates an atmosphere of discussion and debate, which may diminish intergroup agreement, and fosters institutional change (Zilber, 2002).

The concept of organizational legitimacy is based on the manipulation of symbols or particular frames to obtain societal support (Downing, 2005). Legitimacy is depicted as an organizational resource that organizations acquire from their environments and that is

subsequently used to meet established norms. Entrepreneurial success may depend upon the legitimacy that the institutional entrepreneur enjoys and his or her efforts of portraying the new institutional form as legitimate (Suchman, 1995). Garud et al (2007) show how legitimacy tensions arise between interdependent organizations in a technological field as alternative technological trajectories compete to become dominant design. Those agents in possession of superior resources, knowledge or strategic social network positions are better able to use their political power to shape institutions in their favour (Beckert, 1999). In this way, power is both a stabilizing force for institutionalization and a driver of institutional change, as powerful actors can shape the institutional environment in either direction depending on their particular interests (Lawrence, 1999). Further, the extent to which institutions within an organizational field can be proactively transformed depends on the structure of that field (maturity, concentration) and the position of the entrepreneurial organizations within the field (Greenwood and Suddaby, 2006). An organizational field evolves through recurring social interactions across members, which produce mutual understandings and common practices that characterize the institutional environment of that field. Thus, mature fields represent relatively stable structures under which behavior patterns (conflict or cooperation) are well defined. Institutional entrepreneurs are more likely to succeed at promoting radical change in premature fields, where institutional order is not completely developed and resistance to change is not as concerning as in established fields (Greenwood and Suddaby, 2006). The position of players in an organizational field determines when they will alter their institutional environment. Kraatz and Moore (2002) show that when a leader migrates from an organization at the periphery of the field, he or she is more likely to introduce institutional change in the new environment. A leader who migrates from an organization that has implemented a particular practice will be more likely to implement that practice in his or her new organization because that individual possesses the appropriate expertise and the cognitive reasoning to deem that practice as appropriate.

Institutional entrepreneurs tend to be those actors whose position provides them with legitimacy and allows them to bridge stakeholders to gain access to resources from a variety of sources. Institutional economics is concerned with the economic motivation behind institutional entrepreneurship, wherein they are depicted as calculative agents who alter institutions when it is economically desirable to do so. Thus, profit-seeking behavior provides the engine for institutional change and new institutions arise when the benefits that entrepreneurs can accrue from these arrangements exceed the costs of their implementation and enforcement (Alston et al, 1999). The trade-off between the costs and benefits of institutional development focuses on the factors that alter this trade-off and swing the balance of incentives toward new institutional development and institutional entrepreneurship. Transaction cost reductions can also act as a fundamental motivator of institutional change (North, 1990; 2005). Changes in demand and supply create incentives for entrepreneurs to engage in institutional and when demand rises and resources become scarcer, individuals find stronger incentives to delineate and enforce property rights over constrained resources (Alston et al, 1999). Technological change can also drive

entrepreneurs to establish new institutional regimes. For example, Rutten (2006) suggests that technological change in the form of double-cropping and high-yielding rice varieties during the 1950s in India led to the replacement of the institution of shared tenancy contracts with sub-tenancy arrangements. Anderson and Hill (1975) describe how the development of barbed wire allowed for lower cost enforcement of property rights in the American West motivated ranchers to promote the legal institutions necessary to define and secure those rights. When certain cultural resources are available, institutional entrepreneurship actions may be less costly and therefore, more likely to take place. For example, in Japan the conventional moral obligation to cooperate in communal infrastructure made the implementation of rural development programmes less costly and therefore, more likely to succeed (Rutten, 2006). Lastly, transaction costs represent the costs associated with the transfer, capture and protection of property rights (Barzel, 1997) and can dissuade or inhibit economic activity. Transaction costs are also argued to be a function of the nature of economic institutions and as such a central motivating factor in institutional development is the reduction of transaction costs in order to allow market exchange.

Institutional entrepreneurs have been alternatively defined as actors with social skills, where social skills refer to the ability to motivate cooperation of other actors by providing them with common meanings and identities (Fligstein, 1997). They are responsible for sustaining a collective identity and finding ways to bring together the interests of different groups, acting as arbitrageurs that intervene to find common solutions to collective problems. They also work in collaboration with other actors, taking advantage of convergent interests and relying on collective action to influence macro-level institutions (Zucker, 1988). Collective institutional entrepreneurship is the process of overcoming collective action dilemmas and achieving collaboration among dispersed actors to create or transform institutions. Levy and Scully (2007) characterize institutional entrepreneurship as a strategic act, utilizing Machiavelli's conception of power. As a modern prince, the institutional entrepreneurs act as organizers and expression of a collective group moves that group toward action. In doing so, they alter and shape the material, organizational and discursive forces that make up the politically contested field in which they operate. Rao (1998) found that framing had a powerful legitimizing effect in the establishment of consumer watchdog associations. Similarly, the U.S. chemical industry sought to align the creation of self-regulatory institutions with ideas of environmental protection and improved efficiency (King and Lenox, 2000). Such framing tactics tie back to the goal of creating legitimacy for new forms and practices by closely integrating new ideas and processes with commonly accepted narratives. As the poor and disadvantaged fishermen outnumbered the concentrated businesslike fishermen, the highly productive technology of the latter was substituted by more labor-intensive, but less productive, techniques. In this case, the more concentrated interest group did not prevail. Instead, social beliefs coupled with the size of the aggrieved group influenced the direction of the institutions that guided the fishing practices. Goldberg (1974) speaks of the importance of resource endowments of firms in helping them to alter the rules of the game, but is concerned, however with the marginal contribution of resources

that an individual firm should invest in a particular institutional initiative, given the associated free-rider problems that may arise. There is a relationship between the study of property rights (a resource) and power, since the distribution of such rights determines the relative power that some individuals have over others.

8.6 Women entrepreneurship

Women's entrepreneurship development in developing countries has a tremendous potential in empowering women and transforming society. However, this potential remains largely untapped. Sinha (2003) remarks that there are three categories of women entrepreneurs based on chance, forced or created entrepreneurship. These categories are based on how their businesses got started or the main reasons or motivations behind starting their own businesses. Chance entrepreneurs are those who start a business without any clear goals or plans. Their businesses probably evolved from hobbies to economic enterprises over time. Forced entrepreneurs are those who were compelled by circumstances to start a business and their primary motivation tends to be financial. Created entrepreneurs are those who are located, motivated, encouraged and developed through entrepreneurship development programmes. Within the developing countries, the degree varies by country, depending on many factors, including level of economic development, reflected by the level of income per capita and social, cultural and political factors. Gender development index and gender empowerment measure indicate the level of development of women and the extent to which women are free from discrimination in building their capabilities and in gaining access to resources and opportunities. With respect to sectoral distribution within the manufacturing industry, most of the women entrepreneurs are in the food, beverages and tobacco industry, followed by textile, garment and leather and non-metallic mineral products. In basic metal and fabricated metal products, the proportion of women entrepreneurs is very small. This indicates that women entrepreneurs in manufacturing industry tend to do businesses that do not require high skills and expertise. Within SMEs, majority of women entrepreneurs are found in enterprises employing 5 or less people (and in many cases are non-employing). They choose these enterprises because this economic activity is characterized by an easy entry and exit and low capital, skills and simple technology requirements. In non-manufacturing sectors, the percentage of female entrepreneurs is higher than that of their male counterparts in trade, hotel and restaurant. Beyond the manufacturing industry, women entrepreneurs are more likely than male to be involved in these sectors, mostly as own account traders having small shops or as owners of small restaurants or hotel (Tambuan, 2009).

A major factor sequence being discovered as a result of the deep-extending value chain networks is the hitherto invisible and unacknowledged power of women. For instance, in India, in late 1990s, about 6 percent of those in managerial positions were women; this percentage has now more than doubled. India has been dealing with two generations of gender issues. The first

generation was defined by the lack of managerial opportunities for women, because of an assumption that they were only good for easy jobs. Furthermore, the second generation issue was the oppression of women using subtle barriers, even in the face of equal opportunity policies. These barriers include paucity of mentors and role models and the masculine policies such as working late nights and rigid hours. However, the introduction of flex work and other gender-sensitive policies have allowed women to enter in non-traditional jobs and sectors.

As a third generation issue, women's need for varying work-life balance over their careers has remained unaddressed. Insensitivity about this need has resulted in a growing new perception amongst the Indian men that the gender sensitization policies are over-hyped. It has made many Indian men uncomfortable about working with women bosses, feeling that they will be asked to do extra work while the women bosses will have it easy. Women are addressing this issue by becoming entrepreneurs--both within and outside of corporations. This parallels the development in the US, where the rate of women entrepreneurship is growing twice as fast as male entrepreneurship; and, the number of women business owners is now about the same as male business owners (National Association of Women Business Owners). In India, women are pioneers in cultural entrepreneurs and women have always been the stewards of cultural knowledge, and are in charge of cultivating this knowledge amongst children and other family members. In the new India, women are also taking charge of culturally-embedded opportunities outside of the traditional male domains. And they are doing so in a diverse array of organizations: multinational firms, the large private sector, family businesses, their own start-ups, and micro-ventures.

Multinational firms in India have set aggressive percentage goals for hiring, retaining and advancing women as a means of addressing a rapidly expanding workforce requirement. All concerns about the business case for such initiatives have been put to rest by women like Indira Nooyi, ranked by Fortune as the world's most powerful businesswomen in 2006. Non-cola beverages are culturally preferred over the cola beverages in India for health reasons and sensing health conscious in the West, she co-authored Pepsi's 21st century transformation by successfully moving it into non-cola beverages. The large private sector firms have been prodded by diverse teams of overseas clients to include women amongst their top teams. The Senior Vice President of Satyam, a top Hyderabad computer firm, notes that it will be awkward if the company has not a single woman leader, when the customer might have 4-5 women in their group.

As they face intensified competition, the family businesses are calling upon their daughters and daughter-in-laws to take charge of exploiting new opportunities using their culturally sensitive insights. For instance, Hero group called upon the family daughter Shefali Munjal, to champion a new firm offering IT solutions to small and medium auto businesses and in a short period of time, she successfully made this new firm a market leader. Not surprisingly, the group thereafter decided to diversify into the scooters segment and to accomplish this goal,

the company developed women-only showrooms, women friendly product designs and women supervisors and sales executives. Kiran Mazumdar Shaw, counted among the Fortune's top 50 powerful global businesswomen, wanted to be a master brewer following her father. However, she was denied entry into the male bastion and then resolved to start Biocon, a biotech firm, in her garage with a budget of \$1000. Shaw brought in biotech research and clinical trials from overseas firms. Within time her firm achieved a first-day market cap of \$1 billion, making her the wealthiest woman of India.

Finally, women are leaders in micro ventures as well, focusing on leveraging key cultural resources such as the one exemplified by the rag picker story. Women account for more than 90 percent of all micro loans and have more than 95 percent repayment rates. As cultural entrepreneurs, women are guided by socially sensitive leadership. They focus on sustainability, as opposed to short term profits, and are acutely aware of the impact of their decisions on various participants in the cultural system, including suppliers, buyers, and employees, in addition to the members of their families and communities, and the environment.

FICCI Ladies Organization (FLO) has been started as a wing of the Federation of Indian Chambers of Commerce and Industry (FICCI). It was established in 1983 with the objective of women empowerment, to encourage women exploit to the maximum their own human potential as entrepreneurs and serve the community through activities of social welfare on the cultural and social fronts. FLO has around 1000 members comprising entrepreneurs, professionals and executives and has many chapters in important cities. The primary objective of FLO is to promote entrepreneurship and professional excellence in women and society. At the basic level, it holds entrepreneurship development programmes for women, working with them in advising on how to start a business and following it through with some help in vocational training. At the middle level, it holds seminars and workshops for women who run small-scale businesses, such as computerization and financial management. At the senior level, FLO has sophisticated programmes for women at the helm in areas such as marketing and finance. Besides undertaking several business oriented activities for women through entrepreneurship development programmes, workshops and panel discussions, FLO has an active business consultancy cell where free professional guidance is offered and it serves as a single window stop for all information on diversified statutory compliances, procedures and obligations. It advises women entrepreneurs on subjects such as company incorporation, registration, preliminary documentation, taxation and policies of government. FLO has recently launched Young FLO, a forum of career women and has also started giving awards to recognize outstanding women in various walks of life.

The Association of Women Entrepreneurs of Karnataka (AWAKE), founded in 1983 in Bangalore provides business development services. AWAKE's mission is to empower women through entrepreneurship development and improve their economic condition. To achieve this

mission, it conducts various activities, such as business counselling, entrepreneurship awareness, entrepreneurship development training, management development training and business incubator. With growing a membership, AWAKE promotes women entrepreneurship development to its clients through its various activities and supports policy advocacy. An affiliate member of Women's World Banking, AWAKE's activities are formulated and managed by an executive committee comprising voluntary members who design and ensure the successful implementation of all its programmes. AWAKE provides peer group support and handholds new entrants in various aspects of entrepreneurship. Apart from motivating potential women entrepreneurs, it conducts growth-oriented programmes for sustaining the businesses of existing entrepreneurs in manufacturing of garments, electronic components, printing, injection moulded components, machinery manufacturers to services in catering, trading in stationery and business incubator for food processing. AWAKE has developed its own 4s module of Stimulus, Start Up, Sustenance and Support

The common function of the support agencies is to provide opportunities for building knowledge and skills and networking with other women entrepreneurs, besides policy advocacy and business counselling. In Bangladesh, access to reliable and reasonably priced telecom facilities may be a constraint and a common facility has been established providing subsidized services. Mentoring and peer group support has been found to be an effective support device in western industrialized countries. This presupposes the existence of a critical mass of successful entrepreneurs who may be willing to offer their time. In India, this has just begun to take place. There is considerable scope for support agencies to also learn from each other. For example the idea of a directory, institution of awards for successful women entrepreneurs and business opportunity identification are activities which can benefit women entrepreneurs irrespective of their culture or business environment. The following examples of community-based entrepreneurship show how women and girls from poor rural households have registered their own company to carry out industrial activities.

Tamil Nadu has promoted industrialization of Hosur region (near Bangalore) as part of an industrial dispersion programme. The resulting rapid industrialisation created a demand for both labour as well as services. Myrada is an NGO working with rural women from poor households. Titan Industries is a watch company which is part of the TATA group. The collaboration between Titan and Myrada into self-help groups (credit and lending groups) began in 1992, with a contract given to a group of women to launder uniforms of the Titan factory workers. This collaboration stimulated Myrada and Titan to work together on more programmes that could employ the rural poor productively. In 1995, a collaborative venture resulted engagement of girls from poor households in the assembly of watch straps. Meadow (Management of Enterprises and Development of Women) started in 1996 becoming Meadow Rural Enterprises Private Limited in 1998. When Meadow started its job was only bracelet link assembly, to obtain the individual metal components from Titan, link them to form bracelets and return the linked pieces to Titan

for compaction, polishing and further use. Meadow realized right from the beginning the need to build up its fund base and for this, women took an early decision to surrender a part of their cumulative earnings to build up a fund for the Company. Presently, it annually transacts business of more than Rs 100 lakh.

Both Myrada and Titan are regularly approached with requests to see the experiment. Titan received an international award for social development that it attributes at least in part to its involvement with Meadow. Women entrepreneurs are encouraged, taking pride in the fact that they have been involved every step of the way in building and running their company. They have reached levels of capability where they can directly negotiate with Titan in the annual revision of piece rates, handle all purchases, control the movement of their vehicles, draw up work schedules, calculate payments, follow up on receivables and do the base work for meeting all statutory requirements. Besides training them to become managers, Meadow has also had the expected impact of improving incomes. The women have often become the most important wage earner in the family and their social status within their families and communities has changed dramatically, allowing them more social freedom (UNDP, 2010).

Network of Entrepreneurship and Economic Development (NEED) is a non-profit organization that creates and supports grassroots and networking initiatives designed to empower very poor people. Based in Lucknow, Uttar Pradesh, NEED conducts training, creates tools, mobilizes grassroots organisations, sells handicrafts and conducts projects in nearly 1,000 villages in that state (NEED, 2010). NEED aims to uplift marginalized communities and to alleviate poverty in general, but its main focus is on the economic and socio-political empowerment of women. NEED's focus is on forming self help groups (SHGs) for credit and social mobilization. It has defined a training model called Entrepreneurship Linked Income Generation for Self Employment Programme. This strategy represents a movement away from managing quantifiable mechanisms such as credit, thrift, and SHGs to issues of developing human capital. NEED facilitates ecological development through projects to reclaim waste land. NEED has created partnerships between villages and government organizations in which stakeholders can work together toward land reclamation. NEED publishes learning documentation and conducts training programmes for the functionaries of other NGOs, governmental departments, banks and leaders of the formed SHGs. NEED has launched specific projects like poorest area civil society project called empowering the rural poor, especially women, through building local women owned organizations, creation of network platforms and opportunity and enhancing human resource development in a sustainable manner. NEED opened remedial centres to equip the girls with the skills needed to directly enter the next level in the formal primary school system (NEED, 2010).

Self-Employed Women's Association (SEWA) is a trade union for poor, self-employed women workers, established in 1972. SEWA Trade Facilitation Centre (STFC) is a unique

company, owned and managed by more than 15,000 women artisans pursuing craft activities, in particular intricate traditional hand embroidery, in the drought affected and disaster prone districts of Gujarat. The aim of STFC is to strengthen the position of women workers in the informal sector and promote their enterprises in global markets through efficient marketing of their products and services, with a view to providing them economic security and full employment. STFC was established by the artisan members of SEWA to turn their activity in to a commercial venture with the main objective of promoting access to national and global markets, through capacity-building and product development. STFC delivers a range of services ranging from marketing support, product development, quality standardization, information systems and access to capital (SEWA, 2009).

Kiran Mazumdar-Shaw of Biocon became India's richest woman in 2004. She founded the company with a capital of Rs.10,000 in her garage in 1978 with the initial operation to extract an enzyme from papaya. Currently, her company is the biggest biopharmaceutical firm in the country. Ekta Kapoor, creative head of Balaji Telefilms has been synonymous with soap operas in Indian TV, after her most famous venture *Kyunki Saas Bhi Kabhi Bahu Thi* which was aired in 2000 on Star plus. Ekta dominates Indian television. Neelam Dhawan is Managing Director, Microsoft India. She wanted to join FMCGs like Hindustan Uni-lever and Asian Paints, but the companies rejected her as they did not wish to appoint women for marketing and sales. Naina Lal Kidwai was the first Indian woman to graduate from Harvard Business School. Fortune magazine listed Kidwai among the world's top 50 Corporate Women from 2000 to 2003. According to the Economic Times, she is the first woman to head the operations of a foreign bank in India. Indu Jain used to be the Chairman of the Times Group and is known by many different identities such as that of spiritualist, humanist, entrepreneur and educationalist. Priya Paul entered her family business and is currently the Chairperson of Park Hotels. Simone Tata has been instrumental in changing a small subsidiary of Tata Oil Mills into the largest cosmetic brand in India Lakme, synonymous with Indian fashion. She became a part of Lakme during 1961 and has been responsible for turning the company into one of the biggest brands of fashion in India. At present she is the Chairperson of Trent Limited, a subsidiary of Tata group. Mallika Srinivasan, currently the Director of Tractors and Farm Equipment, was honoured with the title of Businesswoman of the Year during 2006 by the Economic Times. She joined the company in 1986 and has been responsible for accelerating turnover many times. Anjana Kumar is a prominent banker. When the Government of India appointed her as the Chairperson and Managing Director of The Indian Bank, she became the first woman to become head of a public sector bank in India.

8.7 Conclusion

Individual entrepreneur denotes a type of entrepreneurs who set up an enterprise, adopt latest techniques, arrange finance and take up all sorts of risks with a view to earn profit. It is found in small scale industrial enterprises. Institutional entrepreneurs are entrepreneurs who

inherit the business of family through inheritance. As the entrepreneurs inherit family business, these are sometimes called as second generation entrepreneurs. Sometimes circumstances compel some persons to become entrepreneurs. These entrepreneurs are called as forced entrepreneurs. Forced entrepreneurs are not successful because lack of proper training and understanding. Entrepreneurs who estimate customers' needs and undertake production to cater them are called industrial entrepreneurs. Corporate entrepreneurs promote corporations having separate legal entity. Agricultural entrepreneurs engage in the process of raising and marketing crops, fertilizers and other inputs of agriculture. Entrepreneurs motivated by government or other non-government agencies are called motivated entrepreneurs. Professional entrepreneurs make entrepreneurship as a profession.

Whatever the type of entrepreneur, an individual creates a business with the ultimate goal of reaching the largest available market whilst making the highest profit. These people build businesses like Google, Microsoft, Sony, Apple and Facebook and make the Forbes list of wealthiest people in the world over and over again. They can be extremely innovative businesses that change the way Facebook and Twitter see the world and they can be run of the mill like Wal-Mart or Toyota. Lifestyle entrepreneurs create businesses around their passions but their primary goal is not vast profits but rather a rich and flexible lifestyle. The business allows them to work extremely flexible hours, travel the world and afford a life that is associated with millionaires. A sub-category that has become quite popular with the establishment of the internet is the internet lifestyle entrepreneur. He builds a business on the internet that allows him to work from anywhere at any time. This has manifested itself in the form of pro-blogging where one makes a business out of their blog and earns income from advertising or selling stuff through their blog.

A social entrepreneur recognizes a social problem and uses entrepreneurial principles to organize, create and manage a venture to make social change. Whereas a wealth creation entrepreneur typically measures performance in terms of profit and return, a social entrepreneur assesses success in terms of the impact on society as well as in profit and return, operating through non-profits or charities from a private standpoint. Just as entrepreneurs change the face of business, social entrepreneurs act as the change agents for society, seizing opportunities others miss and improving systems, inventing new approaches and creating solutions to change society for the better. All these developments usher in an innovative entrepreneurial conclave which would enable the emergence toward global leadership as in the case of iron and steel industry. The next chapter will analyze this aspect in some detail.

Chapter 9

Innovation and Entrepreneurship: India's Emergence in Business Leadership

9.1 Introduction

In the spring, when we see geese heading north for the summer or south in the fall, flying along in V formation, we might be interested in knowing why they fly that way. It has been learned that as each bird flaps its wings, it creates uplift for the bird immediately following. By flying in V formation, the whole flock adds at least 71 percent greater flying range than if each bird flew on its own. Learners who share a common direction and sense of community can get where they are going quicker and easier because they are travelling on the thrust of one another. Whenever a goose falls out of formation, it suddenly feels the drag and resistance of trying to go it alone and quickly gets back into formation to take advantage of the lifting power of the bird immediately in front. If we have as much sense as a goose, we will stay in formation with those who are heading in the same direction as we are. Because a lead goose does not gain any energetic advantage from its position, it will drop back after a time while another takes the lead. Though flock members do not do this on any regular rotation, larger and stronger birds may be in the lead a greater percentage of the time. When the lead goose gets tired, he rotates back in the wing and another goose flies point. It pays to take turns doing hard jobs, with people or with flying geese. These geese honk from behind to encourage those up front to keep up their speed. We need to be careful what we say when we honk from behind. When a goose gets sick or is wounded by gunshot and falls out, two geese fall out of formation and follow him down to help and protect him. They stay with him until he is either able to fly or until he is dead and then they launch out on their own or with another formation until they catch up with their group. If we

have the sense of a goose, we will stand by each other, protect one another and sometimes make new friends who seem to be going in our direction. Research is like geese clustering and flight. Agglomeration and interaction take place with the lead goose, followed by the early goose, the late goose and the followers. Sometimes the birds may be in a circular form so as to frighten any predators. At 6000 feet above, the flock may break into circular formation just in time to avoid collision.

This chapter showcases the growth of innovative culture leading to entrepreneurial development, in which different types of innovations are encountered. Following the cue from the flying geese theory and innovation enhancement, it is shown how in select sectors the country is able to have global leadership. Section 9.2 presents some types of innovation and as we know great changes in business environment take place because of radical innovations. Section 9.3 illustrates the flying geese theory and the emergence of the lead and follower geese. The section concludes presenting the link between Schumpeterian entrepreneurship and the flying geese. Section 9.4 compares the entrepreneurial acumen of Japan, China and India and how the Indian entrepreneur is poised to be the future innovator. Section 9.5 discusses the characteristics of innovative entrepreneur especially in the IT sector. Section 9.6 discusses the genesis of innovative entrepreneurship, while section 9.7 presents how in different phases of entrepreneurial development, innovative culture had developed. Section 9.8 deliberates of the intrapreneurship development and the emergence of innovative entrepreneurship, citing examples of Tata Steel's Cold Rolling Mill and Blast Furnace technology, besides focusing on R&D in general which hinders the growth of entrepreneurship. Section 9.9 presents a few examples of industries which have been characterized by innovativeness in recent years like Tata Steel, Tata Motors and the pharmaceutical industry. Section 9.10 highlights the scope of future entrepreneurial development, taking the lead of the software industry, while section 9.11 concludes.

