CHAPTER V

INDUSTRY COMPETITIVENESS IN PORTERIAN TERMS

We focus on the application of the well-established Michael Porter’s theory of competitive advantage to Indian IT industry, based around his well-known “diamond” of determinants. An attempt is made to investigate the following research issues:

1. Analyzing the industry structure and management of its production processes;
2. Understanding the growth of the IT industry in India.

It is important to recognize that when the Diamond Model was proposed by Porter (1990), it represented a substantially different paradigm to assess the competitiveness of a country. The previous theories, Absolute Advantage Theory (Smith, 1776) and the Comparative Advantage Theory (Ricardo, 1821) focused on each country’s factors of production: land, labor cost, capital and natural resources. According to Adam Smith, the wealth of nations was determined by the total output of production, given specific resources. As modified by Ricardo, the opportunity cost of resource deployment, not simple productivity, would determine the advantage for one country in comparison with another. In either case, however, a country was seen to be more competitive than another based fundamentally on the factors of production or endowments it enjoyed. These theories found support in the eighteenth and nineteenth century, primarily because lower skills were necessary for competition in those days. Natural resources and factors of production were the main source of competitive advantage (Porter, 1990, p. 13). However, with increased technological innovation and globalization of the markets, theories based primarily on factor endowments were not able to explain either the success of some countries that lack natural resources or the poor performance of countries that have enormous natural endowments.

industries become competitive in particular locations. The approach looks at clusters of industries, where the competitiveness of one company is related to the performance of other companies and other factors tied together in the value-added chain, in customer-client relation, or in local or regional contexts. Porter made the analysis in two steps. First, clusters of successful industries were mapped in 10 important trading nations. Second, the history of competition in particular industries was examined to clarify the dynamic process by which competitive advantage is created. The basic method in these studies is historical analysis. The phenomena that are analyzed are classified into four determinants incorporated into the Porter diamond, which has become a key tool for the analysis of competitiveness. (Porter, 1990, p. 6) further explains that a country should focus on some industries that can be highly successful because it is not possible to be highly competitive in every industry.

A study of sectoral growth can be drawn from the literature on competitiveness which (Wignaraja, 2003, p. 15) characterizes into three perspectives:
1. “A macroeconomic perspective which deals with internal and external balance at country level and focuses on real exchange rate management as the principal tool for competitiveness;"
2. A business strategy perspective which is concerned with rivalries between firms and countries and a limited role for public policies in fostering competitiveness;
3. A technology and innovation perspective that emphasizes innovation and learning at the enterprise and national-levels and active public policies for creating competitiveness”.

The theory of competitive advantage, as described by Michael Porter in his book “The Competitive Advantage of Nations” (1990) is a well-known theory from within the second category of literature. It is fairly well known, established and relatively accessible. The work is diligently explained, critiqued and developed. Its application to the software sector in developing nations is illustrated and found to be comparatively stable. Later presentations (e.g., (Porter, 2001)) differed relatively little from the original theory, probably because the theory is “owned” by a single person. The important limitations of
the macroeconomic perspective on competitiveness are conquered. At the same time, certain aspects of the technology and innovation perspective are successfully incorporated.

5.1 MEASURING COMPETITIVE ADVANTAGE

Porter in his presentations explain the two ways to measure “competitiveness/competitive advantage”:

i. A dependent variable that measures the outcome of competitive advantage; and

ii. A set of independent variables that are a source of competitive advantage.

5.1.1 Measures of competitive advantage

Porter offers a choice of the measures: productivity, exports and outbound investment to those desirous of exacting competitive performance. His focus remains on productivity- “The only meaningful concept of competitiveness at the national level is national productivity” (Porter, 1990, p. 6). It is measured in terms of GDP per capita: “the best single, summary measure of microeconomic competitiveness available across all countries” (Porter, 2002, p. 8). Other measures of international competitive advantage are (1) the presence of substantial and sustained exports to a wide array of other nations and/or (2) significant outbound foreign investment based on skills and assets created in the home country” (Porter, 1990, p. 25).