9.2 Types of innovations

Innovations are essential for global leadership and when we look at the 50 top innovations in the world during 2011, radical innovations accounted for the bulk and some of the radical entrepreneurs are found in the electronics industry. Innovations may be general purpose, which change the way of thinking and doing, incremental (continual improvement resulting in improved creativity) and radical (typical creative destruction). Schumpeter (1950) identified radical innovations as new products or processes that are far superior to the existing ones technologically, radical innovations being the major driving force. Technologically strong firms invest in the creation of radical innovations to increase their market share but at the disadvantage of their competitors. Radical innovations cannot be copied easily because they require a high scientific and technological capability that first needs to be acquired by late-comers (Varadarajan, 2011).

Product and process innovations may include continuous product and process improvement, process revolutions, service innovations and strategic innovations like the lean or the Japanese just-in-time method and the implementation of new technology for improving supply chain management. These innovations also represent new products or services, such as the iPhone, without changing business models. Strategic innovations include new products or services but with new business models such as Segway rentals or web-based applications. Finance innovation relates to business models, networks and alliances for innovations such as Dell's personal computer business and supply chain management. Managerial innovation relates to innovative approaches to managing people, technology and resources. Entrepreneurial creativity results in innovation.

Fundamental innovation is a creative idea that leads to a revolution in thinking. Such innovations are based on extensive research, knowledge-driven, theoretically proven and lead to follow-up research and development. Examples of such fundamental innovations include Einstein's theory of relativity, electricity, penicillin, the telephone, wireless communication, the transistor, computer software, UNIX and the internet. The platform innovation leads to the practical application of fundamental innovations. Examples include personal computers, silicon chips, cell phones, digital printers, Microsoft Windows, databases, Linux, iPad, drug delivery devices, satellites and the space shuttle. A derivative innovation is a secondary product or service derived from a platform innovation. Derivative innovations include new server-client configurations based on a new network architecture or operating system for a cellular phone. A variation innovation is a tertiary-level innovation that requires less time to develop and is a slight variation of the next-level products or services based on a derivative innovation. Variation innovations in cell phones are various colour covers, ring tones, camera features and additional software-based optional features.

When we characterize entrepreneurs as general, incremental and radical based on the type of innovations they make, the radical innovators in electronics industry bear the accolades. It all started in Japan following the lead of the US goose, flourishing in the electronics, textiles and automotive industries. Japanese conglomerates like Toyota, Honda and Nissan have had radical innovations in respect of battery, hybrid and fuel cell electric vehicles, with the aim of increasing the understanding of the technology shift process, which was not only incremental but also radical illustrated by their position in the electrification race. Japanese firms in industries such as automobiles, consumer electronics, precision equipment, semiconductors and various hi-tech components have been successful in international markets. In spite of the country's economic malaise from the 1990s, many Japanese firms continue to be world leaders in various product areas like hybrid automobiles, machine tools and various hi-tech components.

In this connection, it may be useful to know the plight of once-leading leaders, say in the case of disc industry. Christensen (1997) points out how in the disc drive industry, technology changes have sustained new product performance improvement. One type of technology

sustained the industry's rate of improvement in product performance (total capacity and recording density) and ranged in difficulty from incremental to radical. The industry's dominant firms always led in developing and adopting these technologies. The other type of technology disrupted (ala Schumpeter) or redefined performance and consistently resulted in the failure of the industry's leading firms. It is the disruptive technologies that toppled the industry's leaders. The most important disruptive technologies (architectural innovations that shrunk the size of the drives from 14-inch diameter discs to diameters of 8, 5.25, and 3.5-inches and then from 2.5 to 1.8 inches) were technologically straightforward. They generally packaged known technologies in a unique architecture and enabled the use of these products in applications where magnetic data storage and retrieval previously had not been technologically or economically feasible.

Secondly, the purpose of advanced technology development in the industry was always to sustain established patterns of performance improvement in order to reach higher performance levels and higher margin domains. Many of these technologies were radically new and difficult, but they were not disruptive. The customers of the leading disc drive suppliers led them toward these achievements. As a result of this, sustaining technologies did not cause failure. In the third pattern, despite the established firms' technological strength in leading sustaining innovations, from the simplest to the most radical, the firms that led the industry in developing and adopting disruptive technologies were entrants to the industry and not its incumbent leaders. The question posed by Christensen is: why was it that firms that could be considered as aggressive, innovative and customer-sensitive could ignore or attend belatedly to technological innovations with enormous strategic importance? The problem was that established firms were unable to confront successfully the downward vision and mobility. Finding new applications and markets for these new products had been a capability that these firms exhibited upon entry but then apparently lost. Perhaps the leading firms were held captive by their customers, enabling attacking entrant firms to topple the incumbent industry leaders each time a disruptive technology emerged (Christensen, 1997).

Notwithstanding this failure, the catch-up paradigm of North American and Western European countries in earlier centuries, the rise of the newly industrializing countries of Asia in the last century and present-day emerging economies is characteristic of radical first and second generation innovations in the typical Schumpeterian sense of creative destruction. The emerging countries have been able to absorb and creatively adapt international technological knowledge and achieve accelerated growth from a global diffusion of technology. These have had access to new technologies without bearing all the costs and risks of investment. Such technological adoption goes beyond mere imitation and is an example of creative and innovative entrepreneurial behaviour.

9.3 The 'flying geese' theory and entrepreneurship

According to the flying geese theory (Ozawa, 2009), the US was the lead goose, soon to

be taken over by Japan as the lead goose in another set-up. Korea took the cue and in turn became the lead goose in the next transformation stage, to be followed by China and India. When China is the lead goose, Vietnam and Myanmar became the followers. While the Japanese economic miracle had enormous impact on its East and Southeast Asian neighbours, as well through direct investment and as a model of development, in the 1980s the initial virtuous circle of accumulation, in which cheap credit by banks played an important role, became a vicious circle of debts for companies too big to fail and the prolonged existence of these so-called *zombie* companies, leading to two lost decades for Japanese growth in the 1990s and 2000s and diminishing the appeal of the Japanese economic model. Vernon's (1966) product cycle theory is similar to it and as a matter of fact the flying geese theory has been incorporated into the western product cycle and growth theories.

The flying geese paradigm is a catching-up process behind a leader (Japan), and the transnational paradigm of development. This was first presented in the early 1930s by Japan's Kaname Akamatsu (1961) and revived in the 1970s and 1980s by Kiyoshi Kojima and Terutoma Ozawa. The theory stresses interactive growth via emulative learning among the economies operating at different stages of growth along the ladder of economic development. Policy makers need a clear understanding of the ladder that offers both inter- and intra-industrial routes to climb over the course of industrial upgrading. Interactive growth is made all the more efficient when countries cluster cooperatively in a regional hierarchy, reaping economies of concatenation (interactive stimuli) and benefiting from comparative advantage recycling (staggered export drives that avoid a fallacy of composition, i.e., the impracticality of simultaneous exports by all economies).

In this, we will have to paraphrase Schumpeter's (1961) views on global competition, which is the extension and diffusion of new knowledge under conditions of rivalry. Schumpeter does not see economic development as a smooth movement, but a process of jumps with tempestuous fluctuations, wherein the business cycle is built within the process of economic development. Economic development is driven by the invention and production of new consumer goods, the new methods of production or transportation, the new markets and the new forms of industrial organization that enterprises create. Innovative entrepreneurs emerge side-by-side with old enterprises and try to take their place and eventually replace them. As an adaptation, the changes in development conditions caused by the competition between the new and old enterprises act as and take the form of a business cycle ('creative destruction'). As a result, more and more new enterprises follow and imitate the innovation of the early enterprises, impelling an economy to boom. Because the economic boom is pushed partly by the latecomer enterprises, which are progressively less qualified in innovation and the old enterprises' struggle for survival, the economic crisis eventually comes and is in turn followed by recession.

We can cite the example of Japan, a latecomer to development, which could catch up with more advanced countries through an integrated process of moving from imports through

import substitution to exports and later became a widespread notion for interpreting and understanding the development pattern of East Asian economies. In the process, production of labour-intensive goods has shifted from Japan, the leading goose in turn to South Korea, Taiwan, Singapore and Hong Kong and then to the Association of South-East Asian Nations countries and to the coastal provinces of China as a result of the dynamic changes of the underlying comparative advantages in the region (Kojima, 2000). Flying geese-like industrial transfer is related to the characteristics of the life cycle of products implying its importance to innovation and comparative advantage, leading to agglomeration amongst these countries. When advanced countries upgrade their industrial structure from labour-intensive to capital-intensive industries, the latecomers can take over the industries washed out by the former and receive foreign investment to those industries. However, changing directions of comparative advantage and forms of the flying geese theory are not the same amongst small and large economies. This is because a small economy is characterized by the homogeneity of its resource endowment and hence its industrial structure. Once its comparative advantage changes, the economy as a whole enters a new stage of development. In contrast, a large economy is characterized by heterogeneity in its resource endowment and its industrial structure among different regions. While some regions move to a new stage of development, the development stage of others might remain unchanged.

As mentioned above, during times of economic crises, there is a greater chance than otherwise to form a process of creative destruction, wherein, production factors can be recombined, old patterns of growth can be replaced by new ones, new technologies wash out the old technologies and productivity improvement contributes a larger and larger role to economic growth (Cai, 2008). Changes in the industrial structure are the by-product of economic crises and the acceleration of industrial transfers among regions can be given impetus on the way out of the crisis. However, in spite of being the lead goose, Japan never succeeded in developing an international currency (if it had, the 1988 Asian financial crisis would not have taken place?) and all the Asian countries had to be linked to the US dollar. In this market-driven dirigiste change, the Schumpeterian entrepreneurship characterizes the sky wherein the geese have their methodic and blissful flight.

Emulative learning is facilitated by multinationals foreign direct investment and other activities that accompany technology, managerial skills and access to export markets, a powerful catalyst for industrial upgrading and development. Borrowed growth' is the finance mode of interactive growth, whose benefits and risks vary with the development stage, institutional set-up and policy. Growth stages fundamentally and structurally determine external imbalances, but short-term, situational and coincidental macroeconomic factors also magnify the imbalances between nations. These two causes should be distinguished, since the latter alone is amenable to immediate adjustments in fiscal, monetary and exchange rate policies – but not the fundamental one. The Asian countries got the basics right and created an environment where the growth of private investment and investment in human capital succeeded. This included a relatively low

degree of inequality, high productivity growth in agriculture, relatively efficient (corruption-free) public administrations and market-enhancing instead of market-distorting interventions (like export goals plus a certain measure of protectionism for home markets instead of simply import substitution). It also included crucially macroeconomic stability, investment in human capital, in particular primary and secondary education, a functioning price system, a stable, though not necessarily market-oriented financial sector and selective instead of massive interventions, like selective credit allocation or export promotion. Market failure through asymmetric information in the financial sector and underdevelopment of the banking sector was, according to the report, overcome by special measures like long term financial allocation by the state and the foundation of specialized public industrial banks.

In the case of Korea and Taiwan, American influence and American aid have been stressed as factors explaining rapid catching-up. However, though US aid was important for Korea in the 1950s, its growth miracle began when aid was less important, in the 1960s, and aid declined subsequently in importance, while growth rates climbed. Also in terms of the economic system, American influence played certainly a role after World War II; it was quite limited by domestic political factors. For ASEAN, the lead was by Singapore, where a new category of incentives was created for those firms leaving Singapore and moving to other ASEAN countries, which can create a counterpart category.

True to the flying geese theory, India had taken the lead from not just the US and Japan, but all other lead geese in becoming innovative and entrepreneurial. According to Boston Consulting Group, Tata group is the only innovative Indian company to find its place in the world's top 50 innovative companies, led by Apple, Toyota, Google, Microsoft and others. Tata Nano has been the most innovative people's car introduced in India in recent times. In iron and steel industry, mergers and acquisitions and technological innovations have enabled Arcelor-Mittal and Tata-Corus to become global leaders. In information technology sector, the emergence of Tata consultancy services, Infosys and Wipro as global outsourcing companies has pushed India to the forefront of global IT leadership. The achievement of Indian biotech firms like Ranbaxy, Cipla, Dr Reddy's and Biocon have resulted in India taking up the leadership in many a pharma sector. There are many more such instances prodding Indian innovativeness to the global standards and with greater economic reforms, the country is set to emerge as one of the leading innovative nations in the near future.

9.4 Business opportunities in different countries: a comparison

Entrepreneurs in Japan, China and India have pursued business opportunities in distinct manner peculiar to their own environment (Gupta, 2008). Japanese entrepreneurs took control of both peripheral physical and intellectual assets discarded by Western firms. In this endeavour, the entrepreneurs found opportunities for redeploying and repacking these assets into popular products. They demonstrated how such products could be produced using peripheral assets, such

as transplanting factories in Asia and other less attractive regions. The use of peripheral assets is depicted by the Japanese in the 1950s as they bought scrap steel from Western junkyards and reprocessed it in their mini steel plants. Later, during the 1980s, the Japanese partnered with the US auto parts suppliers who were subject to huge bargaining pressures from the US assemblers. In this partnership, the Japanese transformed from being suppliers of basic functional vehicles to suppliers of augmented high end vehicles (Gupta, 2002).

Chinese entrepreneurs took control of their previous generation's physical and intellectual assets, which had been transferred by Western firms. Specifically, several Western firms were transferring their older generation's assets into the consumer electronics, auto and other sectors to China since the cost of losing intellectual property rights was relatively limited (Gupta and Wang, 2004). During this time, the entrepreneurs found opportunities for redeploying the assets more cost-effectively using a range of mass products. In discovering such opportunities, the entrepreneurs demonstrated astute negotiation for huge premiums from Western firms; these Western firms were seeking to acquire their share in the joint ventures, while wanting to give up their own share for a huge discount.

Indian entrepreneurs are taking control of their current generation's physical and intellectual assets since Western firms are finding them costly to deploy. In this endeavour, the entrepreneurs are transforming the next generation's assets by making them accessible to even the grassroots markets. As Indian entrepreneurs make assets accessible a variety of markets, they are also examining how grassroots can serve global markets. They are discovering how grassroots can use their unique culturally-embedded knowledge. India's back-yard inventors are coming up with creations that their backers hope will make it big, solve a few of the world's problems, boost India's exports and continue cutting the country's poverty rate (Goering, 2007). An example of these back-yard entrepreneurs is Conserve in New Delhi, which employs poor urban rag-pickers to collect, sort, weigh and clean the plastic bags that litter the streets. The bags are melted together to create a thicker material. Since the bags come in all colours, different designs can be created using strips and cutouts of bags. This recycled trash is then turned into chic handbags that are sold for \$50 in European boutiques. By tapping rag-pickers for their business, Conserve helps grassroots women earn three times what they previously made (World Resources Institute, 2007). Indian entrepreneurship development has been taking place in different phases, which the chapter proposes to deliberate upon.

Three distinct pathways to becoming a business leader are found in Asia: the pioneering pathway, the inheritance pathway and the professional pathway. The pathway each leader experiences stamps him or her with lasting personal and business values, tastes and managerial styles and predilections. One of the amazing phenomena of contemporary China is that despite nearly half a century of socialism, with repeated and violent campaigns against capitalism and the bourgeoisie, the spirit of private entrepreneurship has managed to stay alive. Private

enterprise is alive and well not only among the young but also among those who suffered grievously through the Cultural Revolution. These older individuals responded with great enthusiasm when given permission to set up their own businesses.

China's consumer spending is rising with an urbanization boom resulting in the proliferation of new personal services, which have enabled many entrepreneurs to exploit property development, retail and manufacturing. However, many of these entrepreneurs, especially those from the generation whose education was interrupted by the chaos of the Cultural Revolution, are not well educated. Many come from humble backgrounds in rural China. Most operate with an extremely short time horizon: focusing on making sure that the bank account is not in the red at the end of the month. They act more on gut instincts than on reasoned and sophisticated business planning. And they face intense, cutthroat competition daily. The pioneering pathway in China is a school of hard knocks, governed by a ruthless, Darwinian survival imperative. However, the environment in which they operate, which includes the need to deal with the still formidable government bureaucracy and the inevitable collisions with state-owned enterprises as competitors shapes their behavior and outlook as entrepreneurs and as business leaders. They still need to tread carefully, for instance, and to demonstrate their contributions to China's development wherever they can (Jia, 2007).

Being a successful corporate leader may have less to do with business strategy and visions than with managing government relations. Zhang Yue, founder of Broad Ltd, a Changsha-based maker of giant cooling systems that has successfully marketed its products worldwide, conspicuously displays in his office certificates attesting that Broad has paid more taxes than any other private company in China. Not far from his office is a hangar that houses his private helicopter and jet. This juxtaposition of on the one hand being a champion taxpayer and on the other having a private helicopter and jet is highly illustrative of how Chinese entrepreneurs have chosen to travel on the pioneering pathway to affluence today.

The children of China's top leaders and officials are known as princelings. Before the 1980s, most princelings were given priority in schooling and many ended up being groomed for high positions in the government. Starting in the 1980s many princelings opted to go into business instead of government. Through their personal connections and family pedigrees these princelings have been able to pursue the inheritance pathway to becoming business leaders. Many such princelings grew up in relative comfort and had privileged access to higher education and other opportunities, such as international travel. Because of the still sizable and influential state sector, their connections and pedigrees continue to carry weight and remain valuable assets. It is therefore not difficult to imagine that their conception of corporate leadership is closely tied to the role of the state and government authority. In India, the inheritance pathway could not be more different from China's. If there is a business aristocracy in India, it would have to be the Tatas. Jamsetji Tata started in textiles, then expanded into trading, quickly establishing a

stronghold in Bombay. Jamsetji Tata introduced pensions for workers in his textile mills in 1886 and accident compensation in 1895. In this respect he was way ahead of his time and certainly ahead of other Indian business enterprises. This tradition of employee benefits has continued through vastly shifting economic, political and business conditions as the group has become a large business conglomerate, with enterprises spanning heavy industry, manufacturing, chemicals, agribusiness, financial services, hospitality and IT.

The professional pathway started to operate in China relatively late, with the arrival of foreign multinational companies in the 1980s. Foreign businesses, including some from Hong Kong, created a market for skilled business professionals and paid competitive market wages, typically a high multiple of what could be earned working for a government enterprise. Such professional employment in turn stimulated the supply side Chinese institutions of higher learning started to develop a capability to meet the demand for graduates in business administration, finance, marketing and IT. Even before Chinese educational institutions started to respond to the new demand, enterprising Chinese students took to studying overseas. Fudan University in Shanghai has curricula developed in partnership with leading international institutions, such as the Massachusetts Institute of Technology's Sloan School of Management. Most of these well educated business professionals in China are still in their twenties and thirties. So in a society that is still largely organized by seniority and hierarchy, not many of them have reached leadership positions. In many a way, this may bridge the gap between entrepreneurial energy and corporate leadership in China.

9.5 Some developments in the IT sector

In India, the pioneering pathway works very differently. The momentum driving the pioneering pathway to being a business leader in India comes from the information technology revolution. The story of Infosys, a global provider of IT consulting and services, is a good example. In 1981, Narayana Murthy and six partners set up Infosys in a garage in the southern Indian city of Pune, with \$1,500. The seed capital came from their personal savings, as no bank would consider extending them a business loan. A graduate of the prestigious Indian Institute of Management, Murthy led Infosys's exponential growth. Infosys now has more than \$2 billion in annual revenue, is listed on the NASDAQ stock exchange, and counts among its clients many of the world's leading companies. Murthy is just one of many Indian entrepreneurs who successfully rode the wave of information technology and the Internet to establish world class businesses, amass huge personal fortunes and create hundreds of thousands of well-paid jobs for young, well-trained Indians.

.Many IT companies like Wipro Technologies have become large software companies in India and the world's largest providers of research and development services. This development was made possible by a convergence of three factors. The first was the emergence of India's

technical brainpower, which combined with the rock-bottom wages in India to form a formidable competitive advantage. The brainpower was nurtured by elite schools such as IITs, but these schools came with a price, as basic education for the majority of Indians was and remains neglected. The second factor was that the licence raj, the system of licences and regulations that were required to set up businesses in India until 1990 and that had stifled India's entrepreneurs for five decades following the nation's independence had not anticipated the emergence of the IT industry. IT entrepreneurs were able to operate with relative ease as a result. The third factor was the emergence of the internet, which became the virtual highway for India's IT exports.

Within a decade IT service exports grew from virtually nothing to more than \$40 billion a year. Service exports have also evolved, from basic services such as call centers to increasingly sophisticated business process outsourcing. This industry, while building personal fortunes for the successful pioneers, has also become the standard path to affluence for young, well-educated Indians. In sharp contrast with their Chinese counterparts, most of the Indian business leaders who have come through the pioneering pathway in the IT industry are well educated, technologically savvy and have had some exposure to international business dealings. Their technological orientation and familiarity with corporate leadership tends to give them an air of sophistication.

In India the main thoroughfares in Bangalore are lined with sophisticated office buildings housing IBM, Oracle, Cisco, SAP and many international IT companies as well as Indian companies like Infosys and Wipro. They attract the best and the brightest graduates of India's elite academic institutions and are the points of entry for well educated and skilled Indians to join the ranks of the affluent. These companies form the professional pathway for a whole new generation of young Indians to lead businesses in the future. An added advantage of these professionals' focus on technology is that they are less burdened than many other workers by the tradition of seniority according to age, because IT and related fields thrive on being innovative and creative domains of the young more than the old. However, corporate leadership challenges in the India and China are very different. This is largely because the three pathways function very differently. In both nations the pathways exert powerful influences on emerging business leaders, moulding them to have certain strengths and weaknesses. Therefore, meeting the challenges of corporate leadership has to begin with an understanding these pathways and their impacts.

The Tata group, after being refused entry to a hotel reserved for the British in Bombay, built the legendary Taj Mahal Hotel on the waterfront of that bustling city, opposite the India Gate. The Taj chain of hotels and resorts today is among the most successful in India and the region. J.R.D. Tata pioneered commercial aviation in India and Ratan Tata, the current chairman of the group, took the reins in the 1980s and started a remarkable process of rejuvenating the business, which had started to wilt and lose focus under the licence raj. Ratan Tata began to

professionalize management and moved to invest aggressively in the booming IT sector by launching Tata Consulting Services (TCS), which has since become a global leader in computer software and services. Active overseas, TCS is a leading investor in China's IT sector and an ambitious multibillion dollar plan to invest in neighboring Bangladesh was unveiled in 2005. Seizing opportunities opened by economic reform in the 1990s, the Tata group has expanded into financial services to take advantage of rising domestic purchasing power. The group introduced the cheapest (\$2200) and most innovative people's car by name Nano recently. The group is just one of many large, family-owned business enterprises in India. Their sense of corporate leadership is closely aligned with the values of families, legacies, and traditions.

9.6 The genesis of innovative entrepreneurship

Innovative entrepreneurship rests on factor sequences or personal traits like risk taking propensity, achievement motivation and human capital. Both male and female entrepreneurs in India score rather low on risk-taking propensity measures (Rutten, 2006). This low risk-taking propensity serves as an explanation for the historical preference in India for service ventures, which have lower initial capital outlays and shorter breakeven periods compared to the manufacturing start-ups. Veen (1976) highlights the role of structural factors in India that included market imperfections for venture capital and the non-supporting institutional environment for industrial investments. Streefkerk (1985) and Chandra (2009) document how several artisans, blacksmiths, masons and carpenters, set up small industrial workshops and gradually became industrial entrepreneurs. These studies discredit the assumption that a low risk-taking propensity is an impediment to industrial entrepreneurship in India.

The other factor is achievement motivation. McClelland (1961) identified the n-ach as key to entrepreneurship and noted that high achievers are motivated by an enduring desire to succeed and to exploit opportunities, to take advantage of favorable trade conditions and to shape own destiny. Indian entrepreneurs have low levels of achievement motivation (McClelland and Winter, 1969), but recent studies show fairly high levels of achievement motivation among men entrepreneurs, while only medium level among women entrepreneurs (Shivani et. al, 2006). Small group cohesiveness is far more common among Indian women than men and during group cohesiveness, a highly informal female leader was more frequently present and women tended to be more assertive when denied fairness. Rather than being only achievement motivated, women in India tend to also build and mobilize support networks for achieving success. With respect to the temporal shifts, an important factor is the easing of structural restrictions, which began in the 1980s. The Swedish firm Kairos Future (Times of India, 2007) reports that Indian youth (16-29 year olds) are the happiest in the world and these youth show optimism about their future and their society's future. Additionally, work comes as top priority for Indian youth, followed by a good career and higher status, which priorities result in endurance and entrepreneurship.

Human capital is another factor strengthening entrepreneurship and technical, human and

conceptual skills are as critical to entrepreneurship (Nafziger and Terrell, 1996). Hosseini (1990) observes that the presence of the most able work force can be of little use if the individuals are not sufficiently motivated to work hard. Leeuwen (2007) shows that India lagged behind in human capital during the 20th century, making it difficult for entrepreneurs to adopt new technologies and for politicians to support new technology-based entrepreneurship without causing social unrest. Recent studies indicate a fairly high level of human capital among men entrepreneurs in India, but only a low level among women entrepreneurs (Shivani et. al, 2006). This low level among women entrepreneurs in India may be associated with a lack mentors and role models to assist them with the acquisition of technical and conceptual skills.

With reference to innovative and growth consequences of entrepreneurship (Schumpeter, 1934), some scholars have mistakenly cited India's religion as an impediment to innovativeness and growth (Weber, 1930). They believe the caste system in India inhibits social mobility and Hindu spiritualism inhibits pursuit of material growth (Anstey, 1952; Morris, 1967). Many empirical studies indicated a generally low level of innovativeness amongst both men and women entrepreneurs, showcased by the fact that most entrepreneurs in India were less likely to develop new products or new production methods (Shivani et al, 2006). During 1993-2004, the average income for the bottom 20 percent of the population grew by 10 percent. This is nearly at par with the 12 percent for the top 20 percent of the population in rural and urban areas. Both population strata have high rates of self-employment. However, although many areas of India are experiencing an income growth, fixed-income towns experience it the least (Shivani et al, 2006).

Turner (2007) dismisses India's recent dynamism as a temporary phase and attributes this dynamism to the returning Indians who have held leadership positions and have access to leading edge technology and exposure to global operations and the US-born children of Indian immigrants leading the new generation of high-tech entrepreneurs. The long-term variations in entrepreneurial innovativeness are now recognized as a function of the nation's work culture system, including the economic, political, legal, financial, logistical and social structures that characterize a society (Morris, 1998). Work culture system includes the rules of the game that influence the allocation of entrepreneurial resources between productive activities such as innovation and unproductive activities such as rent seeking or organized crime (Baumol, 1990).

9.7 The development of entrepreneurship in different phases

We can assess the emergence of innovative entrepreneurship from the pre-colonial era to the present in different phases. The emergence of innovative entrepreneurial culture in the pre-colonial period relates to panchayati raj (until 1700). The primary unit of work culture system in India is the panchayat, which is the community of elders. Historically, the panchayati raj system germinated a crafts form of entrepreneurship as each village had different occupation-based community groups, all of which specialized in a particular class of crafts or services. The rural

communities came to be the repositories of deeply embedded cross-generational craft insights. With these crafts came another important element of the panchayati raj, traders who specialized in the international markets paved the way for a future of global entrepreneurship. Today numerous grassroots innovations are generally intended to reduce drudgery of children and women and to empower the poor by solving their problems using the resources to which they already have access. The power of grassroots innovation is well depicted in the life of Jagani, a man who dropped out of his village school at the age of 10 due to financial hardship. During this time, the bulls in his village had little fodder in a drought-affected region and the farmers worried how to cultivate their fields. Jagani hoped to help rectify his village's problems with the use of the powerful Enfield Bullet motorcycle. Jagani modified the motorcycle by replacing the rear wheel with a \$450 cultivating device that had attachments for tilling, weeding and sowing. After completing all necessary modifications, Jagani was able to sell his product for much less than other cultivating devices, which can cost up to \$6,000 (Neelakantan, 2005). Similarly, Agrawat saw women pulling water from the well with a rope, and noticed that the bucket would rush back down the well if the rope slipped. He added a lever so that the bucket would stay in place, so that women can catch a breath. Chitagopakar and Harshangi developed a modified stick for the visually challenged, that can sense can sense obstructions with different alarm signals. Saidullah developed a bicycle that not only travels on land, but can also float on water. This helps people easily cross over ponds and rivers (National Innovation Foundation, 2005). These micro entrepreneurs have opened up debate on the ownership of intellectual property rights on the micro innovations.

During the colonial rule (1700-1947), indigenous crafts faced significantly adverse environment. At this same time, the British period opened a window of opportunity for entrepreneurship with global characteristics. The revival of panchayati raj traders specializing in international markets is documented in the work of Ranchhodlal Chhotalal of Ahmedabad, as he took a position as a clerk in the British colonial government in 1842. While working in this position, Chhotalal obtained cost information from London to determine that a local cotton textile mill would be profitable in Ahmedabad. He then found a British investor and a local banker who were each willing to finance 50 percent of the necessary funding. His success motivated the local Hindu/ Jain bankers and traders to set up their own mills (Oonk, 2007).

World War I cut off the supply of finished consumer goods from the British factories and shortage of goods created a demand for rails to support both the infrastructure and transportation needs of the British in the war and allow subsequent British expansion in Asia. This demand offered a window of opportunity to JRD Tata's new iron and steel factory to thrive (Oonk, 2007). However, with the advent of the internet, 'glocal' multinationals have thrived with one friend or family member based in India and another overseas in countries such as the US. Similarly, others have used new technologies or global markets for making local impacts. For instance, an illiterate masseuse, Indu Sharma in Mumbai, bought a cell phone, which resulted in the

expansion of her business and a few hundred percent increase in revenue (Bhatt, 2006). More broadly, global acumen is evident in the success of both the Patel community, who owns 60 percent of the low-end hospitality market in the US, and the Palanpuri Jains community, which owns 50 percent of the world's rough diamond trade (Godrej, 2005).

Emerging entrepreneurs have found new opportunities in global markets. For instance, in the US and Europe, most tractors use high horsepower, as a result of the farms being much larger. After observing the difference between Indian tractors and U.S. and European tractors, Mahindra and Mahindra opened export markets in Africa, South America, South Asia and Middle East. The firm has expanded its parts warehouse and assembly production in the US and the UK, as a means of sourcing more advanced features that create 75 percent of the Western tractors. With a new dealer network in the US and Europe, a new hobby farmer segment (farmers who work on farms during weekends and holidays) was created using lower horsepower models. This resulted in a 40 percent market share in that niche.

The licence raj period (1947-80) witnessed a regulatory framework of impediments and compensation, resulting in the public sector taking command of major investments, while the small scale sector thrived in minor investments. The communities benefited from the public sector enterprise as it offered critical infrastructures and capital goods, while the small enterprise was assured profitable supply and demand linkages. To regulate the larger private sector's initiatives, the law required approvals for both establishing a new manufacturing unit and for expanding its capacity by more than 25 percent over a five year period. The larger private sector was forced into a race to obtain licences in whatever domains it could. For instance, Birlas evolved into a quasi-public company with major shareholdings that extended into many businesses in metals, textiles, cement and fertilizers. Birla operated according to its philosophy to pursue any business it could obtain a licence for and many of the group's companies became highly fragmented. For instance, its copper company, Indal, owned both a copper smelter and a fertilizer business.

Under the regulatory regime kisan or farm entrepreneurship and jawan or defence entrepreneurship thrived. Consistent with these two patronages, jai jawan jai kisan became the political motto of the era. Farm entrepreneurship was the basis of Green Revolution, whereby India left behind the famine of the mid-1960s. In this endeavour, the state-supported farm R&D and financing, while the US-style extension networks built the capacity of the farm entrepreneurs to make the nation self-sufficient in food grains. Second, the state supported borrowing of defence and allied informatics, transportation and space technologies from overseas and the development of local versions by extending capacity building to private entrepreneurs. Common to both forms of entrepreneurship was the principle of supporting and assembling a network of smaller entrepreneurs. This principle of extension is visible in another emerging form of entrepreneurship in India

Licence raj had trained a large army of educated professionals through its army of public sector firms, government R&D laboratories and technical colleges. However, they lacked the capacity to utilize the individuals in the developmental process. This led to the emergence of two forms of entrepreneurship during the early 1980s, hardware dealers and designers and software developers. The rule of the game in this phase was finding creative short-term workarounds and then building capacity. Many small entrepreneurial firms began importing and assembling Korean and Taiwanese computer kits by exploiting their market reach and knowledge. Large entrepreneurial firms hired professional talent to build their capacity to compete on designs. As a result of such initiatives, a wide range of industries, even the smaller firms, began to offer custom designs and complex solutions over time. With these new opportunities, a small but growing percentage of engineering and management cadres moved into many entrepreneurial ventures.

In the liberalization regime, many firms began hiring professionals to construct capacity for participating in the national automation projects. For instance, the government helped to link these professionals with the American MNCs, while offering a captive infrastructure support to others. Closer alliances with the US firms allowed the Indian entrepreneurs to shift the higher cost systems analysis and design work to India. Conversely, the low-skill programming, which involved short-term client interactions, was retained onsite in the US. All this inspired numerous ancillary ventures in entertainment, media, transportation, hospitality and infrastructure. The internet gave rise to several big Indian portals and mid-sized challengers with specialized offerings, startups and uncounted casualpreneurs (those with full-time day jobs who created India centric web products in their spare time using internet advertising developed as a result of the internet (Ranjan, 2006).

The growth of entrepreneurship in the country's global bio-tech industry is documented by McKinsey Consulting in respect of clinical trials sector. In the West, if there is a disease, firms search for New Chemical Entities (NCEs) that would cure and then patent them. In India, many entrepreneurs use software capabilities to scan for all non-patented NCEs, patent what they discover and finally license them to Western firms for further analysis. Also, many entrepreneurs are venturing into modifying NCEs and discovering new forms and new drug delivery systems. Hepatitis B was priced by the US drug companies at \$50 per day of dose. Shantha Biotechnics developed the drug with less than \$1 million investments over a five year period and was marketed for \$5 per day of dose (Varaprasad, 2011). India is thus evolving from the world's software programmer to the world's back office where service intensive business processes are performed to the world's laboratory where the quality and availability of knowledge workforce make the cost of risk-taking very affordable for companies around the world.

During the current phase, many MNCs emerged as an important influence on local

entrepreneurship and transferred older technologies and product designs, while pushing them using attractive consumer credit. They offered higher compensation to lure away experienced employees. Consequently, the survivalist form of entrepreneurship became pervasive as many were forced to form micro-enterprises. These enterprises had limited life span and produced serial opportunistic ventures. For example, if a paint factory underperformed, the entrepreneur opened a paint shop; if that too failed, he may move into the real estate business. The entrepreneurs are giving eyes to the previously invisible resources and opportunities. For instance, Aravind Eye Hospital, with a mission to provide quality healthcare to the needy has grown to be the largest provider of eye care services in the world. On average, it treats two free patients for every one fee paying patient. It charges only \$20 per eye surgery, compared to \$2000 in the US and has a success rate comparable to that in the US, while still generating 40 percent operating margins. (Neumann and Greenberg, 2012).

To conclude, a pattern of entrepreneurship, distinct from early Japanese and Chinese styles appears to be emerging in India. The Japanese model of entrepreneurship was based on the use of globally discarded materials and manpower; conversely, the Chinese model has been based on the cost-effective use of earlier generation's global machinery and methods. The emerging Indian model is based on the making of the next generation's products and services accessible to the grassroots (Pralhad and Hammond, 2002) and creating new products and services by leveraging the intellectual properties of the grassroots. It may not be feasible to fix knowledge paradigms in the communities as the patterns of poverty, terrorism, migration and other exogenous factors may have acted as bottlenecks. It becomes paramount to acknowledge the potential of diverse families and groups within a community (cultural entrepreneurship). Thereafter, the community may be involved in specific value-adding activities (value-adding entrepreneurship). Extension networks may then be formed to broaden and deepen the participation of the members of the community, through targeted support (extension entrepreneurship). Several communities across international boundaries may then be linked together for mutual exchange (glocal entrepreneurship). This will strengthen knowledge and build the capacity of the isolated communities to solve their grassroots challenges (grassroots entrepreneurship). In this regards, India may be adopting what Bagchi (2005) underlines the development and exchange of culturally-embedded grassroots know-how, which requires an institutional framework acknowledging the rights of communities to these grassroots intellectual properties toward innovative entrepreneurship.

9.8 Development of intrapreneurship

Intrapreneurship involves taking ownership and operating with an entrepreneurial mindset. In the corporate context, since the person leading the reinvention is not an autonomous entrepreneur, he/she is more appropriately referred to as an intrapreneur. It is very unlikely that reinvention at any level can occur without this basic transformation of perspective from

employee to psychological owner or intrapreneur. Intrapreneuring is not a path that is chosen by the vast majority of people in any profession since this path involves a lot more of the person than would be the case for a person operating with an employee mindset. However, the reason it is important is that it is challenging, fulfilling, personally and professionally rewarding and is required by corporations to thrive. The importance arises of innovation across the organization (as opposed to centralized innovation) as one of the important strategies for long-term marketplace success. There is a strong relationship between innovation and employees taking on psychological ownership of the company's growth thereby manifesting entrepreneurial behaviour (Seshadri and Tripathy, 2006). Since this is done within the framework of a large organization rather than as an autonomous entrepreneur, it is more appropriate to look at these innovators as corporate entrepreneurs or intrapreneurs (Pinchot, 1985). Intrapreneurism enables employees of an organization to release their passion that often results in generating new avenues for business growth or alternately provides radically different ways of doing existing business. Every company requires new ideas to survive and grow profitably and, hence, it has to find ways to tap the entrepreneurial potential inherent in its employees.

Even if the top management wants to create an innovative and intrapreneurial organization, there is a need for intrapreneurs within the system to execute intrapreneurial innovation. A model of intrapreneurship is presented by Hamel (2002) where, apart from the culture of innovation in the organization that the top management is responsible for creating, there are three other major components of innovation activism (role played by autonomous corporate entrepreneurs), innovation as a capability (whereby people in the organization are trained for innovation) and innovation as a process (which ensures that ideas are progressively developed from imagination to experimentation, assessment, scale-up and reality). The implicit rule in intrapreneurial innovation is 'make a little, sell a little,' 'low risk experimentation' and 'freedom to fail.' This is visible in 3M, the US-based company that has built its fortunes by harnessing the power of its corporate entrepreneurs.

Cost reduction and improved customer focus tend to be the primary objectives of innovation and intrapreneurship. Intrapreneurs seeking to reinvent a company in order to increase efficiency may do so by removing unproductive layers of bureaucratic hierarchy, harnessing the power of technology and proper delegation of authority and power. Another motive may be the desire to provide more value to the customer through intense customer focus. They may develop innovative means of minimizing inconvenience to the customers that would enable them to become companies that are easy to do business with. They may also seek to enhance the company's market image by providing additional features to its offerings. Intrapreneurial innovation serves as the growth engine and helps the company to expand and deepen its core. In its quest for adding capability for producing higher value products, Tata Steel accomplished many new projects by setting up the Cold Rolling Mill (CRM) to manufacture high value cold rolled products for use in the automobile and white goods industry from hot rolled coils. The estimated project cost was Rs. 25 billion with a completion period of 36

months. The company did not have a very strong in-house project implementation team at the time when the project was initially being conceived and this prompted the management to seek out and induct a project manager. The search resulted in the induction of R P Singh who had earlier occupied several senior project management positions in various public sector steel plants and he joined the company as part of the senior management with a special focus on new projects. In 1997, he was entrusted with the responsibility of heading the CRM project implementation.

After taking stock of other worldwide CRM implementations, Singh announced drastic changes in the implementation of the CRM complex. When he put forward his vision to the project team and contractor companies, he was greeted with skepticism. They regarded him as a new entrant whose enthusiasm would vanish once reality set in. Many foreign contractor companies advised Singh that being an Indian how he can create world records in project implementation. While the initial reactions of the project team ranged from polite amusement to outright disagreement, by July 1998, the 400-strong CRM team was behind Singh. The mindset in the group went through many changes starting from 'it is not possible,' to 'it is very difficult,' followed by 'it can be done,' 'it is being done,' and finally, 'it has been accomplished.' This was the result of a number of initiatives undertaken by Singh including creating a new way of thinking and changing work habits, at the same time providing a route map to team members and developing targets for individuals in the team through a process of patient dialogue with team members. Singh succeeded in creating a pervasive sense of ownership and intrapreneurship among the team members energized by a powerful collective vision of creating a world record in project implementation of the CRM. By June 1999, Tata Steel completed the project successfully under Singh's leadership in a world record time of 26 and half months and at the lowest project cost of Rs. 16 billion while ensuring world-class quality. The steel industry was in a downturn at that time which contributed to achieving the lowest project cost.

The company had managed to beat all earlier records set by several other giants in the industry including Bethlehem Steel of USA, Posco of Korea, Siam United Steel of Thailand and Baoshan of China in implementing similar CRM projects. Singh instilled a can do spirit which gradually led to the melting away of a defeatist attitude. Singh would have been a good project manager if he had delivered the project within the board-approved Rs. 25 billion and 36 months implementation time. Instead, driven by a personal vision of creating a world record in CRM project implementation both in terms of cost and implementation time, as well as a personal point of view that Indian project managers are second to none, he delivered the project with records. Singh took on the role of a corporate entrepreneur and completed the project in a record time and cost. At the time the CRM project was being implemented, Tata Steel was in the process of reinventing itself. Consequent to the liberalization of the Indian economy, a process that commenced from the early nineties, the top management had realized that due to a variety of legacy, it either had to reinvent itself or perish. It took the liberalization of the Indian economy as

a challenge. Although the company was still not ready to face the competitors from overseas, steps were taken by it to make it a fighting fit organization to face the new environment.

While a competitive open market may partly be the reason for attempts at innovation by intrapreneurs, there are many examples of companies where even with the threat of extinction of the company at large, there is little intrapreneurial activity in the company and many companies choose *status quo* and gradually undergo a process that Piramal (1998) called ‘ossification.’ Singh came in with a long legacy of working in the public sector. However, sometime after he joined Tata Steel, he set for himself the personal challenge of beating world records in project implementation. He had never in his earlier project management episodes adopted many of the practices and processes that he instituted in the CRM project. Apart from Singh who staked his reputation and credibility in committing to such aggressive implementation plans, the top management of the company also took significant risks in betting on Singh to deliver and allowing him to aim at high targets. While the possibility of failure to achieve these targets was a reality all through the implementation phase, this did not stop Singh and the company from attempting what seemed impossible to most others.

Soon after the completion of the CRM project, Singh was entrusted with the responsibility of revamping Blast Furnace-F. The old furnace had outlived its utility and had to be totally upgraded. Reputed foreign project consulting firms came up with a best estimate of 210 days and a cost of Rs.5 billion. The Blast Furnace is a set of equipment that forms the heart of any integrated steel plant. There are thousands of jobs to be executed in revamping a Blast Furnace involving interactions among dozens of agencies. The impact of every day delay in executing such a project is several millions of rupees for the company. Based on Singh’s recommendation, the board of the company approved a shut-down period of 155 days. After careful evaluation of all the factors, the contractual shut-down period was fixed at 150 days. However, Singh felt that his team could surely do better than this and called for a meeting of all the experts including the key managers of his team, technical collaborators and lead project contractors. After a detailed study, the team felt that the shut-down period of 130 days could be achieved with careful planning and Singh believed that the team could do better than this. After further, the team came up with a stretch target of 110 days for the completion of the project and a project cost of Rs.2.1 billion. The foreign consultants felt that this was not a practical target even by western standards. Jain, the ex-Chairman of Steel Authority of India Limited had expressed his doubts to B Muthuraman. When the project was finally completed in 104 days, Jain attended the inauguration of the new Blast Furnace. In his talk at the inaugural function, he told the audience that the revamping of Blast Furnace- F would normally have taken six months. He also told the audience that while he thought that Singh had started with a good plan, he was sure that Singh would fail in its execution because it was an impossible schedule, since the project was completed in 104 days at a cost of Rs 2.1 billion.

By the time the Blast Furnace–F rejuvenation project was conceived, Singh had already

established his reputation in the company. Singh had earned what Pinchot (1985) termed as 'intra capital' where the intrapreneur earns the right to dream with a daring vision and works to make them a reality and the organization facilitates the achievement of such expansive dreams. The team members had also tasted success in the CRM project and they were ready to win again and follow Singh. After the successful implementation of the CRM and Blast Furnace- F revamp projects, the project management activities at Tata Steel had got into a virtuous cycle. Blast Furnace-G furnace is three times the size of the Blast Furnace-F and the target completion time for this revamp was set at 95 days and the project was completed within this target.

Sometimes innovation becomes a necessity for sheer survival. When Nandji Pandey took over as the chief of Merchant Mill (MM) at Tata Steel in 1997, the worker morale was low and the plant that was over 40 years old in a run-down condition and there were other products from the other mills that needed immediate attention. MM was not on the priority list of the company. Through the nineties, the company had embarked on major modernization. All unviable plants were getting progressively phased out. The company had two Rolling Mills, RM1 and RM2, which supplied feedstock in the form of 75 mm. square billets to the various finishing plants in the company including to the MM. MM converted these billets into steel rods for construction. RM2 was too far from MM and it was logistically very difficult to supply billets from RM2 to MM. Besides, being old, it was also in the process of being shut down. RM1 had to be closed down because it was very old and run-down. The only other source of billets was the Continuous Caster (CC) that produced billets with a square cross section in two sizes: 100 mm and 127 mm. The foreign collaborators and equipment suppliers who installed MM many years ago were consulted regarding the possibility of using 100 mm. or 127 mm. square billets as raw material for MM. They made it clear to the company that the design of MM would not allow the use of such large-sized billets in place of the 75 mm. square billets for which it was designed without a significant additional investment for revamping the entire plant. The top management of the company saw no merit in making any further capital investments in a rundown plant like MM. The foreign consultants, therefore, suggested that there was no alternative but to close down the MM and sell off the assets to any willing buyer.

With the intention of selling off the plant, the top management identified a prospective buyer who visited the plant to take stock of the machinery. As the prospective buyer was being taken around the plant, Pandey informed him that the plant was not for sale and that his team would make it profitable. To the workers who had gathered around him by this time out of curiosity to see what the commotion was all about, Pandey told implored them to make the plant profitable. Pandey set about motivating his team, encouraging them to come up with their best ideas so that they could run the plant using the larger square billets in place of the earlier 75 mm square billets, without additional capital expenditure. The team came up with several ideas and implemented them systematically without requiring any significant incremental investment. Whatever minor investments were needed for implementing these ideas came from the revenue

budget of the mill. The steps taken included frequent and thorough maintenance, changing the design of the hydraulic pushers to take care of the large-sized billets, changing entry and exit guides to the furnace, improving mixing of fuel gas and air in the burners to create better swirling effect and improving the material handling and logistics in the plant. Important was the change in the mindset of the workforce and inculcating a can-do attitude among them. The average production of the MM plant was in the range of 300 to 500 tonne per day for several years before Pandey took over. Owing to the many steps taken by him to motivate his team, the production by December 1997 reached record levels of over 1,300 tonne per day. This was a major turning point for MM and demonstrated the mill that with focus, determination and teamwork, it was possible to make it economically viable. In the case of MM, necessity had literally become the mother of reinvention.

Pandey had managed to improve the efficiency of both man and machinery. The objective of innovation was to bring in higher volumes without incurring significant incremental investments. This prompted the top management of the company to comment that the capacity of a plant is only in the minds of the people running them and not on the nameplate of the plant. The key to the successful turnaround of MM was the powerful vision of the intrapreneur as well as his ability to mobilize the entire team of 400 dis-spirited workers to rise up to the challenge before them and work towards turning around the plant by working in an entrepreneurial mode. MM has achieved record production levels crossing 300,000 tonne per annum in the early 2000s, up from about 95,000 tonne per annum in 1995.

Indian Steel Wire Products Ltd., Jamshedpur was earlier closed for over eight years. Recently through a court order, it was transferred to Tata Steel as its wholly-owned subsidiary. Pandey's intrapreneurial efforts have borne fruit in this plant as well and within months of the takeover of the company by Tata Steel, it achieved its rated capacity. The company has since been continually bettering its performance, achieving record production levels. Pandey addressed meetings on the shop-floor to celebrate achievements. His manner of speaking, the sincerity, the language and the choice of analogies were down-to-earth and appealing to the semi-educated workforce. He led the battle from the front and even met each one of the 400 people in the MM plant during the first few days of his taking over. The sincerity of his approach and his ability to transmit his vision of the plant to each of the workforce and make them take the ownership of this vision were powerful enablers in his efforts. Whenever there was any significant achievement by anyone in the plant, he made it a point to acknowledge the contribution of the people who made it possible. He would do this by calling for an impromptu meeting on the shop-floor to recognize the contribution. For any record that was broken or bettered, he would ensure that the achievement was genuinely celebrated through various means such as distribution of sweets to the entire team.

Apart from a direct face-to-face communication with the workforce on every possible

occasion, Pandey would also send written messages in his Hindi to each one of the 400 members of the team. He also innovated by unleashing the women power involving the wives of the workers in his vision and calling upon them to provide the emotional support to their husbands to achieve higher targets. In this manner, the targets became targets not only for the MM team but also for the families of the workforce. He created an atmosphere where winning became an addiction for the team. His intrapreneurial skills lay in making people closer to the machines people who intimately knew the equipment to innovate in many small ways that resulted in the rebirth of the mill. When the top managers of the company sent messages congratulating him on the progress being made in the plant, he would ensure that individual copies of these messages were given to everyone of his team. He would conduct unscheduled meetings daily encouraging the employees to achieve even greater heights.