5.1.2 Sources of competitive advantage

To explain competitive advantage Porter feels that one must look for the independent variables – the determinants of competitive advantage – at industry or even at segment level. These determinants, in part, can be summed up by a “diamond” of four main determinant categories.
5.2 DETERMINANTS OF COMPETITIVE ADVANTAGE

The determinants of competitive advantage envisaged by Porter in his diamond model are discussed below:

5.2.1 Factor Conditions

Factorsofproductionaré“the inputsnecessaryto competetoinanyindustry” (Porter, 1990, p. 76). Porterclassifies these intohuman resources, physicalresources(natural resources inclusive of location andtimezone),knowledgeresources, capitalresources,andinfrastructure(transport, communications,andpower).Hemoves a step ahead beyond the simplefactorapproachesofother models(usedineconomics)inanumber ofways:

- The richness of categorization (Grant, 1991): Porter provides a much richer perspective on production inputs compared to simple factor models, like labour”, “capital” and “land”. He identifies hierarchies among factors. The “basic factors
... natural resources, climate, location, unskilled and semi-skilled labor, and debt capital” and “advanced factors ...modern digital data communications infrastructure, highly educated personnel... and university research institutes” (Porter, 1990, p. 77) as well as “generalized factors... the highway system, a supply of debt capital... [that] can be deployed in a wide range of industries” and “specialized factors [that] involve narrowly skilled personnel, infrastructure with specific properties” and that have limited applicability (Porter, 1990, p. 78). Advanced factors are more significant for competitive advantages and unlike factors whose supply depends upon exogenous ‘endowment’; advanced factors are a result of the investment by individuals, companies and governments. The relationship between basic and advanced factors is complex. Basic factors can provide initial advantages which are subsequently extended and reinforced through more advanced factors. Conversely, disadvantages in basic factors can create pressures to invest in advanced factors. The advanced factors which provide the most enduring basis for competitive advantage tend to be specialized rather than generalized. Specialized resources are often specific for an industry and are more significant for competitiveness. Echoing the ideas of resource-based theory, he finds that the resources that are more significant for competitive advantage are those that are hardest to replicate. This applies particularly to services where “less-skilled labour is usually not important” whereas “a nation’s stock of specialized, skilled professional and technical personnel is frequently vital” (Porter, 1990, p. 256).

- **Deployment and creation:** Porter believes that for competitive advantage, it is not merely a question of a factor accessible in an economy but is the way in which these factors are “created, upgraded and made more specialized... [and] ...how efficiently and effectively they are deployed”; (Porter, 1990, p. 76). He hence takes a dynamic and process-oriented viewpoint on factors (even though his studies are inclined to articulatemodestly about how factors are in fact deployed inthe firms).

- **Factor disadvantages:** From his field data, Porter notes that some national industries succeed despite the absence or weakness of a production factor. This
he attributes to the pressures for innovation that such a factor disadvantage creates.

5.2.2 Demand Conditions

This determinant category moves beyond the assumptions of simple economic models, which concern themselves primarily with market size. Porter is of the opinion that market size is of comparatively limited importance. What matters is the composition of demand, especially of domestic demand because, “where foreign and home market needs diverge, signals from the home market usually dominate” (Porter, 1990, p. 87). The composition of domestic demand can be traced as follows:

- The nature of the market in terms of growth rate, number of buyers, and the specific segments that dictate;
- The nature of local buyers in terms of sophistication of their demand;
- The association of domestic buyers with international markets and trends; if these buyers anticipate global demands and/or can provide channels for internationalizing domestic demand (for instance, if they are multinationals) competitive advantage shall accrue.

By and large the message is, greater the innovative pressure local buyers are able to place on firms (through qualitative than quantitative factors), the greater the competitive advantage.

5.2.3 Related and Supporting Industries

An industry’s investments in advanced factors of production are likely to have the spillover benefits beyond the confines of that industry. One of the most pervasive findings of the study was the tendency for successful industries within each country to be grouped into cluster of related and supporting industries. Economies, which are external to individual firms and industries, are internalized within the industry cluster.

The domestic focus in this determinant too is pervasive. It looks at “the presence in the nation” of internationally competitive suppliers (Porter, 1990, p. 100). Local related and supporting industries are more vital than foreign ones because of the
proximity, lower cost of transaction and “cultural similarity” (Porter, 1990, p. 106). If the suppliers to the focal industry are competitive, they can deliver low-cost and/or high-quality inputs with an early access. They can operate in a less formal manner by furnishing new ideas, through mutual problem solving and participation in the upgrading process, thus invigorating other companies in the chain to innovate. They can tender “information flow and technical interchange”.