However, resource constraints and time pressure bring out the best of intrapreneurial innovation and this includes freedom to induct or remove any member of the team and freedom to select suppliers. This is what Hamel (2002) refers to as an open market for talent. The management needs to recognize, mentor and encourage people who demonstrate intrapreneurial traits. The management's inconsistent, intermittent or lack of commitment can kill the intrapreneurial spirit of the employees. Also, a high manpower turnover due to poor human resources policies or a rigid or myopic approach by the top management can hurt the intrapreneurial process. Some companies simply lack the courage to accept failures and instead penalize employees for failures. These include companies that have an aversion to risk and want to play safe due to ingrained corporate dogmas, limited exposure of the company's leadership and its inability to comprehend the realistic situation.

Over 80 percent of the R&D done in India was financed by the government of India and conducted within government research laboratories (Forbes, 1999). Much of this was in the strategic sectors of atomic energy, defence and space research, resulting in some of the most advanced capabilities in these areas. The government created a network of laboratories under the aegis of the Council of Scientific and Industrial Research to do work of relevance to industry, but the links of these laboratories with the industrial sector remained limited and such technological capabilities created remained largely confined to the laboratories themselves. An effort was made in the early 1970s to formulate a national science and technology plan that would dovetail with the economic planning process and help integration of the government's technology development efforts with industrial development, but this was short-lived. Starting in the later 1950s, the central government created a strong infrastructure of institutions of higher technical education. At the state-level, many governments created and funded government colleges of engineering and private involvement in higher technical education was limited and restricted to a few states that experimented with capitation fee colleges. The IITs recruited good faculty who had obtained doctoral degrees from the United States and provided a good environment for

academic pursuits. The quality of IIT education is excellent, the research output from its faculty good but not outstanding but, as in the case of the national research laboratories, IITs had limited interaction with Indian industry. IIT graduates found few opportunities to use their technical knowledge in the industrial sector and tended to emigrate in large numbers, principally to the United States.

Those that stayed behind went into the government research establishments or to management positions in the private sector. By the end of the 1980s, India had perhaps the strongest scientific and technological infrastructure among developing countries, but little benefit of this was accruing to the industrial production system. The economy was largely stuck in the historical Hindu rate of growth of about 3.5 percent and India had fallen significantly behind countries such as Korea and China that at one time had comparable per capita incomes. Before liberalization, the government's involvement in support for R&D and technological innovation was largely through the direct funding of government research laboratories and establishments. While R&D in some public sector industrial enterprises received budgetary support, there was no direct funding of R&D in the private sector. R&D in the private sector was supported indirectly by a scheme of recognition of in-house R&D units of companies that allowed procedures for the import of capital goods and other inputs required for R&D and income tax concessions. The programmes support the absorption of imported technologies by industry, develop and demonstrate indigenous technologies, help individual innovators to become technology-based entrepreneurs and commercialize indigenous technologies. There are also programmes to support collaboration between technical institutions and industrial enterprises. In addition to these horizontal support programmes, there are programmes targeted at specific sectors such as drug development and instrumentation. The large government scientific agencies in the atomic energy and space programmes have programmes to involve industry in developing technologies and products for their programmes as well as commercializing spin-offs. Another initiative is the New Millennium Indian Technology Leadership Initiative to attain a global leadership position in selected niche areas by supporting scientific and technological innovation. In spite of these support measures, the national expenditure on R&D remains at around 0.8 percent of GNP after dipping to 0.7 percent in the mid-1990s. However, private sector industry's share of national R&D expenditure has gone up from 13.8 percent in 1990-91 to 23.6 percent in 2006-07. While the government's investment in R&D has not kept pace with the growth of the economy, the private sector's investments have clearly been increasing at a much higher rate.

9.9 Innovativeness in different frontiers

Brush (1952) points out that India has been a major leader and exporter of pig iron in spite of World War II, but in respect of steel production, it lacked the technology and had to import one third of its requirement. With severe restrictions on FDI and thereby technology adoption, coupled with the licence raj, India was not able to emerge as global leader in iron and steel manufacturing for long. It was only after the liberalization regime in 1991 that foreign

collaboration and new technology absorption became possible. Moreover as Giriappa (2003) remarks, the Indian iron and steel making are relatively high energy intensive (consuming 7.5 to 13 giga calories of energy per tonne) as compared to less than 5 giga calories in Japan and other advanced countries. However, recent energy conservation measures have greatly reduced energy intensity in the industry and the country is slated to be number two producer after China in the near future.

India could not cope with the technological change satisfactorily in the field of iron and steel making. While India's adoption of sophisticated steel making technology was almost at the same time with many developed and rapidly industrialized countries, it could not achieve the full benefits due to improper assimilation. In spite of abundance of iron ore and many other raw materials and availability of cheap labour and a large pool of technically qualified people, productivity of Indian steel industry remained low. The major bottlenecks were protectionism and administrative control over prices and distribution. Till India adopted the liberalization policy in 1991, steel industry was not able to grow. Inadequate technology policy, less emphasis on R&D, government bureaucracy and poor socio-economic background are reasons for which the steel industry could not attain technological advancement. With adequate ore and other raw materials, a good technology base and a well-framed technology policy, India can become highly competitive in iron and steel making in the global scenario.

India's use of basic oxygen process is 54 percent and it is comparable to many leading steel manufacturers in the world like United States and Republic of Korea. It is better than Mexico and Egypt. However, 14 percent steel is still produced using the obsolete Open Hearth Process in India. This has reduced the overall competitiveness of Indian steel manufactures in the global platform. Out of the major steel producers in the world, only erstwhile USSR countries still use Open Hearth furnaces for making 33 percent of its total production, followed by India (14.3 percent) and Peoples Republic of China (4.9 percent). As regards the use of Electric Arc Process, which is 32 percent, India is placed in the middle. While all 9 integrated steel plants are operating at their total capacity, only 67 Electric Arc Furnaces are working out of 184 and these are operating at 60 percent of their total capacity. EAP has lower capital costs, greater production flexibility, lower environmental impact and more efficient small-scale operations. Some of the important reasons for the reduction in the use of EAP include the requirement of high quality scrap and its vulnerability to rising prices. The quality of steel produced using BOP can attain much higher quality at reduced cost as compared to EAP route. Many large manufacturers now-a-days are producing special steel items, where many of those items were being produced earlier by smaller units. Large units get the advantage of economy of scale. The high cost of electrical power is also a reason for switching over to the other processes from EAP. Due to up-gradation of technology from EAP to BOP, many of the Electric Arc Furnaces became idle. Because of the government policies of reserving the development of new integrated steel plants to the public sector, many EAP-based smaller units were closed down

Developing economies need to import many technologies from developed nations (De, 1999). After 1950s, many steel producers went for technical collaborations and many public sector steel plants were built with collaboration from countries like United Kingdom, Germany and erstwhile USSR. In earlier years, many of these plants faced problems in their collaboration projects. Due to elements of secrecy and other reasons, India had to deviate from what considered suitable by the countries aiding the project. Indian Iron and Steel Company (collaboration with British, Soviet and Japanese firms), Rourkela (collaboration with West Germany), and Bokaro (collaboration with Russia) had many teething problems during execution of the projects (Krishnamurthy, 1987). Hence, most of the state-owned plants and some private ones have gone for large capital-intensive modernization programmes, mostly with foreign collaborations.

In the case of new plants, the electrical power consumption has been higher than many other countries. New plants in India consume an average of 450-575 kwh/tonne of billet in EAF, whereas the figures for Japan, Germany and USA are 378, 410, and 430 respectively. Heating time is more as compared to that of all the six countries mentioned in the table. The furnace size used in India is also relatively small as compared to other countries. The cost of major raw materials like iron ore, coking coal, and other raw materials is less in India among the countries mentioned. The labour cost is low, but it is neutralized by its low level of productivity. The financial cost and the cost of power, oil and some other materials are high. Energy accounts for about 35 to 40 percent of the cost of steel production in India, whereas it is about 28 percent in the developed countries (Das, 2008). All these make the pre-tax cost of steelmaking in India higher than that of South Korea, Australia, Mexico and CIS countries. Considering the low wage rate and other economic factors, the labour cost in India is around 15 percent of the cost of the steel as compared to around 30 percent in many developed countries like Japan and United States. In spite of these advantages Indian firms could not become cost-effective. Because of liberalization, licensing requirement for capacity creation has been abolished and steel industry has been removed from the list of industries reserved for the state sector. Automatic approval granted for foreign equity investment in steel has been increased up to 74 percent. Price and distribution controls were removed from 1992 and restrictions on external trade, both in import and export, have been removed. Import tariff was reduced from 105 percent in 1992-93 to 30 percent in 1996-97. Other policy measures adopted included convertibility of rupee on trade account, permission to mobilize resources from overseas financial markets and rationalization of existing tax structure.

India has adopted IT Mark Three (iron making technology mark three), a unique technology developed and owned by Kobe Steel Limited, Japan for smelting iron ore fines using non-coking coal to produce premium grade iron in the form of nuggets. Unlike traditional technologies of iron making, this process represents a revolutionary change in the way iron is made and in the product quality. This is a new source of iron particularly, for electric steel

making (Das, 2008).

There was expansion of the steel sector after the economic reforms. The new entrants and the existing manufacturers went for technical tie-ups with leading steel producers of the world. For many decades since independence, the steel industry in India grew in protected and controlled environment with administrative control over prices, distribution and allocation of imports resources and high tariffs. The productivity levels of state-owned large integrated steel plants remained low and on the other hand private sector firms were deprived of many of the opportunities to grow. Due to inadequate growth of infrastructure sectors, the overall demand of steel remained low. In 1996 the per capita consumption of steel in India was low when compared to western countries. Import of certain types of steel products due to liberalization has further reduced the demand of in-house steel products. India took a long time to develop its first technology policy in 1958. It lacked direction during the early formative years after independence. The next notable technology policy came only in 1983 but could not generate the desired thrust for a sustainable technological growth (De, 1999). The low level of R&D expenditure by steel manufacturers has impact on the technological growth of steel sector. Except a very few companies, the overall focus on R&D is too low. In 1997-98, Tata Steel and Reliance spent only 0.14 percent and 0.29 percent of their sales value respectively on R&D.

Some of the major problems in this under-development include inadequacy of knowledge and skill to exploit the results and lack of confidence in the successful exploitation of the projects on commercial basis. Bureaucratic efficiency, controls of royalty, inadequate price of technology, import restrictions are some of the major impediments considered serious by the technology suppliers (Desai, 1998). Impact of poor infrastructure like high cost of electrical power, poor reliability of the availability of electrical power, inadequate transport facilities and less-developed logistic network decelerated the growth of steel industry. Further, the manufacturing industry was not able to provide adequate technological support to steel sector. The steel manufacturers had to import many of their equipment besides technology. Cumbersome procedures to comply with the series of statutory requirements and the corresponding poor efficiency of administrative machinery retarded the growth of steel industry. Technical aspects like high alumina content in raw materials, adverse alumina to silica ratio in iron ore and high content of ash in coal increased the cost of production. In medium and smaller size steel producers, initial high cost of adoption of newer technologies is also a major barrier to their technology adoption.

India produced nearly 67 mt steel in 2010 and aims to produce 100 mt in the near future to become, after China, the second largest steelmaker. To do this, India benefits from large iron ore reserves, especially of high-grade hematites, which presently constitute the largest amount of the local consumption as well of the exports. For the future, however, it will be necessary to beneficiate the large reserves of lower-grade iron ores, especially the magnetites. India also has very large coal resources but mainly in non-coking coal, and often with high ash content. The

Indian iron and steel industry has to choose between: the conventional route based on the Blast Furnace and Oxygen Converter, which implies increasing the imports of high-grade coking coal, mainly from Australia. Various routes are also available based on local Indian coals like Corex or Finex processes to produce liquid hot metal or direct reduction processes, based on natural gas or on local coals, mainly in rotary kilns or based on coal gasification processes. Another feature of Tata, Essar and Jindal is their development outside of India, which means the control of some 18 mt steel/year.

The best example of a company that has transformed itself into a globally competitive organization is Tata Steel. One of India's oldest companies, its future viability was in doubt at the onset of liberalization as it had outdated processes, a large workforce and an inward-looking mindset. However, by 2001, it had been ranked number one in a survey of steelmakers conducted by World Steel Dynamics, a US-based research firm. While its main advantage came from historical and locational advantages such as ownership of low-cost iron ore and coking coal, it was number two in terms of operating costs. This transformation came about as a result of nearly ten years of concerted effort to control costs, improve operational efficiency, modernize the plant, develop a high margin downstream product mix and increase labour productivity. Introduction of a flatter structure (only three levels against the eleven existing previously) in new parts of the plant, in-house fabrication of specialized equipment, and a shift to an external focus on the customer were important managerial decisions adopted by Tata Steel in becoming a global leader. Raw material consumption efficiency improved from 4.81 tonnes per tonne of saleable steel in 1990-91 to 3.71 in 2000-01 and labour productivity improved from 79 tonnes of saleable steel per man-year in 1995 to 189 in 2001 (Kanavi, 2001).

Tata Motors (formerly Tata Engineering and Locomotive Company) progressively diversified into the design and manufacture of passenger cars in the 1990s. Starting with products derived from their light commercial vehicles, the company launched a small passenger car, the Indica, to compete with small cars produced by Maruti Udyog (then a joint venture between the Indian government and the Suzuki Motor Company of Japan), Hyundai and Daewoo. The car was a success in the market and has established Tata Motors as a significant player. The company has subsequently entered into an arrangement whereby the car will be sold under the Rover brand name in Europe. Another vehicle manufacturer, Mahindra & Mahindra has launched a new sports utility vehicle, the Scorpio, which is competing successfully with vehicles from Tata and Toyota.

Other prominent loci of product innovation have been the two-wheeler industry and the pharmaceutical industry. The Indian two-wheeler industry is one of the largest in the world and has grown at a compounded annual growth rate of 10 percent in the last seven years, caused by a rising demand for affordable personal transportation. In this industry, product innovation and frequent product launches has become the key to competitive success (Krishnan and Prabhu, 1999). One of the most successful companies has been the TVS Motor Company, which was

formerly a joint venture between the TVS group and Suzuki Motor Company. Even before it broke the joint venture with Suzuki, the company had developed a stream of successful mopeds and scooterettes (Krishnan, 2001). It has launched the Victor, one of the successful motorcycles that have sold more than 600,000 vehicles since its launch in 2001. Other two-wheeler companies like Bajaj Auto and Kinetic Motors have also launched products designed and developed in-house.

Companies like Tata Motors, Mahindra and Mahindra and TVS Motor have backed up their efforts in design and engineering by major investments in plant and machinery to produce their new products in large volumes with the latest manufacturing practices. They have all demonstrated a production capability, an investment capability and an innovation capability (Dahlman et al, 1987). Their innovation capability centres on understanding user needs, conceptualizing distinctive products to meet these needs, system and industrial design and system integration. They have outsourced technologies and designs for sub-assemblies but managed the integrity of the design and the product.

Tata's Nano uses a modular design that enables a knowledgeable mechanic to assemble the car in a suitable workshop. Tata can outsource assembly to independent workshops that can then assemble the car on buyers' orders. This innovation not only removes costly labour from the manufacturer's side but also allows for distributed entrepreneurship on the dealer's side. Further, the low cost of the Nano comes from a combination of its exclusion of frills and luxuries and its inclusion of numerous lighter components, from simple door handles and bulbs to the transmission and engine parts. The lighter vehicle enables a more energy efficient engine that gets about 28 kms per litre. Moreover, the Nano's novel design incorporates a much smaller footprint at three metres long and it is one of the shortest four-passenger cars on the market, yet it allows for ample interior space.

The Indian pharmaceutical industry has been one of the high performance industries of the 1990s. About one-third of its 2002 production of \$5.2 billion was exported to other countries. Among the ten entities based in India with the largest number of US patents. These pharmaceutical companies are seeking to move from imitative research and reverse engineering to the discovery of new molecules and drug delivery systems. The average R&D intensity of large Indian pharmaceutical firms is 2 percent (OPPI, 2002) but the R&D intensity of these innovative firms is substantially higher. Joint R&D initiatives with multinational drug companies, licensing of new discoveries to MNCs, sponsored research projects at national laboratories with government support and the creation of international marketing networks in the hope of future exploitation of such networks to sell newly developed novel drugs are some of the developments in this area. One of the most successful pharmaceutical companies has been Dr. Reddy's Laboratories Ltd (DRL). Starting a full-fledged R&D laboratory in 1992, DRL invested about Rs.1.12 billion in R&D over an 8-year period. It filed 55 US patents of which 19 have

been granted. It licensed three molecules to foreign drug firms (two to Novo Nordisk and one to Novartis) for revenue of \$8 million till 2001 (Business Today, 2001) and increased its R&D intensity from 5.5 to 8 percent. Ranbaxy, Cipla, Wockhardt and Sun Pharma are some other pharmaceutical companies with ambitious new drug discovery programmes.

The evolution of innovation capabilities in the two-wheeler and pharmaceutical industries has been driven by regulatory changes, demand conditions, competitive forces and entrepreneurial initiative. While both have been high growth industries, regulatory changes have played an important role in the two-wheeler industry, stringent new emission norms required up-gradation of products and since sourcing new designs from outside India would be too expensive, companies created their own designs. In the pharmaceutical industry, the changes in the patent laws following the government's acceptance of the WTO agreement put pressure on companies to move away from imitative research. In the two-wheeler market, the need to be able to differentiate products in the marketplace has influenced the creation of innovation capabilities. Both the two wheeler and pharmaceutical industries have also had visionary entrepreneurs who were willing to make the investments and take the risks involved in creating and launching new products. These entrepreneurs became role models for the other companies in the industry. Many of the companies that have demonstrated innovative capabilities in the 1990s had a tradition of innovative behaviour even pre-liberalization. For example, Tata Motors successfully developed and launched a range of light commercial vehicles in the 1980s to combat the entry of Indo-Japanese joint ventures in the market. The company invested resources in the development of a strong engineering capability even at a time when due to regulatory constraints they were unable to leverage this in the market. Similarly, the TVS group's efforts at designing two-wheelers go back to the late 1970s when they launched a two-wheeler moped, the TVS 50. For these companies, liberalization allowed them to use their own technological capabilities, fill gaps through imports and integrate these abilities with understanding of the market to launch successful products. In the pharmaceutical industry, government support and links with government research laboratories have also facilitated the process of innovation.

To turn to the patent regime, which specifies the intensity of innovativeness, CSIR laboratories filed 310 Indian patent applications in 1998-99 against 120 in 1987-88 and were awarded 133 Indian patents in 1998-99 against 76 in 1987-88. More impressive was the increase in patents filed abroad from 11 in 1987-88 to 112 in 1998-99. While no international patents were granted in 1987-88, the CSIR was awarded 38 international patents in 1998-99. External cash flows had reached Rs. 2040 million in 1998-99 with about Rs. 370 million (18.1 percent) coming from private industry and Rs. 150 million (7.3 percent) coming from foreign sources (CSIR, multiple years). Some CSIR-specific policy changes facilitated this transition. Following a review in the mid-1980s, the CSIR adopted a target of achieving at least one third of its revenue from sources outside the government (Krishnan, 2002). This target was implemented with effect from 1989, but laboratories took the target more seriously after the onset of economic liberalization. The government also created a proxy for profitability by allowing laboratories to

retain net earnings from externally sponsored projects in a separate laboratory reserve fund with the laboratories being given greater freedom to spend the proceeds from the laboratory reserve. Economic liberalization also created an environment in which laboratories could target customers outside India and also obtain contract research projects without being accused of violating their mandate (Krishnan, 2002).

The most prominent case of a laboratory that was able to reorient itself taking advantage of the policy changes was the National Chemical Laboratory (NCL) (Krishnan, 2002). NCL succeeded in transforming itself into a global R&D platform, both licensing technologies and undertaking contract research for multinational corporations. The NCL leadership found that contract research allowed them to overcome the problem of having to provide complete production technologies, a requirement of Indian companies. This in turn avoided the need to set up pilot plants, scale-up technologies or provide performance guarantees. NCL became the trailblazer in obtaining US patents, accounting for more than 90 percent of the patents obtained by the CSIR and propelling the CSIR to the position of the largest holder of U.S. patents from India. To make this transformation, NCL's top management made a number of organizational changes including the creation of separate business planning and scientific information system divisions, medals for obtaining U.S. patents, awards for technology development and support functions, and a scheme to support kite-flying ideas from scientists. To fund the awards, a separate NCL Research Foundation was created using funding obtained from well wishers of the laboratory. The revenue from sponsored projects at the IIT Kanpur, one of the top engineering schools, has increased tenfold while the consultancy income has gone up about sixteen times between 1993-94 and 2002-03. In IIT Madras, revenue from sponsored projects increased 3.5 times and that of consultancy projects almost doubled over the same period, though from a larger base. Indian software companies entered the industry by providing low-cost, skilled manpower to clients in developed markets. To start with, this manpower provided labour at the customer's site, typically under the direction of an external consultant or the firm's own information systems department. Starting with low value adding jobs like maintenance and testing, the software companies graduated to reengineering existing pieces of code to new operating systems and platforms. Demand for the latter was created by the shift of users from mainframes to client-server systems. In the years immediately preceding 2000, Indian software companies obtained many projects to solve the Y2K problem (Arora et al, 2001). The internet and e-commerce explosion helped companies graduate to large-scale coding assignments that actually developed new applications. Simultaneously, Indian software companies developed good project management and quality processes that enabled them to manage large projects whether at the customer's site or back in India (offshore) at their own development centre. The declining cost of telecommunication links and the wide diffusion of the always on internet combined with the good track record of the companies have led to a steady increase in the proportion of offshore revenues (Nasscom, 2002).

9.10 The predominance of software industry

The success of the Indian software industry (the lead goose) can be attributed to factors on both the demand and supply sides. Globally, large corporations are under pressure to reduce their costs and yet exploit the potential benefits of advances in information technology. They have moved toward operating models that allow them to concentrate on areas of their core competence and outsource other activities. Indian software companies built on a strong human resource base to create organizational processes to quickly absorb new technologies and ramp-up internal delivery capabilities in a short time to meet customer requirements and at the same time ensure on-time delivery at an acceptable level of quality. Using cost arbitrage as an entry strategy in an emerging business, they opportunistically expanded their business, at the same time building more sophisticated organizational capabilities within (Athreye, 2002). Their growth was facilitated by the fact that the software services model does not involve irreversible commitments on specialized resources and that the basic skills required are fairly generic (Krishnan et al, 2003). The persistent gap between demand and supply allowed for greater experimentation by firms to find the right business model and also prevented a downward spiral in rates (Athreye, 2002).

While it cannot be claimed that the software industry is a policy-driven success, it played an important role in the 1990s through the exemption of software industry export profits from income tax and the setting up of Software Technology Parks that allowed companies to have the regulatory benefits of an export promotion zone irrespective of their location. The early employees of the software industry came from scientific research organizations and some public sector enterprises that had good computer infrastructure such as Hindustan Aeronautics or Bharat Electronics. This was due to the fact that these organizations were the ones that had an installed base of state-of-the-art computers and therefore also had people who were skilled at working on computers. Subsequently as the number of computers in the economy grew and so did the number of formal education programmes training people in computer science or engineering, the need for people from the laboratories declined. Companies also created their own training programmes to convert raw engineers into programmers.

Compared to manufacturing, software development has limited spillovers to the rest of the economy (Arora and Athreye, 2002). However, the growth of the Indian software industry has had a number of indirect benefits to the Indian economy. Software companies were among the first Indian companies to raise capital internationally and be listed on foreign stock exchanges such as NASDAQ and the New York Stock Exchange, thereby raising capital internationally. They set new standards for corporate governance, adopting US GAAP and became benchmarks for disclosures. They also introduced US-style employee ownership plans (through the creation of stock options) to the Indian corporate environment. Compared to traditional Indian organizations, they are more egalitarian and less hierarchical. Indian software companies also succeeded in converting the made in India label from a liability to a source of

competitive advantage. This has enabled the creation of an IT-enabled services industry centered on business process outsourcing, call centres and other remotely-provided services. This reputation also facilitated the movement of higher-end R&D services like chip design and engineering services to India and some MNCs have also started locating multi-disciplinary research and development centres in India. Prominent among the latter is the John F. Welch Technology Center set up by General Electric in Bangalore.

Indian software companies have also provided role models for entrepreneurship. Three out of the top five software companies were started after 1980 by individuals who were not from Indian business families. They have therefore communicated a message that there is no need of a family business background to be successful in business. Their success and the status enjoyed by their founders have attracted many persons to start new ventures. The maximum impact of this could be seen during the dot-com boom. The southern states of India that have been at the forefront of the growth of the software industry have displayed entrepreneurial leadership in governance. They have also been pioneers in e-governance. The software industry has made direct contributions to local governance and the Bangalore Agenda Task Force, an industry-government joint initiative renews the city's urban infrastructure and private foundations have created civic facilities and spread primary education.

The software industry also attracted international venture capital to India and has been responsible for annual flows of upto \$1 billion. Many international investors came to India because of the software industry and it thus became the conduit for flow of international capital to India. About 70 percent of the venture capital coming in to India is estimated to have gone to the software industry (Nigam, 2001). The software industry has used its influence to play a role in creating policy changes such as changing the norms for venture capital, international listing and the acquisition of companies outside India. The software services sector has attracted India's best talent and spurred a tremendous growth of technical education, much of it in the private sector. A sizeable computer and software training industry has also evolved in the shadow of the software industry. The software industry has created more than 500,000 jobs in addition to providing a steppingstone to hundreds of software professionals to immigrate to the United States. The software industry, with its strong export orientation, has developed limited links with the local manufacturing industry. This is partly a result of the fact that export contracts are much more lucrative for the software industry. However, it is also a result of the limited sophistication of the Indian manufacturing sector's information technology infrastructure. The high cost of domestic telecommunications services (until the recent decline in the wake of telecom industry deregulation) and the low penetration of the internet have also prevented manufacturing companies from taking the benefit of networking their IT infrastructure.

9.11 Conclusion

While Indian companies are globally challenged, they have to find ways to continually

reinvent themselves through widespread innovation. Companies have to re-skill at all levels in order to meet the challenge of value creation and this re-skilling may facilitate in the creation of a innovative culture. Process-related challenges and mindset changes are to be properly comprehended. The starting point for innovation is innovation in the educational sector and a fundamental retooling in the educational system would be required to successfully exploit global opportunities. Focusing on the intrapreneur, there are factors that are relatively more under control and others that are relatively less under the control of the intrapreneur. What drives every intrapreneur is a clear sense of purpose or mission of life. Another important prerequisite for effective intrapreneurship is communication with stakeholders. Finally, the image of the intrapreneur in the perception of the people who matter is a key driving force in the intrapreneurial innovation.

However, with a few exceptions, the public sector failed to drive the Indian industrial sector on to a higher growth trajectory and got bogged down by cost and time overruns, high costs and a lack of technological dynamism. Though private industrial activity by both Indian firms and multinational companies flourished, there were tight regulations on inward capital flows, expansion, diversification and the import of capital goods and technology. Technology imports were regulated on a case-to-case basis and companies permitted to import technology were often required to commit to progressive indigenization through a phased manufacturing programme. The high effective rate of protection coupled with industrial licensing meant that local industry felt little need to innovate (Forbes, 1999). Constraints on growth also acted as a disincentive to innovative behaviour. With a protected market and a high cost structure, very few firms pursued exports or targeted external markets. R&D as done by industry was concentrated on import substitution and the creation of local sources for inputs. The small scale sector was provided reservation in many sectors and implicitly encouraged to make imitative products through reverse engineering and improvisation (Tyabji, 2000). Since small-scale industries enjoyed fiscal benefits like lower rates of excise duties and were outside the purview of industrial regulation, there was a tendency to fragment capacities and no incentive to grow in exploiting economies of scale or scope. It was only after the liberalization that foreign direct investment and collaboration and less regulated regime has emerged, thus facilitating the emergence of global entrepreneurship in India.

The World Bank and International Finance Corporation's report Doing Business 2012 ranks India at 166 out of 183 countries for ease of starting a business, putting it in the company of the West Bank, Gaza and Nigeria. In 2011, India ranked the same, demonstrating miniscule improvement in the enabling environment. According to the report, it takes 29 days to register and start a business, whereas it took 89 days to do the same thing in 2004. India has stayed the same in the categories of enforcing contracts, dealing with construction permits and trading across borders. A Legatum Institute 2011 survey found that Indian entrepreneurs are increasingly optimistic about their country's future, though they are far less approving of the government. The

top five constraints to starting a business in India are mostly within the purview of the government, namely energy, corruption, tax administration, labour regulation and labour skills. Across industry surveys, the biggest constraint to creating and growing a small business is lack of infrastructure, power, roads, water and public transportation. Laura Parkin, cofounder of National Entrepreneurship Network explains that a lack of governance makes it difficult for entrepreneurs and lack of infrastructure disproportionately affects businesses. For example, the cost of backup power equals 4 to 8 months of salary for a junior programmer. That is a lifetime in a start-up and start-ups cannot generally afford to buy back-up generators or spend hours in the dark. Endemic corruption is another constant grouse of entrepreneurs. Local officials reportedly request bribes, seek a lengthy list of approvals and licences and even cite rules to follow, which they often cannot explain or produce. Hiring lawyers to deal with opaque procedures consumes valuable time and income of start-ups. The recent protests against corruption might affect local officials' behaviour temporarily, but a sustained effort to eradicate low-level corruption would benefit entrepreneurs. Venture capital, angel investors, innovation incubators and programmes for skill building all contribute greatly to economic activity, but unless the basic infrastructure exists, the entrepreneur gold rush that many foresee for India will take much longer to be realized. The next chapter proposes to assess the entrepreneurial capability in terms of global entrepreneurship index.

Chapter 10

The Prospects of Entrepreneurship Development in India

10.1 Introduction

Everyone has an invisible sign hanging from their neck saying, 'make me feel important.' Hence we shall not forget this message when working with people. Business is not just doing deals. It is producing great products and providing tremendous service to customers. It is a 'cobweb of human relationship,' as HR Perot remarks. Successful entrepreneurs are not born business leaders but they are made and became great leaders because they desire it and humble themselves by learning the art and science of leadership. Today, they are leaders in their game with a huge number of followers. An entrepreneur's success depends on his or her power of getting people to believe he or she has something they want. Development of entrepreneurial skills provides an understanding of creative thinking processes and the ability to use creative thinking techniques. It enhances the ability to identify and sort out opportunities that will enable people to act entrepreneurially. Further, it develops skills in functional areas such as finance, marketing and human resources that are essential for the realization of innovative ideas. Finally, it advances the leadership attributes in the articulation of vision and stamina needed for the realization of entrepreneurial ventures. Personal skills are those skills that are attached to personality, more like habits. These are the characters possessed by successful entrepreneurs. As

Warren Buffett says it takes 20 years to build a reputation and only five minutes to ruin it. If we think about that, we will do things differently.

From this perspective, the concluding chapter focuses on the status of entrepreneurship in India and its prospects. Section 10.2 deliberates on the general aspects of entrepreneurship that requires an evaluative discussion in terms of global competition. Section 10.3 discusses the relevance of global competitiveness index, comparing the competitive performance of countries like the US, Singapore, Japan, Korea, China and India. Section 10.4 focuses on global entrepreneurial assessment in different stages of economic development in terms of global entrepreneurship monitor reports. Section 10.5 compares the different countries as to the global entrepreneurial development index as reported by the GEM report for 2010-11. Section 10.6 summarizes the different chapters of the book so as to pool together the major highlights of the study. The pertinent questions pertaining to the arguments in different chapters are summarized in section 10.7, while section 10.8 extends the thread toward the assessment of Indian entrepreneurship in terms of its crucial role, innovativeness, global presence and societal contribution. Section 10.9 focuses on the scope of entrepreneurship in India, while section 10.10 concludes.

10.2 Entrepreneurship in retrospective

In an economy characterized by higher values of the aggregate elasticity of substitution, a higher level of development with more entrepreneurs and smaller firms may be expected. In recent years, economists have come to recognize the input-completing and gap-filling capacities of entrepreneurial activity in innovation and growth and the significant contribution of innovation and growth to prosperity and economic welfare (Acs and Armington, 2006). While most developed countries are in the innovation-driven stage, most developing economies, including Brazil, Russia, India and China are in the efficiency-driven stage (Acs et al, 2008). In addition to differences in the nature of competition across stages, there are also differences in the degree of integration of countries into the world economy. In particular, since innovation contributes to competitive advantage in foreign markets, developed economies are better integrated globally (UNCTAD, 2006) and tend to have higher levels of export-oriented entrepreneurship than developing economies. To move into the innovation-driven stage, it is necessary for the countries to develop environmental conditions conducive to entrepreneurship.

Bill Gates became the richest man in the world in his thirties because he strategically negotiated a deal with IBM in his early 20s. If he had lacked persuasion skills, his name may not have been made famous. When confronted by a lady, Picasso had this to say: Yes, it took only 30 seconds to draw your picture; but 30 long years to achieve this status! And business is all about our relationship with people. It entails uniting people with different backgrounds, beliefs and skills to a common cause. Finally, as the adage goes: if you cannot sell, you will be sold. This chapter continues with the deliberations of the last section of the preceding chapter in assessing

the entrepreneurial capability of India in the world scenario in terms of global competitiveness index and global entrepreneurship development index, considering the different stages of entrepreneurial development in which the countries are categorized. Further, it focuses on the future prospects of entrepreneurship in the light of the conclusions presented in all the chapters and the questions raised therewith.

Jeffrey Timmon, a professor at Harvard Business School, summarized entrepreneurship as commitment and determination to overcome obstacles and compensate for others' weaknesses, where successful entrepreneurs are self-starters with an internal locus of control and who can transmit vision and passion to the management team and other employees. They are market-driven and obsessed with value creation and enhancement and high tolerance for risk and uncertainty, thriving on chaos and able to resolve problems and integrate solutions. They adapt to change and solving problems creatively and motivate to excel, with a high need for achievement (Prasad, 2003). Drucker neither judges entrepreneurship to be a practice as a state of being nor characterized by making plans that are not acted upon. According to him, entrepreneurship begins with action (creation of a new organization) and when individuals create a new organization, they enter the entrepreneurship paradigm. The entrepreneur considers change as rules and always pursues change, responds actively and utilizes it as an opportunity (Prasad, 2003). The Global Entrepreneurship Monitor defines entrepreneurship as an attempt at new business or new venture creation, such as self-employment, new organizations or the expansion of an existing business, by an individual, a team of individuals or an established business (Prasad, 2003).

We can enlist five streams of research which are at the roots of entrepreneurship (Minniti and Levesque, 2008), namely boundary rationality, rule following, institutions, cognition and evolution. At the macro level, studies in entrepreneurship are either on the impact of entrepreneurship on issues such as job creation, economic growth and poverty reduction (Parker, 2004) or on entrepreneurial performance (Audretsch and Thurik, 2001) or on the determinants of entrepreneurship such as culture, access to finance and R&D technology (Schramm, 2006). With regard to entrepreneurial performance and entrepreneurial impact, a majority of studies applied data from World Bank, Eurostat and GEM databases, looking at entrepreneurship development in OECD countries or focused on entrepreneurship comparison between high income and low-income economies. It is evident from the studies that entrepreneurship contributes to economic development by introducing innovation, enhancing rivalry and creating competition (Wong et al, 2005) and developing countries have higher levels of necessity entrepreneurial activities (starting a business because of being pushed into it), while high-income countries have lower levels of necessity entrepreneurial activities but higher level of opportunity entrepreneurship (starting a business to exploit a perceived opportunity). From this angle, an attempt is made to evaluate entrepreneurial performance in India as against other countries.

10.3 Global competitiveness index

Development of entrepreneurship depends on the competitive nature of an economy. According to Global Competitiveness Index for 2010-11 (Sala-I-Martin et al, 2011), basic requirements which are key for factor-driven economies include institutions, infrastructure, macroeconomic environment and health and primary education. Efficiency enhancers which are basic for efficiency-driven economies include higher education and training; goods market efficiency, labour market efficiency, financial market development, technological readiness and market size. Innovation and sophistication factors which are essential for innovation-driven economies include business sophistication and innovation. Switzerland retains its first place position, characterized by an excellent capacity for innovation and a very sophisticated business culture, ranked fourth for its business sophistication and second for its innovation capacity. Switzerland's scientific research institutions are among the world's best, and the strong collaboration between the academic and business sectors, combined with high company spending on R&D, ensures that much of this research is translated into marketable products and processes, reinforced by strong intellectual property protection and government support of innovation through its procurement processes. The strong innovative capacity is matched by a high rate of patenting (159 per million inhabitants) for which Switzerland ranks seventh worldwide on a per capita basis. Public institutions in Switzerland are among the most effective and transparent in the world, receiving an even better comparative assessment this year than in past years. Governance structures ensure a level playing field, enhancing business confidence; these include an independent judiciary, strong rule of law, and a highly accountable public sector. Competitiveness is also buttressed by excellent infrastructure, a well-functioning goods market (fourth), and a highly developed financial market (eighth) as well as a labor market that is among the most efficient in the world (second). Switzerland's macroeconomic environment, after weakening slightly last year, has bounced back and is among the most stable in the world (fifth) at a time when many countries are struggling in this area. While Switzerland demonstrates competitive strengths, the university enrollment rate of 49.4 percent continues to lag behind many other high-innovation countries, placing it 48th on this indicator. With an eye to the future, efforts should be made to boost higher education attainment to ensure sufficient national talent to continue contributing to productivity improvements.

Singapore maintains its position at third place, still the highest-ranked country from Asia. The country's institutions continue to be assessed as the best in the world, ranked first for both the lack of corruption in the country and government efficiency. Singapore places first for the efficiency of its goods and labour markets and second for its financial market sophistication, ensuring the proper allocation of these factors to their best use. Singapore also has world-class infrastructure (fifth), with excellent roads, ports, and air transport facilities. In addition, the country's competitiveness is buttressed by a strong focus on education, providing individuals with the skills needed for a rapidly changing global economy. In order to strengthen its

competitiveness further, Singapore could encourage even stronger adoption of the latest technologies as well as policies that enhance the sophistication of its companies.

The United States continues the decline that began last year, falling two more places to fourth position. While many structural features that make its economy extremely productive, a number of escalating weaknesses have lowered the US ranking over the past two years. US companies are highly sophisticated and innovative, supported by an excellent university system that collaborates strongly with the business sector in R&D. Combined with the scale opportunities afforded by the sheer size of its domestic economy, the largest in the world and these qualities continue to make the United States very competitive. Labour markets are ranked fourth, characterized by the ease and affordability of hiring workers and significant wage flexibility.

There are approximately five million businesses in the US with less than 20 employees. Between 1996 and 2004, US created an average of 550,000 small businesses every month. Entrepreneurs like Andrew Carnegie, the Rothschilds, the Rockefeller family and Henry Ford are celebrated in monuments in the US. In that country, school children are raised on stories about inventors like Benjamin Franklin, Alexander Graham Bell and Thomas Alva Edison. Some educational institutions like Stanford promote garage business and create heroes out of dropouts. Entrepreneurs like Bill Gates, Steve Jobs and Marc Zuckerberg have been eulogized. The fact that America is a nation of immigrants, adds to the diversity critical for entrepreneurship. Immigration policy too has supported this in a large measure. The US has grown to become the world's most mature venture capital industry with the American Research and Development Corporation being founded in 1946. The spirit of enterprise has been a core constituent of state policy and has been adopted as a model for socio-economic development by the entire society. No wonder the nation and its people respect entrepreneurs, risk takers and innovators who work towards destroying old certainties to create new opportunities.

Japan moves up two places to sixth overall, maintaining its performance compared with last year, while some other countries in the top 10 have weakened. Japan continues to enjoy a major competitive edge in the areas of business sophistication and innovation, and is ranked first and fourth respectively. Company spending on R&D remains high and the country benefits from the availability of many scientists and engineers buttressing a strong capacity for innovation. Indeed, in terms of innovation output and this pays off with a rate of patenting per capita (279.1 per million inhabitants) that is second worldwide, just behind the United States. The country's overall competitive performance, however, continues to be dragged down by its macroeconomic weaknesses, with high budget deficits over several years (ranked 134), which have led to the buildup of one of the highest public debt levels in the world (217.6 percent of GDP in 2009, corresponding to a 137th rank, or second to last on this indicator). Japan's rise in the rankings can in large part be traced to the fact that its main areas of weakness, linked to macroeconomic

instability and weaknesses in the banking sector, for example, have now become concerns for many other countries.

The Republic of Korea falls by three places to 22nd position. The country continues to do very well in most categories. It possesses world-class transport infrastructure (twelfth), a healthy macroeconomic environment at a time when many industrialized countries are struggling in this area (sixth) and excellent higher education (fifteenth), with the highest rate of tertiary education enrollment in the world. Korea remains one of the world's innovation powerhouses (twelfth in the innovation pillar). Yet it continues to suffer from weaknesses that represent a major drag on its competitiveness, for it ranks 124th with respect to labour market flexibility. Business leaders express dismay at the difficulty of hiring and firing employees (115th) reflected in the World Bank's Rigidity of employment index (90th). World Bank estimates that the average severance pay for dismissing an employee is equivalent to 91 weeks worth of salary (placing Korea 114th on this indicator). This leads companies to resort extensively to temporary employment, thus creating precarious working conditions and giving rise to tensions, Korea ranks 138th for the difficult relations between employers and workers. The second area of concern is the country's financial market (83rd), where the assessment has considerably worsened over the past year. Access to credit and financing has become more difficult, and the business community continues to express doubts as to the soundness of the banking sector (99th) and complains about the limited availability (98th) and high costs (82nd) of financial services. Korea has not improved its institutional framework, losing further ground at 62nd. Within this pillar are the lack of trust of politicians (105th) and the perceived inefficiency of the government (91st) complaints about excessive regulation (108th) and low transparency of policymaking (111th).

China with a rank of 27th is the only BRIC country to improve in the rankings this year. China's performance remains stable in most areas measured with the index compared with last year, with its main strengths in large and growing market size, macroeconomic stability and relatively sophisticated and innovative businesses. The two-rank improvement is attributable to a better assessment of its financial market (up 24 places to 57th), which has historically been a notable weak point. This is the result of easier access to credit and financing through equity markets, banks and venture capital, which has been accompanied by a slight improvement in the perceived soundness of the banking sector (60th). Technological readiness is another area where China has traditionally underperformed (78th), with low ICT penetration. In 2009, China added over 100 million mobile telephone subscriptions and 86 million new internet users. Mobile penetration has reached more than 50 percent, and about a quarter of the population uses the Internet on a regular basis. Other areas for improvement are related to its human resources base. China has made small strides in the quality of higher education and training (60th), but there remains considerable scope for improvement. Although labour market is indeed quite efficient, a lack of flexibility (96th) constitutes a major challenge.

India's performance remains quite stable, falling two positions to 51st with a small improvement in score. India's competitiveness is based on its large market size and good results in more complex areas including financial markets (17th), business sophistication (14th) and innovation (39th). India has failed to improve significantly on any of the basic drivers of its competitiveness. It ranks 104th in the health and primary education with high rates of communicable diseases and high infant mortality. Indeed, life expectancy in India is 10 years shorter than in Brazil and China. Although primary enrollment is becoming universal, the quality of primary education remains fairly poor (98th). Higher education also remains a weak point, with low enrollment rates at the secondary and tertiary levels. Infrastructure (86th) is in need of upgrade, especially with respect to quality of roads, ports and the electricity supply, with India falling 10 places in this area this year. The macroeconomic environment continues to be characterized by persistent budget deficits, high public debt and high inflation. Labour markets are in need of greater efficiency and flexibility (92nd). The performance of entrepreneurship has been assessed through the global entrepreneurship monitor reports as detailed below.

10.4 Global entrepreneurship assessment

The level of entrepreneurship has been evaluated by quantitative measures like the self-employment rate, business ownership rate or business startups. The Global Entrepreneurship Monitor's (GEM) Total Early-stage Entrepreneurial Activity (TEA) ratio has become a widely used measure of entrepreneurship (Acs and Szerb, 2010). OECD and European Union have provided sophisticated measures of entrepreneurship encompassing areas of the determinants of entrepreneurship (regulation, R&D, entrepreneurial capabilities, culture, access to finance and market conditions), entrepreneurial performance (firms, employment and wealth) and impact of entrepreneurship. While these indicators or ratios have undergone some modification and change to incorporate qualitative measures, like education and high growth firms, they are basically limited to measuring the quantity of existing or nascent businesses.

Rostow (1960) suggests that countries go through five stages of economic growth. Porter (1990) defines competitiveness according to the nature of economic development, distinguishing among factor-driven, efficiency-driven and innovation-driven stages, with two transitions between these stages (Acs et al, 2008). While Rostow focuses on the age of high mass consumption, Porter's model encompasses recent developments in the economics of knowledge and hence the focus is on innovation. Countries in the factor-driven stage compete through low cost efficiencies in the production of commodities or low value-added products. This stage is marked with high rates of non-agricultural self-employment and sole proprietorships (self-employed) account for most small manufacturing and service firms. Economies experiencing this

neither create knowledge for innovation nor use knowledge for exporting. To move into the second efficiency-driven stage, countries must increase their production efficiency and educate the workforce to be able to adapt in the subsequent technological development phase. To compete in this stage, countries must have efficient productive practices on large markets, which allow companies to exploit economies of scale. Industries in this stage are manufacturers or provide basic services (Syrquin, 1988). The efficiency-driven stage is marked by decreasing rates of self-employment. There may be several reasons for entrepreneurial activity to decline as economies become more developed (Kuznets, 1966). If individuals have different endowments of managerial ability, then as economy becomes wealthier, the average firm size should increase as better managers run the companies. Average firm size is an increasing function of the wealth of the economy if capital and labour are substitutes. An increase in the capital stock increases returns from working and lowers returns from managing. In other words, marginal managers find they can earn more money when employed by somebody else. Increases in the capital stock (through private enterprise, direct foreign investment or government ownership) will increase returns to wage work relative to entrepreneurial activity and the relationship between entrepreneurial activity and economic development would be negative. As the economy becomes more developed, fewer people may be pursuing entrepreneurial activity.

Sala-I-Martin et al (2007) point out that the first two stages of development are dominated by institutions. In fact, innovation accounts for only about 5 percent of economic activity in factor-driven economies and rises to 10 percent in the efficiency driven stage. However, in the innovation-driven stage when opportunities for productivity gains from factors and efficiency have been exhausted, innovation accounts for 30 percent of economic activity. The innovation-driven stage is marked by an increase in entrepreneurial activity. Firm size distribution in developed countries began to shift away from larger corporations and toward entrepreneurial activity. There are three reasons entrepreneurial activity rises in the final stage of economic activity. First, the innovation-driven stage is marked by decreases in the share of manufacturing in the economy. Many industrialized market economies experienced a decline in manufacturing over the last 30 years. The business service sector expanded relative to manufacturing. Service firms are smaller on average than manufacturing firms and economy-wide average firm size may decline. Moreover, service firms provide more opportunities for entrepreneurship. This is clearly the case in the United States and several EU countries. Second, technological change during the postwar period has been biased toward industries in which entrepreneurial activity is important (Jorgenson, 2001). Improvements in information technologies may increase returns to entrepreneurship. Express mail services, photocopying services, personal computers, the internet, web services and mobile phones services make it less expensive and less time consuming for geographically separate individuals to exchange information. Third, a high value of the elasticity of factor substitution not only leads to more per capita capital, but makes it at the same time easier for an individual to become an entrepreneur if the aggregate elasticity of substitution is also negative.

GEM programme is an annual assessment of the national level of entrepreneurial activity. Initiated in 1999 with 10 countries, it was expanded to 21 in 2000 and to over 60 countries in 2008. The programme based on a assessment of the level of national entrepreneurial activity for all participating countries, involves exploration of the role of entrepreneurship in national economic growth. Representative samples of randomly selected adults ranging in 1,000 to 27,000 are surveyed annually in each participating country to provide harmonized measures of the prevalence of entrepreneurial activity. The GEM project is unique in that while all countries collect official data on self-employment, the size distribution of firms, census data on all or most plants and firms, firm and plant entry, almost none of these registry sources are comparable across countries. Official data sources differ in the way they define when an establishment enters a file, when it leaves and how they handle self-employment, which makes cross-national comparisons almost impossible. Therefore, one of the major strengths of the GEM project is the application of uniform definitions and data collection across countries for international comparisons.

The purpose of GEM data is to systematically assess the level of start-up activity or the prevalence of nascent firms and the prevalence of new or young firms that have survived the start-up phase. Start-up activity is measured by the proportion of the adult population (18-64 years of age) in each country that is engaged in the process of creating a nascent business. The proportion of adults in each country who are involved in operating a business that is less than 42 months old measures the presence of new firms. The distinction between nascent and new firms is made to determine the relationship of each to national economic growth. For both measures, the focus is on entrepreneurial activity in which the individual involved has a direct, but not necessarily full ownership interest in the business. The GEM model serves as a vehicle to interpret both the data collection process and provide a framework for theory and policy (Levie and Autio, 2008).

A shortcoming of GEM data has been the fact that it has not been able to effectively deal with the issue of how to compare entrepreneurial activity in developed and developing countries. For example, low-income countries, such as Uganda, Peru and Ecuador, have very high levels of self-employment and therefore, have high levels of entrepreneurial activity as measured by the GEM programme. High income countries like Japan, Sweden and Germany have much lower levels of entrepreneurial activity as measured by GEM. In order to address this issue for developing countries, GEM started to collect data on both opportunity entrepreneurship (starting a business to exploit a perceived business opportunity) and necessity entrepreneurship (starting a business, pushed into it). However, both measures show higher levels in developing countries than in developed countries. Many respondents state they are pursuing an opportunity rather than being involved in entrepreneurial activities because they have no other option for work. Moreover, the relationship between necessity entrepreneurship and economic development is

most likely negative in low-income countries, while in high-income countries it may be positive. Countries like India and China have high levels of opportunity entrepreneurship and countries like Japan have very low levels of opportunity entrepreneurship and low growth. Therefore, in economies in the early or middle stage of economic development, the efficiency-driven stage, entrepreneurial activity would be negatively related to economic development since most people would be trying to move from self-employment to wage employment. In developed economies, entrepreneurial activity may be positively related to economic development as people shift from wage work to entrepreneurial activity, indicating a U-shaped relationship may exist between entrepreneurial activity and economic development in the global economy. Countries like Uganda, Peru and Ecuador are all countries with high levels of entrepreneurial activity but low levels of per capita income. Countries with much lower levels of entrepreneurial activity, Brazil and Argentina have higher levels of per capita income and are moving toward lower levels of entrepreneurial activity. The middle represents a set of countries that appear to be transitioning from a middle-income level to a higher income level and some have rising levels of entrepreneurial activity. High-income countries have relatively low levels of entrepreneurial activity. Japan, with one of the lowest levels of entrepreneurial activity and the United States, with one of the highest levels of entrepreneurial activity are exceptions.

The situation in developed countries is different and has its origins in the work of Blau (1987), who documents the upturn in self-employment rates after they declined. A major explanation for the diversity in the level and time series pattern of entrepreneurship is the stage of economic development and the negative relationship between entrepreneurship and economic development. Although economic development is essential for entrepreneurship development, the convergence of several factors in the 1970s tended to stem the secular decline in entrepreneurship for many countries. Of 23 OECD countries examined by Acs et al (1994), 15 had a U-shaped relationship during the 1970s and 1980s, wherein sources of inter- and intra-country variations in self-employment included stages of economic development, bias of technological change, changes in industry composition, changes in female labour force participation, unemployment and cultural factors. The development of new technologies and the emergence of new business models have shifted from large corporations to small and new ventures (Jorgenson, 2001).

Entrepreneurship contributes to economic performance by introducing innovation, enhancing rivalry and creating competition. As regards economic development and business ownership in OECD countries, the existence of a U-shaped relationship is witnessed (Wennekers et al, 2005). The U-shaped approach is useful in understanding the decline in self-employment in developing countries both across countries and over time, but is less useful in explaining entrepreneurship. The U-shaped approach is not very useful in explaining the role of entrepreneurship in developing countries in the efficiency-driven stage of development, either as they enter the efficiency-driven stage or leave the efficiency-driven stage (Acs and Amoroso,

2008). While the U-shaped framework was originally developed to understand the increase in entrepreneurship in high-income OECD countries, the model is also of limited value. Carree et al (2007) suggest that the S-shaped or L-shaped or U-shaped relationship between entrepreneurship and economic development could not be distinguished empirically. For example, the U-shaped relationship does not provide an adequate explanation for the relationship between entrepreneurial activity and economic development (Carree and Thurik, 2003). Total Entrepreneurial Activity measures reflect various activities or components related to entrepreneurship in both developed and developing countries (Acs et al, 2008) and can independently be inadequate for policy planning. The 2004 Global Entrepreneurship Report (Acs et al, 2005) started to pursue the idea of using the opportunity-necessity ratio as a composite indicator of entrepreneurial activity and economic development.

GEM data are used to identify the type of activity in countries at different levels of development. Opportunity entrepreneurship represents the voluntary nature of participation and necessity, reflecting the individual's perception that such actions presented the best option available for employment. Opportunity entrepreneurship differs from necessity by sector of industry and with respect to growth aspirations. Opportunity entrepreneurs expect their ventures to grow more and provide more new jobs. A clear trend occurs between the ratio of opportunity to necessity entrepreneurship and the per capita income of a country. Opportunity to necessity entrepreneurship ratio describes the importance of the desirable, opportunity entrepreneurship relative to the necessity-induced entrepreneurship. In this case, countries with high levels of necessity entrepreneurship will be ranked with low levels of entrepreneurship. Countries, where more entrepreneurship is motivated by an economic opportunity recognized than by necessity have higher levels of income. Brazil with an opportunity/necessity of 1.1 is at the bottom, Japan is in the middle next to New Zealand and Denmark is near the top (Acs and Szerb, 2008). The development of measures like the World Bank Group Entrepreneurship Survey and the Complex Entrepreneurship Context index can be helpful in providing a broader and more encompassing picture of entrepreneurship. In this case, the relationship between entrepreneurship and economic development is S-shaped and not U-shaped. The CEC index is consistent with the three stages of development (Porter et al, 2002). In the efficiency-driven stage, entrepreneurial activity is mildly increasing or relatively flat as necessity entrepreneurship is steadily reduced and innovation comes from outside. The role of foreign direct investment becomes critical in creating efficiency in the efficiency-driven stage and knowledge spillovers to move a country to the technological frontier, which is synonymous with the innovation-driven economy (Baumol, 2006). In the early days of GEM, a conceptual model including various Entrepreneurial Framework Conditions (EFCs) was developed, indicating various conditions in which entrepreneurship may flourish. It includes aspects such as access to finance existence of government support policies for entrepreneurship, presence of entrepreneurship-specific training and education and access to and transfer of R&D and technology. Various EFCs affect entrepreneurial activity by enhancing opportunity recognition and skills perception.

Recent GEM reports (2007 and 2008, India has not participated subsequently) indicate India as emerging major economy in the world, the outlook of its potential entrepreneurs is relatively becoming very optimistic. The estimates of the GEM Report 2007 of perceptions about entrepreneurship among even the non-entrepreneurially active population in the age group of 18-64 years are quite positive. On potential entrepreneurship activity, India scores 52 percent compared to 17 percent in China, 4 percent in Russia and 25 percent in Brazil and in the case of perceived opportunities, the score is 70 percent; in perceived capabilities, 69 percent and 50 percent on entrepreneurial intentions (Bosma et al, 2008). The GEM Report 2008 has worked out entrepreneurial attitude and perception in 43 GEM member countries, by the phase of economic development. India scores quite high on almost all the parameters. Though India is among the low income countries and is factor-driven country, its economic and entrepreneurial performance has been better than most of its peers, owing to a high growth rate of 7.5-9.7 percent since 2000. During the global economic meltdown, India's economy performed much better than the major world economies. India's comparison with some of the countries as regards entrepreneurship development is deliberated in the following section.

10.5 Global entrepreneurship development index

Global entrepreneurship and development index (GEDI) captures the essence of the contextual features of entrepreneurship by focusing on entrepreneurial attitudes, entrepreneurial activity and entrepreneurial aspirations. Entrepreneurial attitudes indicate the society's basic attitudes toward entrepreneurship through education and social stability. Entrepreneurial activity implies what individuals are actually doing to improve the quality of human resources and technological efficiency. Entrepreneurial aspirations showcase how much of the entrepreneurial activity is being directed toward innovation, high-impact entrepreneurship and globalization. Entrepreneurial aspirations incorporates the efforts of the early-stage entrepreneur to introduce new products and services, develop new production processes, penetrate foreign markets, substantially increase the number of firm employees and finance the business with either formal or informal venture capital or both. America is the most enterprising economy, European Union coming second. The rest of the world, including India and China, is far behind. The index incorporates individual level as well as institutional variables. The 14 individual pillars of entrepreneurship used in the construction of index are calculated by involving more than 963,000 individuals from the 71 countries. The pillars themselves are constructed through an interaction of individual level and institutional variables.

Acs and Szerb (2010) calculate the GEDI taking into consideration different indicators.

Domestic market size that is the sum of gross domestic product plus value of imports of goods and services, minus value of exports of goods and services, normalized on a 1-7 scale data are from the World Economic Forum Competitiveness Index. Urbanization that is the percentage of the population living in urban areas, data are from the population division of the United Nations. Market size indicates a combined measure of the domestic market size and the urbanization that later measures the potential agglomeration effect. The business climate rate assesses the overall business environment quality in a country and reflects whether corporate financial information is available and reliable, whether the legal system provides fair and efficient creditor protection and whether a country's institutional framework is favorable to intercompany transactions. The number Internet users in a particular country per 100 inhabitants and the corruption perceptions index measures the perceived level of public-sector corruption in a country and the performance is measured on a ten point Likert scale. Business freedom is a quantitative measure of the ability to start, operate and close a business that represents the overall burden of regulation and the efficiency of government in the regulatory process. The business freedom score for each country is a number between 0 and 100, with 100 equaling the freest business environment. The score is based on 10 factors, all weighted equally, using data from the World Bank's Doing Business. Firm level technology absorption indicates in the scale 1-7 the capability not to absorb new technology to aggressively absorb new technology. The extent of staff training indicates to what extent companies invest in training and employee development. The extent of market dominance indicates corporate activity dominated by business groups.

Gross domestic expenditure on R&D is taken as a percentage of GDP, whereas innovation index points from GCI and is a complex measure of innovation including investment in R&D by the private sector, the presence of high-quality scientific research institutions, the collaboration in research between universities and industry, and the protection of intellectual property. It refers to the ability of companies to pursue distinctive strategies, which involves differentiated positioning and innovative means of production and service delivery. Globalization Index measuring the economic dimension of globalization involves the actual flows of trade, foreign direct investment, portfolio investment and income payments to foreign nationals as well as restrictions of hidden import barriers, mean tariff rate, taxes on international trade and capital account restrictions. Another measure is the capacity for the entrepreneurs with innovative but risky projects to find venture capital.

Two Scandinavian countries Denmark and Sweden lead in the innovation-driven stage of development. New Zealand, an outlier with about \$26,000 GDP is in fifth place due to its excellent performance in attitudes that counterbalance its relatively weak performance in aspiration. Four of the five Nordic countries, Denmark, Sweden, Iceland, and Norway, are in the top ten and Finland is 13th still with a good performance. The US is in third place following Canada because of its weaknesses in attitude measures. Australia, Ireland and Switzerland are all good performers, but possess weaknesses in at least one of the sub-indexes. The UK has 14th rank,

Germany 16th, France 18th, Italy 27th followed by Spain in 28th place. A reason for the weak economic performance of the EU countries over the last decade (as well as Japan 29th place) may be low levels of entrepreneurship. Low GDP-level factor-driven countries, such as Jamaica, Bosnia-Herzegovina, Venezuela, Brazil, Philippines, Iran, Bolivia, Ecuador and Uganda are on the bottom of entrepreneurship ranking. Hungary and Russia should have higher level of entrepreneurship as implied by the trend-line. The indexes show significant and high correlations with one another and with the GDP PPP per capita values. While measures of competitiveness, red tape, economic freedom and corruption are available, a vital aspect of wealth creation and development, entrepreneurship has been missing from the picture.

GEI fits into the picture and may be capable of providing valuable insight to understand entrepreneurship and its components and their role in economic development. A more detailed picture emerges when we examine the average values of the indicators for countries grouped according to the three stages of development. The entrepreneurial performance of the innovation driven countries is significantly different from the efficiency-driven countries in all indicators but one. The exception is the opportunity perception potential. Factor-driven and efficiency-driven countries are more similar regarding entrepreneurship indicators, but the differences are the highest in the cases of the attitude indicators of non-fear of failure and cultural support. It implies that attitude development is vital for those countries that transit from the factor-driven stage to the efficiency-driven stage. Aspiration related internationalization is a key to forward to the efficiency driven stage. The largest differences between the stage two and three countries are in new product, non-fear of failure, internationalization and risk capital. The three groups of the countries are the most similar to each other, besides the previously mentioned opportunity perception, in high growth. This may imply that there are other sources of high growth than entrepreneurship in the lower phases of economic development. Examining the attitude sub-index pillars, opportunity perception and startup skills are the highest in the case of the leaders. However, factor driven are second followed by innovation challengers. Comparing resource based and efficiency based, it seems that institutional improvement, increased internationalization and technological progress is not followed by opportunity and skill development. Mainly lacking individual characteristics of opportunity recognition and managerial startup skills and not institutional deficiencies cause the low level of attitudes in the cases of efficiency driven and innovation followers. This finding underlines the general beliefs that changing institutions is relatively easier than changing individual characteristics. Hence, efficiency driven and innovation followers need to improve opportunity perception and startup skills while not to decrease other indicator values.

Though aspiration is increasing in terms of economic development, the aspiration related pillar values do not necessary follow this trend. New product is the highest in the innovation follower cluster as is internationalization. Innovation challengers lead in high growth, followed by innovation followers and the innovation leaders are only in third place implying that gazelle

type of fast growing start-ups is the weakest pillar in leading entrepreneurial countries. Innovation challengers have a low level of new technology, lower than that of the efficiency driven economies. Innovation challengers are good in industries that require relatively old technology and product innovation as opposed to innovation followers. Leaders are ahead of the followers and challengers because of the formal and informal venture finance, technology application and adaptation and a more balanced performance over the five aspiration pillars.

While the institutional and individual variable averages are very close to each other, it is balanced only in the innovation challenger cluster. In the cases of the innovation followers and efficiency transformers individual variable averages are higher than institutional ones. However efficiency driven countries improved more in institutions than in individual characteristics. Therefore, the key factor in the case of lower level of development is to enhance institutions. This is particularly true in the Innovation follower cluster the difference between institutional and individual means is almost ten times as compared to the Individual developers. While the difference between the individual and institutional variables is the same in the leaders as in the Institutional developers the relative difference is the same. To reach a higher level of development and capture the leading entrepreneurial nations, Institutional developers should improve in individual characteristics while Individual developers should enhance their institutions. The innovation leaders are the same countries that lead the Gedindex rank, wherein thirteen out of the first fourteen countries constitute the leader group. These are the Anglo-Saxon, and Nordic countries together with the Netherlands and Switzerland. Most Latin American countries are factor-driven, save Jamaica and Chile which are efficiency-driven. Eastern European and Balkan countries, except Serbia, the Czech Republic, Slovenia and Latvia are efficiency transformers.

Asian countries are the most diverse nations in terms of entrepreneurship, found in four groups. Poorer Asian countries are in the resource driven clusters (5) and the factor driven (4) clusters. The most populous Asian nations, China, India and Indonesia belong to the efficiency-driven cluster. The most entrepreneurial Asian nations Hong Kong, Saudi Arabia and the United Arab Emirates are innovation challengers. Israel, Japan, Korea and Singapore are innovation followers and none are innovation leaders. With this assessment, an attempt is made to summarize the different chapters so as to bring in the crucial questions that arise in the study of entrepreneurship.

10.6 Chapter summaries

Entrepreneurship was not a serious agent of development for developing economies in spite of the important role played by entrepreneurship in the transformation of the west. Many developing countries like India which are in a state of transition, strive to move from a subsistence-oriented, tightly integrated, inward looking local economy to a surplus seeking,

market led, outward looking economies. Entrepreneurship is an evolving phenomenon and successful entrepreneurship depends on dedicated, talented, creative entrepreneurs, irrespective of the nature of an economy.

10.6.1 First chapter

The first chapter provides definitions of entrepreneurship which have emphasized a broad range of activities including the creation of organizations (Gartner, 1988), the carrying out of new combinations (Schumpeter, 1934), the exploration of opportunities (Kirzner, 1973), the bearing of uncertainty (Knight, 1921) and bringing together of factors of production (Say, 1803). Richard Cantillon (1755) defines entrepreneurship as self-employment of any sort. According to Jean Baptiste Say (1816), the entrepreneur is an agent who combines all means of production and finds in the value of the products the fruits of the entire capital he employs and the value of the wages, the interest and rent which he pays, as well as profits belonging to himself. Frank Knight (1921) emphasizes the entrepreneur's role in bearing the uncertainty of market dynamics. Joseph Schumpeter (1934) argues that entrepreneur is the innovator who implements change within markets through the carrying out of new combinations. Schumpeter equates entrepreneurship with the concept of innovation applied to a business context, exhibiting what he calls as a creative destruction system of development. Penrose (1963) opines that entrepreneurial activity involves identifying opportunities within the economic system. Harvey Leibenstein's (1968, 1979) entrepreneur fills market deficiencies through input-completing activities. Israel Kirzner (1979) argues that an entrepreneur has to recognize and act upon market opportunities. The entrepreneur is essentially an arbitrageur. In contrast to Schumpeter's viewpoint, the entrepreneur moves the market toward equilibrium. Peter Drucker (1986) puts forward the view that Schumpeter's type of innovation can be systematically undertaken by managers to revitalize business and non-business organizations. To him, entrepreneurship is a tool to be implemented by managers and organizational leaders as a means of growing a business.

According to Max Weber (1930), religion is the major driver of entrepreneurship and he stressed on the spirit of capitalism, which highlights economic freedom and private enterprise. Hoselitz (1966) explains that the supply of entrepreneurship is governed by cultural factors and culturally minority groups are the spark-plugs of entrepreneurial and economic development. McClelland (1961) contends that people have three motives for accomplishing things, namely, the need for achievement, need for affiliation and need for power. McClelland's experiment revealed that traditional beliefs do not inhibit an entrepreneur and that it is possible to internalize the motivation required for achievement orientation through training. In many systems, socio-cultural history accounts for the performance of entrepreneurial functions by a considerable number of individuals. Greater the development of n-Ach, during early socialization of people, the more likely would be economic growth.

In a psycho-social theory, Hagen (1962) relegates economic variables to a relatively

minor role emphasizing on certain aspects of personality. Hisrich (1990) identifies several characteristics of entrepreneurs in terms of conditions that make entrepreneurship desirable and possible wherein the childhood family background and education level, personal values and motivations and role modeling effects and other support systems are persistent. The theoretical work in the discovery theory (Alvarez and Barney, 2007) focuses on the existence, discovery and exploitation of opportunities and the influence of individuals and opportunities. From Kirzner, this assumption recognizes that the entrepreneurial nature of human action refers to more than just the action taken, but additionally refers to the human agent that is at all times spontaneously on the lookout for unnoticed market imperfections that might inspire new activity. The creation theory assumes uncertainty and not risk and argues that under conditions of uncertainty the attributes of an industry are either not knowable or changing in difficult to predict ways.

Entrepreneurial models focus on the different choices available to the entrepreneurs either in the shape of opportunities or necessity, besides information exploitation and skill development. The chapter concludes that entrepreneurship research today implicitly assumes that there is no difference between the entrepreneurship being carried out in the most developed nations and that carried out in latecomer or developing countries.

10.6.2 Second chapter

Entrepreneurial development in India relies on generational mentoring, family business skill set and exploration of technological progress. The second chapter documents different works on the evolution of entrepreneurship in India during the pre and post-independence periods. The Indian community internalized the traditional values and translated them into daily behaviour and these values remained insulated against external pressure and change. The behaviour of the mercantile communities was not very entrepreneurial in the modern sense but the non-mercantile communities did not break the occupational barriers as imposed by the caste system. During the colonial period, agency houses were established in the presidency cities of Calcutta, Bombay and Madras during the last decades of the 18th century as supportive of British firms in London. Entrepreneurship flourished among ethnic minorities which formed special links with colonial authorities, such as the *parsees* in nineteenth century. There was no major innovation in the field of agriculture or any other sector of the economy. Big cities provided prospective businessmen the opportunities for their growth and determined the nature of domestic consumption in the light of import of British goods. The factors that enabled the entrepreneurs to carry on their businesses included intuition and the ability to utilize the opportunities. The nationalism movement resulted in a 'decolonial motive' and entrepreneurs were expected to carry out their activities in tune with the existing public interest provided for by the new dispensation.

India's economic development strategy after independence was based primarily on the Mahalanobis model, which gave preference to the investment goods industries sector, with

secondary importance accorded to the services and household goods sector (Nayar, 2001). The strategy of economic development in India involved direct participation of the government in economic activities such as production and selling and regulation of private sector economic activities through a complex system of controls. The complex system of government controls, including price ceilings, along with the resultant corruption, meant that decision making was arbitrary and the transactions non-transparent. The economic reforms of the early 1990s set the stage for substantial improvements and in the past decade entrepreneurship has slowly taken off. India is ninth in the Global Entrepreneurship Monitor survey of entrepreneurial countries. It is highest among 28 countries in necessity-based entrepreneurship, while 5th from the lowest in opportunity based entrepreneurship.

10.6.3 Third chapter

This chapter introduces the entrepreneurship development experience of China and India and compares the iron and steel industry growth in Korea and India. Beginning 1978, China's entrepreneurship development can be divided into three phases (Zhang and Duysters, 2010). The first generation of Chinese entrepreneurs emerged during the reform programme to encourage entrepreneurial activities in the early 1980s. Since the mid 1980s, private entrepreneurial activities had started to evolve into the second phase, characterized by the organizational mode of township and village enterprises. The third phase was encouraged by the entry of foreign investment in the late 1980s. After the era of *getihu*, the third phase of entrepreneurship development was remarked by the emergence of private sectors and another organizational mode called *si ying qiye* (Zhang and Duysters, 2010). By this, private enterprises were recognized to coexist with stated-owned enterprises. The emergence of socialist market economy dispelled the bias on entrepreneurship and narrowed down the differences between state and private owned businesses. China's entrepreneurship development has been characterized by its relationship-based network, which not only included an association with business partners such as suppliers, customers and competitors but also political interactions with government (Peng, 2003). China has been recognized as an opportunity-oriented entrepreneurial country and ranked 10th as an opportunity-oriented economy in the world according to Global Entrepreneurship Monitor report (Zhang and Duysters, 2010).

The Korean economy experienced tremendous change from the beginning of the 1960s during its transformation into a modern industrial country (Surie and Torras, 2007). Korea acquired technology mainly through licensing rather than through foreign direct investment to build local capabilities. The case of Pohang Iron and Steel Company Ltd (POSCO), which began as a government owned enterprise but later privatized, highlights the role played by the government in incubating technological capabilities (Westphal et al, 1985). POSCO was founded in 1968 as the first integrated iron and steel and its construction began in 1970 with a capacity of one million tonnes per year of crude steel. In the first stage of expansion, completed in 1976, steel capacity was increased to 2.6m tonnes; in the second stage, completed in 1978, to 5.5m

tonnes and in the third, completed in 1981, to 8.5m tonnes. In 2004, POSCO was the world's 5th largest producer of crude steel. Agreements were signed with the Japanese for loans and all major technology and facilities (Enos and Park, 1988). The Japanese contract specified the provision of help with planning and consulting, purchasing and construction, planning and execution of the construction and construction management system, and on-site assistance for start up and operation. In 1999 the company began to globalize operations by launching corporate-wide process innovation and Six Sigma initiatives to cultivate a continuous improvement culture. The company was privatized in 2000 and focused on knowledge management through continuing education and R&D efforts. In 2006 POSCO was ranked third among global steel producers by the International Steel Institute.

The scale and capital intensity of the steel industry in India ensured that the only large integrated steel plants established after 1950 were government-owned Steel Authority of India (SAIL) with the exception of Tata Iron and Steel Company (TISCO, now Tata Steel). India faced the same difficulties as Korea in obtaining financing. SAIL was burdened with difficulties in transferring technology, besides poor engineering, failure to take account of poor local raw material characteristics, low capacity utilization, price controls and poor management which all contributed to its lacklustre performance. TISCO faced similar difficulties in obtaining quality inputs. Moreover, the government allowed only limited capacity expansion and modernization of its aging facilities was possible only in 1983, partly because of the threat of nationalization and partly because price controls held back profitability (Lall, 1985).

In contrast to the industrial policy followed by Korea which favoured large enterprises, Indian industrial policy focused on encouraging small enterprises while containing the growth of large private enterprises. Consequently, India's progress was slow in comparison with other developing countries in the beginning. The steel industry was granted tariff protection by the British government from 1924 till 1941. In the 1950s and 1960s, Indian steel was much cheaper than imported steels. TISCO obtained foreign technology in the form of individually recruited experts and equipment. It continued to introduce new steels developed from its in-house R&D. Other capabilities were developed in industrial engineering such as quality control, productivity monitoring, and cost evaluation. In 1983, TISCO launched its first expansion in almost 30 years and began modernization (Lall, 1987). TISCO modernized further in the 1990s by importing a new state-of-the-art blast furnace which was installed mainly by local organized cross-functional team and learning was transferred to other divisions of the organization and to suppliers. Similar to POSCO, the blast furnace project team worked overtime to meet completion deadlines. In 2000, a new cold rolling mill was installed using the same procedure and an internal reorganization to match new technology and enhance capabilities throughout the value chain was accomplished with the help of McKinsey and Company. The company began globalising via exports, overseas expansion, acquisition and diversification into information technology based industries. TISCO was ranked the fifth largest steel producer in the world by the International

Iron and Steel Institute in 2006. In 2007 TISCO completed the acquisition of a steel company in the UK. Although TISCO was established in 1907, the regulatory environment impeded its expansion and entry into the global economy until the 1990s. POSCO evolved more rapidly because newer technologies were adopted at the outset in the 1970s while TISCO began modernization only in the 1980s and was able to catch up in the 1990s.

10.6.4 Fourth chapter

India's information technology (IT) sector is an example appropriating Porter's demand and factor conditionalities and in establishing competitive advantage in the global market. Necessity entrepreneurship has little or no effect on economic growth while opportunity entrepreneurship as has been characterized by the IT sector, has a positive and significant effect. With financial liberalization of the economy, software companies realized advantages of operating in a global market. The first known case of a software product from India was from Tata Consultancy Services (TCS). TCS had paid attention to tools in software writing and in the early 1980s the utilized the opportunity to sell some of those tools as products. Many telecom firms like Texas Instruments, Motorola and Nortel have sourced their research on digital signal processing chips in India and this gave rise to spin-off firms. A very important agent for institutional reform is the National Association of Software and Services Companies. The emergence of third party BPO activities in India led by firms which received venture capital funding for their seed capital, has impacted on manufacturing, health care, banking and financial services, pharmaceuticals, engineering and textiles. There is a gradual convergence in India toward the US model of venture capital institutions, which was initiated and aided by the diaspora of technology entrepreneurs in India and their Silicon Valley partners. The NASSCOM model of industry-government interaction has been adopted by new sectors relying on domestic entrepreneurship.

The establishment of the National Science and Technology Entrepreneurship Development Board and Technopreneur Promotion Programme has helped to realize the vast latent innovative potential of the technopreneurs. There are many IT incubators spread throughout the country and the TiE network (The Indus Entrepreneurs, established in Silicon Valley in 1992) besides the Wadhvani Foundation promote entrepreneurship by organizing workshops and seminars nationally and fund various entrepreneurship education-related projects like the National Entrepreneurship Network.

The software sector is human capital intensive in its production process. In 1985, Electronics City was established in Bangalore and the International Technology Park established later was co-financed by the state government of Karnataka. Bangalore has a range of public sector research and educational institutions (Indian Institute of Science, Indian Institute of Management and Indian Institute of Information Technology), public sector establishments

(Indian Air Force and Indian Space Research Organization) and high-tech manufacturers (Hindustan Aeronautics, Bharat Electronics and Hindustan Machine Tools). Karnataka leads the rest of India in electronics and telecommunications, hosting over 300 of the world's leading companies. In addition, there are many SMEs located in various industrial estates and Bangalore is the home of several public and private R&D.

Hyderabad is known not only for its IT and IT-enabled services, but also for pharmaceuticals and entertainment industries. Many call centres, business process outsourcing firms, dealing with IT and other technological services were set up in the 1990s making it the hub of BPO firms. Ramoji Film City, the largest film studio in the world is located on the outskirts of the hi-tech city. The software sector in Hyderabad has registered impressive growth and its total exports of Rs 325 billion in the year 2008-09 was surpassed only by Bangalore (Rs 703 billion) and Maharashtra (Rs 423 billion). A study by NASSCOM reports that Hyderabad scores over Bangalore and in fact over other software locations in the quality of its infrastructure.

The chapter also briefs the achievement of software companies like TCS, Infosys, Wipro, Mahindra Satyam and HCL along with their founders and entrepreneurs as to the emergence of the Indian companies in the global IT arena. However, software service exporters face two major challenges, the first being the difficulty in attracting and retaining talented software professionals and the challenge of developing beyond competing on low costs alone in an environment with rapidly rising labour costs.

10.6.5 Fifth chapter

While the software sector has become a global leader without much innovation, India's biotech sector has become one with many innovations. Biotechnology is one of the essential technologies of the knowledge economy and is one of the most R&D intensive industries, as global leaders of the biotech industry spent an average of more than 20 percent of their revenue on R&D, whereas other high-tech sectors, such as computer hardware and software fields spent, on average, less than 10 and 20 percent respectively. The Indian biotech industry grew threefold in just five years to report revenues of \$3 billion in 2009-10, a rise of 17 per cent over the previous year. The biopharma sector contributed nearly three-fifth to the industry's revenues at \$1.9 billion (rise of 12 per cent), followed by bioservices at \$573 million and bioagri at \$420.4 million. The remaining revenue came from the bioindustrials (\$122.5 million) and bioinformatics (\$50.2 million). Biopharma and bioservices sectors contributed 63 per cent and 33 per cent respectively in biotech exports. Bioagriculture, bioindustrials and bioinformatics sectors remain focused on domestic operations. While the industry accounted for \$3 billion, the equipment and ancillary segment contributed around \$1 billion. India is also gaining importance as a clinical trial destination. India's biotech action is not confined to just therapeutic products. In 2002, after a long regulatory process, the first genetically modified product, a *Bacillus thuringiensis* cotton

variety was introduced.

The Indian biotech firms demonstrate their innovation capability by a large number of their own brands of recombinant products. Biotechnology Information System has more than 150 bioinformatics centres located across the country. The biopharma segment mainly concentrates on vaccines, non-vaccine therapeutics, other novel products and contract services. Biogenerics represent a major future opportunity in economic terms and for products at reasonable costs because of many noted drugs going off patents. India's thrust is on producing ethanol from cellulose biomass, including agricultural and forestry waste, biodiesel from varied feed stocks, and optimally harness the energy potential of natural resources for conversion to alternative fuel.

Nicholas Piramal India is a big brand name and ranks as fourth in the Indian healthcare market, offering a number of services like medicines and therapies. The company has also successfully launched itself in the markets of Europe, North America and Asia. Dr Reddy's ranks among the premier biotech companies and has successfully launched into the American and European markets. The company is known for offering specialized facilities in the field of healthcare and therapeutic medicines. It also provides research facilities in areas like inflammation, metabolic disorders and infective diseases. Indian Immunologicals ranks among the best vaccine producing companies in the world. Bharat Serums and Vaccines is one of the fastest growing biotech companies, having engaged in the development and manufacturing of specialized biological and pharmaceutical products. The Serum Institute of India is the world's largest producer of MMR and DTP group of vaccines. The Institute produces several recombinant and combination vaccines (like Gene Vac-B), anti-cancer drugs, as well as anti-sera, plasma and hormonal products. Biocon is a premier biotech company specializing in biopharmaceuticals, custom research, clinical research and enzymes. The company is a leader in the field of bioprocessing and clinical research and development, and provides solutions/products in both domestic and international markets. Biocon launched the world's first recombinant human insulin and has produced India's first indigenous monoclonal antibody. Panacea Biotech is a leading health management company specializing in developing innovative prescription medicines, breakthrough vaccines, peptides and monoclonal antibodies and cutting edge new drug delivery technology. Wockhardt is concentrating on the anti-infective therapeutic segment, as the main thrust area in new drug discovery R&D. Ranbaxy started as a manufacturer of active pharmaceutical ingredients and soon began looking at international markets for securing these ingredients. Domestic biotech firms are confronted with two major challenges in developing innovation capacity, financial and human resource constraints. India has many world famous bioentrepreneurs.

10.6.6 Sixth chapter

The Indian business groups have flourished due to policy distortions, informational imperfections and entrepreneurial scarcity and in the absence of specialized intermediaries in the

capital market. This chapter discusses about the business groups, characterizing their growth and development of entrepreneurship in terms of innovations, market leadership and future development. Indian business families are different from those in the west and most of them are part of the old joint family system. In the colonial period, only the European entrepreneurs flourished and it was only after the mid-19th century that family businesses emerged in India under solely individual funding and family-controlled managing agency system. After independence until 1991, the growth was subject to many government regulations and licence raj dirigisme. It was only after 1991 that the business groups diversified and internationalized toward global leadership.

Tata Group is one of the largest companies in India by market capitalization and revenue. The group has interests in communications and information technology, engineering, materials, services, energy, consumer products and chemicals. The group went through significant restructuring around 1998 and reduced the number of group affiliated firms and business portfolios by more than 50 per cent. The Tatas shifted their focus from commodity businesses (like cement, pharmaceuticals and toiletries) to brand and services (like software) that provided a more sustainable return. However, the group has many unrelated businesses that prevent it from achieving the required level of improved focus and synergy of resources to compete with relatively newer groups.

The Reliance group is the largest business house with total revenues being more than \$22.6 billion. It is involved in oil exploration and production, gas refining and marketing, petrochemicals, textiles, financial services, insurance, power, telecommunications and information technology. Reliance has the distinction of being the first Indian company to be named among the five hundred in Forbes. With innovative measures like convertible debentures, Reliance has become a favourite in the stock markets and it pioneered in raising funds in the international markets. Mukesh Ambani is the chairman of Reliance Industries, the largest private sector enterprise in India listed in Fortune 500 magazine. Though petrochemicals, refining and oil and gas-related operations form the core of its business, other segments include textiles, retail business, telecommunications and special economic zone development. Reliance Industry is the world's largest polyester producer and as a result one of the largest producers of polyester waste. Anil Ambani is the chairman of Reliance Anil Dhirubhai Ambani group, which was split after the death of the founder of Reliance.

The Aditya Birla group has diversified business interests and is a dominant player in sectors in which it operates such as viscose staple fibre, metals, cement, viscose filament yarn, branded apparel, carbon black, chemicals, fertilizers, insulators, financial services, telecom, BPO and IT services. The group is organized into various subsidiaries that operate across different sectors like viscose staple fibre, non-ferrous metals, cement, viscose filament yarn, branded apparel, carbon black, chemicals, retail (under the more brand of supermarkets), fertilizers,

insulators, financial services, telecommunication, BPO and information technology services.

ITC is engaged in fast moving consumer goods, hotels, cigarettes, paperboards, packaging, information technology, branded apparel, safety matches and agribusiness. The Company's e-choupal initiative is enabling Indian agriculture significantly enhance its competitiveness by empowering Indian farmers through the internet.

The Bajaj group comprises 34 companies and its flagship company Bajaj Auto is ranked as the world's fourth largest two and three wheeler manufacturer and the other companies include Bajaj Electricals, Mukund and Bajaj Hindustan. The group is involved in automobiles (2 and 3 wheelers), home appliances, lighting, iron and steel, insurance, travel and finance.

Bharti Airtel is one of India's largest telecommunications providers, with a market capitalization of \$31.8 billion. The company's partnerships with a range of foreign firms over the course of its history were central to Bharti Airtel's ability to grow in a capital-intensive industry and take on tough competition from state-owned enterprises and well-funded offshoots of powerful business groups.

The Godrej group is among the largest family-owned businesses in the country. Its seven major companies have interests in real estate, FMCG, industrial engineering, appliances, furniture, security and agribusiness and its turnover crosses \$2.6 billion. Its products include locks, access control systems, security systems and safes, typewriters and word processors, rocket launchers, refrigerators and furniture, outsourcing services, machine tools and process equipment, cosmetics and detergents, engineering workstations, medical diagnostics and aerospace equipment, edible oils and chemical, mosquito repellents, car perfumes, chicken and agri-products, material handling equipment like forklift trucks, stackers, tyre handlers, sweeping machines, access equipments etc.

The Adani group's core business includes commodities trading, edible oil manufacturing, Mundra port operations and distribution of natural gas.

Wipro started in 1945 with the setting up of an oil factory and remained largely unheard of in the pre-reform era. During 1990s, the group had diversified into various product lines like soaps, baby products, hydraulic cylinders, personal computers and software services. After liberalization, it has transformed into a global group and derives most of its value from information technology services.

The Hero group had focused on manufacturing automobile parts and other related goods. The Escorts group has played a pivotal role in the agricultural growth, especially in farm mechanization. The MP Birla group has operations in over 12 countries and a turnover that exceeds \$8 billion. In the initial years, the group was only involved in commodity trading and in

exports and imports. In 1918, the group diversified out into manufacturing and set up its first jute mill. The group was involved in the manufacture of a vast range of textiles made from jute, synthetics, cotton, wool and fibres.

The chapter concludes that about 75 percent of the largest companies are family businesses, with some variation in the number of family firms in big companies, wherein the top 17 private business groups lead in market capitalization.

10.6.7 Seventh chapter

This chapter enumerates the achievement of small and medium enterprises (SMEs) to the growth of entrepreneurship in India and how the sector has been able to sustain the pace of development in the economy. Small enterprises are the engine of growth in countries like India and create jobs, foster entrepreneurship, utilize local skills and resources and strengthen the industrial base of the economy. This sector has contributed to the overall growth of the GDP, to employment generation and to exports, consistently outperforming large industry in production and employment. While in the advanced countries, the typology of SMEs tends to be homogeneous mainly in term of firm size and technology, in India they are characterized by low industrialization, with co-existence of both very small enterprises in the informal and SMEs in the organized sectors. However, modern SMEs are capable of adopting state of the art technology, relatively big with larger market share, quality conscious and export-oriented. The major problems faced by the SMEs not only in the auto industry but in general relate to availability of loan without collateral, delay in getting the loan, high cost of funds, delayed payments, marketing problems, WTO related issues and sickness.

National Institute of Small Industry Extension Training has developed the first Entrepreneurship Development Programme (EDP) model to develop first-generation entrepreneurs. Indian Institute of Entrepreneurship, state-level Centres of Entrepreneurship Development (CEDs) and Institutes of Entrepreneurship Development (IEDs) have been established for strengthening the training infrastructure of existing and new entrepreneurship development institutions. National Entrepreneurship Development Board is the apex body for entrepreneurship development. Small Industries Development Organization agency advises, coordinates and formulates policies and programmes for the development and promotion of the small-scale sector. The Department of Science and Technology under the Ministry of Science and Technology has made efforts to tap the talents of the country's science and technology students through entrepreneurship strategy. National Science and Technology Entrepreneurship Development Board promote knowledge-based, technology-driven entrepreneurship.

Technology-based Entrepreneurship Development Programme is designed to develop and motivate entrepreneurs in specific products, technologies and processes developed by CSIR labs and other R&D institutions. In addition to training programmes, NSTEDB has created

Entrepreneurship Development Cells (EDCs) to generate entrepreneurial culture in academic institutions, foster techno-entrepreneurship and encourage enterprise startups. Science and Technology Entrepreneurship Development aims to bring about socioeconomic development in the selected area through S&T intervention. The department of Scientific and Industrial Research promotes R&D among the industries, support small and medium industrial units to develop state-of-the-art globally competitive technologies of potential, catalyze faster commercialization of R&D, enhance the share of technology-intensive exports, strengthen industrial consultancy and technology management capabilities and establish a user-friendly information network to facilitate scientific and industrial research. The Techno-Entrepreneur Promotion Programme promotes supports and assists individual innovators in becoming technology-based entrepreneurs.

The EDP mainly focused on entrepreneurial stimulation through a training-cum-counseling package that includes motivation, project guidance, managerial orientation and information, preparation of a project plan and implementation of the project. The National Resource Centre for Cluster Development with fund assistance from SIDO has been working on manufacturing, service and traditional clusters. Finally, the chapter documents the success stories of SMEs citing three case studies in Andhra Pradesh, two in Karnataka and one in Tamil Nadu.

10.6.8 Eighth chapter

This chapter presents the various aspects of entrepreneurship in its social, public, ecological, institutional and gender perspectives to showcase some of the recent deliberations on the subject. Social entrepreneurs play the role of change agents in the social sector by adopting a mission to create and sustain social value (not just private value), recognizing and pursuing new opportunities to serve that mission, engaging in a process of continuous innovation, adaptation and learning, acting boldly without being limited by resources currently in hand and exhibiting a sense of accountability to the constituencies served and for the outcomes created. The first phase of social entrepreneurship was around 1980, represented by the founding of Ashoka by Bill Drayton to develop and legitimize the field. The second phase occurred soon after and the two were part of the same wave of the early 1980s with the response to the increasingly growing gap between the haves and the have-nots. The third phase of evolution is related to corporate social responsibility in the early 1990s that holds that the business of business is not just increasing shareholder value; rather, companies must embody transparency and ethical behaviour, respect for stakeholder groups and a commitment to add economic, social and environmental value. The fourth phase began in the early 1990s, wherein it was proved that one non-profit was a more effective investment than another and is accomplished by the establishment of clear measurable goals, benchmarks and outcomes. If business entrepreneurship deals with application of entrepreneurial energy primarily for generating wealth for a commercial business group and its shareholders by producing and supplying products and services, social entrepreneurship deals with application of entrepreneurship for addressing social and environmental and causing social

and environmental change through non-violent, non-coercive methods by generating significant impacts in the target. An important aspect of social entrepreneurship is microfinance, where the participation of women in micro development has become very crucial.

Ecopreneurship involves green or ecological entrepreneurship and plays a critical role in business development. Future sustainability driven activities of business are driven by innovative market based mechanisms which might make these sectors profitable apart from achieving the objective of sustainable development. Such mechanisms offer vast scope for various players including SMEs. The recently established perform-achieve-trade of the government of India through the Bureau of Energy Efficiency is a step which is likely to provide not only a major impetus to strengthening energy efficiency practices across many industries, but also provide a market based trading mechanism for achievers in the forms of energy saving certificates. The concept of Renewable Energy Certificates is also an attempt to involve industry at providing market based incentives to project developers in renewable energy to develop clean technologies and increasing the overall share of renewable energy in the energy mix.

Public entrepreneurs are individuals whose policy proposals and political positions represent a dynamic change from existing procedures. The theory of political entrepreneurship depends on some concept of economic profit, which cannot be easily employed in the study of political entrepreneurs. As political actors do not produce goods and services that are bought and sold on markets, political gains cannot be measured in monetary terms, in the same way as economic profit and political entrepreneurs cannot use strict monetary calculation to measure the success of their efforts. Therefore, political entrepreneurship requires subjective measures of benefits and costs from the actor's point of view (Penrose, 1959). Examples include perceptions by the electorate of fairness and subjective valuations by special-interest group members affected by political actors. Political entrepreneurship involves identification and exploitation of political profit opportunities, which are identified as gains from trade analogous to those resulting from market exchange and the theory takes a Schumpeterian perspective focusing on creative political innovations that modify the way that public entities operate. Political entrepreneurship has to consider the institutional environment or the rules of the game (constitutions, laws, norms, property rights and regulatory systems), while commercial entrepreneurship aims at creating economic value for the purpose of private appropriation within a given set of (shifting and non-immutable) rules.

The institutional economics approach is consistent with entrepreneurship theory that focuses on economic opportunity as a fundamental determinant of entrepreneurial action. Institutional entrepreneurs recognize the obsolescence of institutions, design new institutional arrangements and engage in a variety of strategies like pooling of resources, mobilizing constituents and framing issues to their advantage in order to implement institutional change (DiMaggio, 1988). Institutional entrepreneurs reflect on the institutional status quo and are able

to challenge existing rules and practices and institutionalize the alternative rules and practices they are championing. Recent work has focused on institutional entrepreneurs at the corporate firm or trade association level, where they may seek to influence state-level policies. Institutional entrepreneurs may act in response to functional, political or social pressures that challenge existing institutional structures. Institutional entrepreneurs have been defined as actors with social skills, where social skills refer to the ability to motivate cooperation of other actors by providing them with common meanings and identities

Women entrepreneurship development in developing countries has a tremendous potential in empowering women and transforming society. However, this potential remains largely untapped. Sinha (2003) remarks that there are three categories of women entrepreneurs based on chance, forced or created entrepreneurship. These categories are based on how their businesses got started or the main reasons or motivations behind starting their own businesses. Chance entrepreneurs are those who start a business without any clear goals or plans. Their businesses probably evolved from hobbies to economic enterprises over time. Forced entrepreneurs are those who were compelled by circumstances to start a business and their primary motivation tends to be financial. Created entrepreneurs are those who are located, motivated, encouraged and developed through entrepreneurship development programmes. India has been dealing with many generations of gender issues. The first generation was defined by the lack of managerial opportunities for women, because of an assumption that they were only good for easy jobs. The second generation issue was the oppression of women using subtle barriers, even in the face of equal opportunity policies. As a third generation issue, women's need for varying work-life balance over their careers has remained unaddressed. Women are leaders in micro ventures, focusing on leveraging key cultural resources.

The chapter concludes that whereas a wealth creation entrepreneur typically measures performance in terms of profit and return, social and institutional entrepreneurs assess success in terms of the impact on society as well as in profit and return, operating through non-profits or charities from a private standpoint. Just as entrepreneurs change the face of business, they act as the change agents for society, seizing opportunities others miss and improving systems, inventing new approaches and creating solutions to change society for the better.

10.6.9 Ninth chapter

Tata is the only innovative Indian company to find its place in the world's top 50 innovative companies. To name a few instances of India's leadership, Tata Nano has been the most innovative people's car introduced in recent times. In iron and steel industry, mergers and acquisitions and technological innovations have enabled Arcelor-Mittal and Tata-Corus to become global leaders. The emergence of Tata Consultancy Services, Infosys and Wipro as global outsourcing companies has pushed India to the forefront of global IT leadership. The achievement of Indian biotech firms like Ranbaxy, Cipla, Dr Reddy's and Biocon have resulted

in India taking up leadership in many a pharma sector. This chapter showcases the growth of innovative culture amongst Indian entrepreneurs and how in select sectors the country is able to have global leadership

While Japanese entrepreneurs took control of both peripheral physical and intellectual assets discarded by western firms, the entrepreneurs found opportunities for redeploying and repacking these assets into popular products. They demonstrated how such products could be produced using peripheral assets, such as transplanting factories in Asia and other less attractive regions. The use of peripheral assets is depicted by the Japanese in the 1950s as they bought scrap steel from western junkyards and reprocessed it in their mini steel plants. Later, during the 1980s, the Japanese partnered with the US auto parts suppliers who were subject to huge bargaining pressures from the US assemblers and in this partnership, the Japanese transformed from being suppliers of basic functional vehicles to suppliers of augmented high end vehicles (Gupta, 2002).

Chinese entrepreneurs took control of their previous generation's physical and intellectual assets, which had been transferred by western firms. Several western firms were transferring their older generation's assets into the consumer electronics, auto and other sectors to China since the cost of losing intellectual property rights was relatively limited (Gupta and Wang, 2004). During this time, the entrepreneurs found opportunities for redeploying the assets more cost-effectively using a range of mass products. In discovering such opportunities, the entrepreneurs demonstrated astute negotiation for huge premiums from western firms, which were seeking to acquire their share in the joint ventures, while wanting to give up their own share for a huge discount.

Indian entrepreneurs are taking control of their current generation's physical and intellectual assets since western firms are finding them costly to deploy. The entrepreneurs are transforming the next generation's assets by making them accessible to even the grassroots markets. They are discovering how grassroots can use their unique culturally-embedded knowledge. An example of back-yard entrepreneurs is Conserve in New Delhi, which employs poor urban rag-pickers to collect, sort, weigh and clean the plastic bags that litter the streets. The bags are melted together to create a thicker material. This recycled trash is then turned into chic handbags that are sold for \$50 in European boutiques. The information technology revolution has created global leaders in IT.

The emergence of innovative entrepreneurial culture in the pre-colonial period relates to panchayati raj (until 1700). The panchayati raj system germinated a crafts form of entrepreneurship as each village had different occupation-based community groups, all of which specialized in a particular class of crafts or services. During the colonial rule (1700-1947), indigenous crafts faced significantly adverse environment. At the same time, the colonial era opened a window of opportunity for entrepreneurship with global characteristics, with the revival

of panchayati raj traders specializing in international markets. The licence raj period (1947-80) witnessed a regulatory framework of impediments and compensation, resulting in the public sector taking command of major investments, while the small scale sector thrived in minor investments. In the liberalization regime, many firms began hiring professionals to construct capacity for participating in the national automation projects. Many MNCs emerged as an important influence on local entrepreneurship and transferred older technologies and product designs, while pushing them using attractive consumer credit.

In India, a pattern of entrepreneurship, distinct from early Japanese and Chinese styles appears to be emerging. The Japanese model of entrepreneurship was based on the use of globally discarded materials and manpower, while the Chinese model has been based on the cost-effective use of earlier generation's global machinery and methods. The emerging Indian model is based on the making of the next generation's products and services accessible to the grassroots (Prahalad and Hammond, 2002) and creating new products and services by leveraging the intellectual properties of the grassroots.

Intrapreneurship involves taking ownership and operating with an entrepreneurial mindset. In the corporate context, since the person leading the reinvention is not an autonomous entrepreneur, he/she is more appropriately referred to as an intrapreneur. As an example, Tata Steel accomplished many new projects by setting up the Cold Rolling Mill (CRM) to manufacture high value cold rolled products for use in the automobile and white goods industry from hot rolled coils. After the completion of the CRM project was started the revamping Blast Furnace-F. The old furnace had outlived its utility and had to be totally upgraded. However, resource constraints (especially R&D) and time pressure have been the major factors inhibiting intrapreneurship. In the iron and steel industry, the new entrants and the existing manufacturers went for technical tie-ups with leading steel producers of the world post-liberalization. The best example of a company that has transformed itself into a globally competitive organization is Tata Steel. In 2001, it had been ranked number one in a survey of steelmakers conducted by World Steel Dynamics. While its main advantage came from historical and locational advantages such as ownership of low-cost iron ore and coking coal, it was number two in terms of operating costs. This transformation came about as a result of nearly ten years of concerted effort to control costs, improve operational efficiency, modernize the plant and develop a high margin. The example of likes of Tata Motors in modernization and introducing the first cheap people's car may also be cited.

The pharmaceutical companies are seeking to move from imitative research and reverse engineering to the discovery of new molecules and drug delivery systems. The average R&D intensity of large Indian pharmaceutical firms is 2 percent, owing to joint R&D initiatives with multinational drug companies, licensing of new discoveries to MNCs, sponsored research projects at national laboratories with government support and the creation of international

marketing networks. One of the most successful pharmaceutical companies has been Dr. Reddy's Laboratories and the company has invested about Rs.1.12 billion in R&D over an 8-year period. It filed 55 US patents of which 19 have been granted. It licensed three molecules to foreign drug firms for revenue of \$8 million till 200 and has increased its R&D intensity from 5.5 to 8 percent. Ranbaxy, Cipla, Wockhardt and Sun Pharma are some other pharmaceutical companies with ambitious new drug discovery programmes.

The success of the Indian software industry can be attributed to factors on both the demand and supply sides (Krishnan et al, 2003). The software companies have provided role models for entrepreneurship. Three out of the top five software companies were started after 1980 by individuals who were not from Indian business families. They have therefore communicated a message that there is no need of a family business background to be successful in business. Their success and the status enjoyed by their founders have attracted many persons to start new ventures. The southern states that have been at the forefront of the growth of the software industry have displayed entrepreneurial leadership in governance. While Indian companies are globally challenged, they have to find ways to continually reinvent themselves through widespread innovation.

In spite of development, India's overall performance in the global scenario is not in the top order. The World Bank and International Finance Corporation's report Doing Business 2012 ranks India at 166 out of 183 countries for ease of starting a business, putting it in the company of the West Bank, Gaza and Nigeria. In 2011, India did not improve in its ranking. According to the report, it takes 29 days to register and start a business in India, whereas it took 89 days to do the same thing in 2004. India has stayed the same in the categories of enforcing contracts, dealing with construction permits and trading across borders. A Legatum Institute 2011 survey found that Indian entrepreneurs are increasingly optimistic about their country's future, though they are far less approving of the government. The top five constraints to starting a business in India are mostly within the purview of the government, namely energy, corruption, tax administration, labour regulation and labour skills. India's global scenario is continued in the 10th chapter in the treatment of global competitiveness index and global entrepreneurial development index, wherein India presents an improving position, though placed at the middle order.

10.7 Some questions to be answered

The first chapter poses the question as to whether entrepreneurship is crucial to economic development in the developing countries as in the advanced countries. Entrepreneurial opportunities may be created through demographic, regulatory and institutional changes, wherein some of these changes result from entrepreneurial drivers. Also, even when opportunities may originate in demographic, regulatory and technological changes, they can pre-exist the process itself (Sarasvathy and Venkataraman, 2011). It may be possible to conceptualize opportunities in

different ways so that what appears as discovered at one point in time may be shown to have been co-created at another.

The second chapter, while assessing the evolution of entrepreneurship in India, questions whether it may emerge as a world leader. Visionary entrepreneurs had to build their markets systematically. The Kirloskar brothers could not sell their six metal ploughs even though they clearly increased productivity tenfold over wooden ploughs. They worked with social reformers and the independence movement to educate the farmers on the links between economics and patriotism could they grow their venture into the enduring firm it is today. Successful entrepreneurs become visionaries after the fact, single-minded in pursuit of their vision in the face of criticism and in the absence of resources within their control (Sarasvathy and Venkataraman, 2011).

The third chapter compares the experiences of Japan, China and Korea and discusses the entrepreneurial performance of a core sector like iron and steel industry establishment in Korea and India as a transition to global leadership. Entrepreneurship becomes a specific set of skills and becomes a generalized method (Sarasvathy and Venkataraman, 2011).

The fourth and fifth chapters fortify this by showcasing the experiences of the software and biotech industries respectively. Entrepreneurs operate continually creating a world in which no particular set of conditions is necessary for success and progress. Their job is to implement sufficient even if unnecessary conditions arise. Each solution they implement may be focal and temporary, but successful solutions are usually stable and profitable enough to fix the objectives to a new signpost (Sarasvathy and Venkataraman, 2011)

The sixth chapter presents the profiles of some of the major business houses in different sectors that have characterized the companies in the forefront of global business environment. Success depends on building on past successes and reshaping parts of the present that do not work well. Entrepreneurial action has been described as an interaction over time, between stakeholders and through local transformations of every kind of environment (Sarasvathy and Venkataraman, 2011). Rationality embedded in these interactions not only reshapes economic and social landscapes, it reconstitutes individual preferences and values.

The seventh chapter then analyzes the performance of small and medium enterprises on which the bulk of future entrepreneurial development hinges upon. Knight emphasized the importance of entrepreneurial judgment in creating the notion of profit and Schumpeter and Baumol have questioned the lack of a central role for the entrepreneur in economic theory. Entrepreneurship is not merely an instrument of free markets, but uses both markets and governments as instruments in formulating and achieving new ends (Sarasvathy and Venkataraman, 2011).

The eighth chapter focuses on different types of entrepreneurship and the progress made in India in respect of social, public, institutional, ecological and gender entrepreneurship, citing many case studies. Entrepreneurs may be characterized by heterogeneity, wherein they may be very different from one another. Further, they may change over time, wherein not only behaviours, but traits and preferences also change. They may play multiple roles, wherein both

risk taking and risk averse activities may be undertaken at the same time. (Sarasvathy and Venkataraman, 2011).

The ninth chapter devotes some space in the development of innovativeness in the case of Tatas and pharmaceutical and software companies. This chapter assesses the global competitiveness and global entrepreneurship development indexes in respect of India's emerging trend. Why it has taken so many years for India to emerge into the current position and whether it can be a global leader in select sectors? Is entrepreneurship in India showing a convergence to the western type or can there being a definite Indian model? Answers to these and other questions may be had from the assessment of entrepreneurship attempted as in the Indian case, which necessitate reformulation of entrepreneurship as a method of human action, comparable to social forces such democracy and the scientific method to tackle developing problems.

10.8 An assessment of Indian entrepreneurship

Four ethnic Indian entrepreneurs appear in the 2008 Forbes list of the top 10 billionaires Minqiu (2010). Private enterprises have provided the foundation for India's economic growth. Among the 47 Indians included in the 2008 Forbes list are Mukesh Ambani (5th) and Anil Ambani (6th) of Reliance Industries, Azim Premji (60th) of Wipro, Kumar Birla (76th) of Aditya Birla Group, Shiv Nadar (277th) of Hindustan Computer Limited and N. R. Narayana Murthy (843rd) of Infosys Technologies. India has reached its goal of becoming a global centre for manufacturing, trade, and service and many enterprises have expanded their foreign investments through various mergers and acquisitions. It is no longer unusual to encounter an Indian chief executive officer at multinational companies like PepsiCo and Citigroup and many top management positions at many Fortune 500 companies are occupied by Indian nationals.

Entrepreneurs with a strong sense of mission, steadfast values, self-confidence and determined actions according to Minqiu (2010) include Jamsetji Tata, Azim Premji and Narayana Murthy, who rather than focusing solely on generating personal income aimed to create wealth for the country and society. These entrepreneurs always set large goals and explored ways to achieve them and develop values for their enterprises and incorporate into them a code of conduct to guide their employees, the codes of conduct addressing integrity, honesty, trust, equality, responsibility, understanding, excellence and unity.

As regards innovative entrepreneurs, Dhirubhai Ambani, the founder of Reliance Industries created a massive industrial conglomerate in his lifetime. His focus was on providing shareholder value to India's multitude of small retail investors through the relentless pursuit of growth and profits through diversification, backward integration and creation of economically viable large scale industrial units. Azim Premji, the chairman of Wipro, stressed that innovation is Wipro and Wipro is innovation. When government policy restricted foreign capital, causing International Business Machines Corporation to withdraw from India in the late 1970s, Premji

entered the domestic computer market and propelled Wipro into becoming a leading information technology company.

Entrepreneurs maintain an international perspective, stressing adoption of the most advanced technologies and equipment, absorbing best talent in the world and following modern systems to keep pace and occasionally to surge ahead of international competition. India's enterprises are influenced by those in developed countries and they seek cooperation to keep pace with advanced technologies and to enter the world market. International cooperation generally involves importing technology, equipment and talent during the company's initial development stage, exporting products and launching joint ventures when the company gains strength and pressing their advantage by expanding beyond the homeland and establishing sole proprietorships and joint ventures to cooperate in technology and sales. When Jamsetji Tata opened a modern textile mill over 100 years ago, he recruited engineers, machines, technologies and various textile inventions from the United Kingdom. When he entered the steel industry, experts from the United States guided the entire process, from exploration of iron ore and coal mines to site selection and construction. When the steel plant began production, the company imported new technologies and processes from the international steel industry, becoming the most technologically efficient steel enterprise in India. The Tata group completed its four-phase, 20-year modernization and expansion programme by importing the most advanced technologies and equipment from around the world, propelling it from a small producer of carbon steel into the largest specialized steel enterprise in India. Upon entering the automobile manufacturing industry in 1954, the group reached a cooperative agreement with Daimler-Benz in Germany. During the 1990s, the group imported technologies from leading automotive companies in Germany, Japan and the United States and began manufacturing sedans. In 1998, it independently produced the Tata Indica hatchback.

JRD Tata believed that excellence requires a goal of perfection and that achieving perfection requires strict attention to detail. For Ratan Tata, quality means that consumers not only purchase Tata products but also choose them over and over again. He designed the Tata business excellence model to mirror quality standards in the United States, enabling Tata group companies to reach the highest international product standards. The international perspective of Tata group is that the company focuses on international trade and it wants to be powerful in domestic industries. Its view of a global company is that it has to be internationally competitive and must draw its assets and employees from all over the world. Global consumers must demand its products and global investors must buy its shares. A global company must obtain its raw materials, funds and talents from the best and most competitive sources, and gain customers and markets in all areas to deliver superior value to its customers, suppliers and business partners. After entering markets in other countries or areas, the company must accept the local culture, merge into society and contribute to local economic development.

Tata Consultancy services has created a new offshore operation method, changing from body shopping to business process outsourcing, bringing overseas projects to India for work. It developed new software programmes, most notably for financial services. It generates 90 percent of its income from overseas businesses. Infosys Technologies derives more than half of its revenue from the United States and about a quarter from Europe. Shiv Nadar's Hindustan Computer Limited developed India's first microcomputer and initiated technology cradles where new, high-potential and cutting-edge technologies are incubated and developed. HCL Technologies has over 500 clients around the world and conducts business in 17 countries. Mahindra & Mahindra Limited purchased a franchise from Willys-Overland, the American Jeep producer, which allowed it to import, assemble and sell Jeep parts in India. This strategy allowed the company to sell various types of vehicles to consumers in different market segments. Hero group, after becoming India's largest bicycle producer in 1975 targeted the western market and imported modern equipment from Europe and Taipei, China, updating its technologies and manufactured high-standard products. Technological support from developed countries played an important role in Wipro's business expansion, which earns 60 percent of its sales revenue in the U S and 30 percent in Europe. Wipro imported technologies from Switzerland when it was still a hydraulic cylinder producer and later forged a strategic relationship with Apple, IBM, Intel Corporation, Seiko Epson Corporation, Sun Microsystems and Tandem Computers.

Infosys sells its products on the basis of value rather than cost, while providing an image of a local company. Kumar Birla of Aditya Birla group believes that the greatest challenge to the globalization of India's enterprises comes from culture, i.e., that global expansion requires not only geographical reach but also a mindset. Several Tata companies have completed more than 20 overseas acquisitions in recent years. Wipro employs workers from over 40 countries and its 53 research centres are located throughout the world. Aditya Birla group owns 85 companies and maintains service centers in 20 countries. Infosys operates offices or research centres in 20 countries. Tata Consultancy Services has established research and development centres in 10 countries. Infosys and Wipro joined NASDAQ9 in 1999, and Dr. Reddy's Laboratories joined the New York Stock Exchange in 2001. In the mid-1990s, Reliance Industries raised funds through global depository receipts and later issued euro convertible bonds in Europe and the first Indian company to issue 50-100 year bonds in the United States.

JRD Tata believed that Tata group companies should recruit the best and most dedicated personnel. Wipro operates by the principle of employing the best and invest in them. Infosys Technologies identifies the best learners among skilled applicants, because they generally are modest, often to the point of shyness, and have a deep respect and hunger for knowledge which is the key to personal progress (Ghoshal and Bartlett, 1994) Training programmes at Reliance Industries reflect the company's belief that thoughts, behaviour and management should mirror the world's best training methods. Tata group's strict rules encourage and discipline employee behaviour, and its companies offered generous salaries and benefits before they were required by

law. Tata's code of conduct includes stringent requirements for services, skills, ethics and values. Wipro stresses trust and encourages its employees to create synergistic efficiency through joint efforts.

G D Birla indicated that the wealth one generates should benefit multiple stakeholders. Aditya Birla Group invests part of its profits outside of its business to improve society, notably health care, education and infrastructure. The group also developed a concept of sustainable livelihood, channeling resources to ensure that people can sustain themselves. In 1995, Kumar Birla further institutionalized the concept of triple accountability of economic success, environmental responsibility and social commitment. The Aditya Birla Centre for Community Initiatives and Rural Development was established to provide strategic direction and thrust areas for their work ensuring performance management. All Aditya Birla companies have rural development cells that implement various sustainable livelihood programmes and all are subject to internal performance assessment and external auditing. Reliance Industries builds public infrastructure; ensures environmental safety; implements energy conservation and provides local communities with drinking water, health care, schools, scholarships and hospitals.

Premji's management model includes replacing intrusive judgment with objective fact, guiding the development of enterprise with measurement standards, achieving objectives by combining data, intention and measurement, establishing a target pole management model that recognizes excellent management, implementing target, result and purpose management that combines strategic objectives with root performance, automating business processes, improving the scientific basis of programmes and keeping customers informed about the progress of their projects, maintaining a strict performance evaluation system to review all employees and encourage them to recognize their own achievements, define their career paths and achieve their personal goals and eliminating extravagance and encouraging thrift (Hamm, 2007). Premji recognizes a strong relationship among the accumulation and development of human resources, the development of an enterprise and power of a nation. In the modern world, the key difference between advanced and developing countries involves their ability to release human capacity and translate human capital into economic activities.

10.9 Scope of entrepreneurship in India

In India there is a dearth of quality people in industry, which demands high level of entrepreneurship development programme. The scope of entrepreneurship development in India is tremendous, since there is widespread concern that the acceleration in GDP growth in the post reforms period has not been accompanied by a commensurate expansion in employment. Results of the 66th round of the National Sample Survey Organization show that unemployment figures in 2009-10 were as high as 8.9 million, one million more Indians joining the rank of the unemployed between 2007 and 2010. The rate of employment generation has declined from 2.7 to 0.8 percent during the period. This slowdown in employment generation is evident across both

rural and urban areas, though it was especially marked in rural India, requiring an upping of rural entrepreneurship. The rising unemployment rate (9.2 percent) has resulted in growing frustration among the youth. In addition there is always problem of underemployment. As a result, increasing the entrepreneurial activities in the country is the only way out. The report of Planning Commission to generate employment opportunities for 10 crore people over the next ten years has recommended self-employment as a way-out for teaming unemployed youth. The success of Indian entrepreneurs in Silicon Valley is evident and the only thing that is lacking is confidence and mental preparation. What is more important than the skill and knowledge base is the courage to take the plunge. However, it is appreciative that the current generations of youth do not have hang-ups about the previous legacy and are willing to experiment. Vikas Kedia was only 21 when he had turned his back on a possible \$100,000 a year job. He has also created history of sorts in the IIM circuit by starting his own dot.com company in Bangalore, now he has his own company which is a California and Kolkata based GRMtech.

Various government departments and chambers of commerce have started organizing seminars and workshops to promote entrepreneurship. Many management colleges have incorporated entrepreneurship as part of their curriculum. In India, where over 300 million people are living below the poverty line, it is simply impossible for any government to provide means of livelihood to everyone. Such situations surely demand for a continuous effort from the society, where the people are encouraged to come up with their entrepreneurial initiative. Encouragement has to be provided in the shape of venture capital and infrastructural support, like the export processing zones. About 35 percent of the start-ups in Silicon Valley are by Indians and similar risk-taking ability has to be cultivated within the country. Entrepreneurs need more than technical talent, more than business savvy. Entrepreneurs must learn how to overcome the risk of failure or of vulnerability. The institutions can give them valuable insights and also support them in this.

Entrepreneurship will determine technical innovations, status of social institutions and political management systems. On the basis of these factors, we can expect the future to be a place where basic needs will remain and only the wants will change. India will overcome the barriers of infrastructure with a strong manufacturing and agricultural sector. Entrepreneurs and not managers will be in demand, as only they will be equipped to find order in chaos. The focus of entrepreneurial energy will shift from achieving volume sales to fulfill a specific requirement. Governance will become more transparent and will be willing to accept changes necessary for growth and development. More autonomy will become the basis of all issues. The future entrepreneurship endowment will be the key driver of economic development. Technological obsolescence will become order of the day and there will be more space for leisure. New businesses will be credited with providing variety of new jobs in the economy. New and small business will also develop more than their share of product and service innovation. There may be technological upheavals in quick succession, social value systems and cultural issues undergoing

slow but dynamic transformations. For transformation to happen there needs to be support both at the governmental and societal level. For the government it is important to realize that the goal of small business owners will be to remain self-employed. Such people may not need financial assistance but they will need marketing and legal assistance in order to sustain themselves. Practical and cost effective programmes need to be developed to address their needs because self-employed people will represent an important segment in economic revitalization. Entrepreneurship development is the key factor to fight against unemployment, poverty and to prepare the country for global competitive advantage.

The lack of effective entrepreneurship may be one of the causes of poverty in developing countries, though they may have many entrepreneurs. Many in advanced countries are not entrepreneurs, mostly working for companies, doing highly specialized and narrowly specified jobs, implementing someone else's entrepreneurial vision and people are entrepreneurial in the developing countries than in the developed countries (OECD, 2007). According to that OECD study, in most developing countries, 30-50 per cent of the non-agricultural workforce is self-employed. In some of the poorest countries, the ratio of people working as one-person entrepreneurs is high at 66.9 per cent in Ghana, 75.4 per cent in Bangladesh and 88.7 per cent in Benin. In contrast, only 12.8 per cent of the non-agricultural workforce in developed countries is self-employed and the ratio is only 6.7 per cent in Norway, 7.5 per cent in the USA and 8.6 per cent in France. The difference is 10 times, if we compare Bangladesh with the USA (7.5 per cent versus 75.4 per cent). And in the most extreme case, the chance of someone from Benin being an entrepreneur is 13 times higher than the equivalent chance for a Norwegian (88.7 per cent versus 6.7 per cent).

Entrepreneurs like Edison and Gates became what they are only because they were supported by a whole host of collective institutions and the scientific infrastructure that enabled them to acquire their knowledge and experiment with it. Company and other commercial laws made it possible for them subsequently to build companies with large and complex organizations, while educational institutions supplied highly trained personnel that manned those companies. The financial institutions enabled them to raise huge amounts of capital when they wanted to expand, while patent and copyright laws protected their inventions. Besides institutional support, cooperation amongst the entrepreneurs also matters. As in the case of dairy industry in Denmark, the Netherlands and Germany which has become what it is because farmers organized themselves, with state help into co-operatives and jointly invested in processing facilities and export marketing. In contrast, the dairy sectors in the Balkan countries have failed to develop, despite quite a large amount of microcredit channelled into them, mainly because the farmers tried to make it on their own. Many small firms in Italy and Germany jointly invest in R&D and export marketing, which are beyond their individual means, through industry associations, whereas developing country firms do not invest in these areas because there is not such a collective mechanism.

The engine of development for developing countries is the informal sector, fuelled by microcredit. Microcredit allows the poor to get out of poverty through their own efforts, by providing them with the financial means to realize their entrepreneurial potential. In the process they gain independence and self-respect, as they are not relying on hand-outs from the government and foreign aid agencies for their survival any more. Women are empowered by microcredit, as it gives them the ability to earn an income and thus improve their bargaining positions vis-à-vis their male partners. Unfortunately, there are criticisms of microfinance since little evidence is available on its positive impact. In short, it is not the lack of raw individual entrepreneurial energy, but it is the inability to channel the individual entrepreneurial energy into collective entrepreneurship that matters.

Finally, at the firm level, entrepreneurship has become highly collective in the advanced countries, manned by professional managers. The increasing scale of modern technologies was making it increasingly impossible for a large company to be established and run by a visionary individual entrepreneur and displacement of heroic entrepreneurs by executive types. In the case of Japan, the firms have even developed institutional mechanisms to exploit the creativity of even the lowliest production line workers. Similar institutional support and entrepreneurial initiatives are required for countries like India.

10.10 Conclusion

There is no doubt entrepreneurs respond to incentives in their pursuit of self-survival and accumulation of wealth. The nature of this response depends on the economic and social climates and the policy of government. The economy has to face many problems due to government regulations and little interaction with outside world. It was only after the economic reforms of post-1991 era that Indian economy began a course with the rest of the world. In this, entrepreneurial efforts have generated many social and economic benefits, including new businesses, new jobs, innovative products and services and increased wealth for future community investment (Kayne, 1999). According to Global Entrepreneurship Monitor model, the social-cultural-political context within a country must foster certain general national framework conditions, which can generate not only the opportunities for entrepreneurship but also the capacity for entrepreneurship. The important framework conditions are the availability of financing, the need for supportive government policies and the opportunities for education and training in entrepreneurship (Lal and Clement, 2005) and providing opportunities for education in entrepreneurship is critical in this. Foreign capital has been pumped into India to exploit software development and technology services. Networking and exchange among both new and established entrepreneurs and providing venture capital to the start-ups are to be the focus, besides an emphasis on high-tech manufacturing, which is very low at present. Though India has a good industrial base (never it had an industrial revolution) its export structure is still dominated by low-tech products. A high-tech export structure relies on complex products like electronic machinery, precision instruments and fine chemicals, which yield competitive advantage. Hence,

encouragement of high-tech entrepreneurship is required, especially of the intra, eco and technopreneur types leading to strengthening of entrepreneurial skills and improvement of entrepreneurial framework conditions.

Nations cannot exist without establishing competitive advantage in certain aspects and in this regards, increase in competitiveness is the only criterion to establish an effective entrepreneurial system. Global competitiveness necessarily involves high-tech innovations and organization of labour toward increasing productivity. Proper attention has to be laid to employment generation also so that in addition to poverty alleviation, unemployment, underemployment and disguised unemployment, so characteristic of the past Indian economy are annihilated. Entrepreneurs may fall on accumulation of capital or transfer of technology, but an innovation-driven scenario beats them all. At the macro level, effective measures to develop entrepreneurship by strengthening entrepreneurial research with education and industry collaboration and at the micro level by offering specialized training courses to bring in the entrepreneurial potential of the students would be required. Modernizing the small and medium industry sector toward sustainability and case studying success stories of entrepreneurship in other systems would provide a new lease of life to the live and practice of entrepreneurship in the country. It was Adam Smith's petty 'bakers and butchers' who gave rise to the emergence of bigger day capitalists and it was the Schumpeterian entrepreneur who gave rise to radical innovations. All the more, the future of industrial prospects in India largely depends on the self-interested small capitalists and radically innovative entrepreneurs.

When we look at the breathtaking scope of entrepreneurial innovations, ordinary consumers are now able to pay their bills and purchase goods and services using their cellular phones instead of cash, thanks to innovations by telecommunications companies. The concept of micro-lending has been transformed into micro-saving, providing poor immigrants with a low-cost, secure way of saving money and sending money back home to their families. Also, entrepreneurs make use of knowledge of the tastes and preferences of local consumers to challenge the long-standing dominance of multinational. Entrepreneurs in the developing countries often start from a clean slate and engage in leapfrogging strategies. A time has come where innovation is no longer considered synonymous with Silicon Valley and other icons of Western success. Hence the Look south parody!

Lastly, the problem of unemployment which daunts not only India but many other countries can be removed only if people understand the reason behind the problem and the options available to become an entrepreneur. Entrepreneurs can fulfill the dream of any country that does not have any kind of unemployment problems. They also help the governments in implementing several plans by funding the schemes through the different taxes that their businesses pay to the government treasury. Most of these plans are aimed towards benefit of the residents thereby helping them in living a utopian dream. As has been mentioned in the preface, the drama is unfolding! Look south!! Invent in thy future fortunes!!!

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