The demand for what the focal industry produces can be “pulled through” by the international demand for the products of related and competitive industry (for instance, a globally competitive consulting services industry could help pull through the demand for software services).

5.2.4 Firm strategy, Structure and Rivalry

Porter identifies systematic differences in the characteristics of the business sectors of different countries, which are important determinants of the industry pattern of competitive advantage within each country. These characteristics include strategies, structures, goals, managerial practices, individual attitudes and intensity of rivalry within the business sector.

Three main elements are recognized:

1. **Domestic firm strategy and structure**: “Nations will tend to succeed in industries where the management practices and mode of organization favored by the national environment are well suited to the industries’ sources of competitive advantage” (Porter, 1990, p. 108). The fundamentals that comprise the national environment are quite wide-ranging. These include “attitudes towards authority, norms of interpersonal interaction, attitudes of workers towards management and vice versa, social norms of individualistic or group behavior and professional standards. These in turn grow out of the educational system, social and religious history, family structures, and many other often intangible but unique national conditions” (Porter, 1990, p. 109). The language skills, government policy and nation’s political position too play a significant role.
2. **Goals:** “Nations will succeed in industries where... goals and motivations are aligned with the sources of competitive advantage”. For the company goals, alignment will be determined by “ownership structure, the motivation of owners and holders of debt, the nature of the corporate governance and the incentive processes that shape the motivation of senior managers” (Porter, 1990, p. 110). The incentive system along with national attitudes toward money, success and risk will influence alignment of individual goals. The sector’s national prestige and priority and its ability to demonstrate sustained commitment to build it shall affect both goals.

3. **Domestic rivalry:** Whereas the previous two elements are rather somewhat broad, this one is to some extent clearer: “Among the strongest empirical findings from our research is the association between vigorous domestic rivalry and the creation and persistence of competitive advantage in an industry” (Porter, 1990, p. 117). The presence of several strongly competing domestic rivals – who foster new business formation – push each other to search new markets (often overseas), to compete on cost and quality, to develop new products and innovate and to look for higher-order factors of production. The competition between domestic firms is more emotive and personal and because domestic rivals compete from a common national platform their rivalry tends to be more intense than with foreign competitors. Hence domestic rivalry creates pressure to innovate in order to upgrade competitiveness.

5.3 **INFLUENCES ON COMPETITIVE ADVANTAGE**

While the ‘diamond’ is the central focus of the analysis, allowance is made for two other factors, ‘chance’ and ‘government’ that sit outside (Figure 5.2) the diamond.

- Chance describes elements outside the control of firms or sectors. It includes unpredictable technological discontinuities, wars, surges in demand and other chance events. These are not part of the diamond itself, but they may alter the conditions within it by exerting significant influence on the core determinants that decide which nations or sectors gain or lose from chance.
Porter takes a similar line on government policy. It is an “important influence on competitive advantage” (Porter, 1990, p. 128) but lies outside the diamond because its role is as a positive or negative influence on the four determinants. Of itself, he argues, government cannot create competitive advantage.

![Figure 5.2: System of competitive advantage](image)

Source: Adapted from (Porter, 1990)

### 5.4 DYNAMICS OF THE NATIONAL DIAMOND

The Porter thesis is that these factors interact with each other to create conditions where innovation and improved competitiveness occurs. Porter takes a holistic and systemic view of the diamond as “a mutually reinforcing system”. The four determinants operate interdependently rather than individually. Porter explores the complex dynamics of these interactions. This adds at least three further aspects to his theory:
5.4.1 Inter-relationship of Determinants

The arrows of Porter’s diamond denote that each one of the determinant categories impacts and is affected by remaining three categories. Therefore, for a comprehensive analysis of competitive advantage in an industrial sector all twelve of the possible inter-relations need to be analyzed systematically (Porter, 1990, pp. 132-143).

5.4.2 Clustering

Another important insight about Porter’s Model is the presence of “clusters” around competitive industries. Particular industry clusters can be located in countries, regions within countries, and zones within regions. They are formed by networks established among companies, suppliers, service providers, supporting industries and associations (universities, trade associations, cooperative associations) (Porter, 1998). These clusters of industries provide an enormous support because they build strong capabilities that later will develop competitive advantages to compete around the world. In Italy, for example, leather fashion makers have the support of competitive related industries such as: leather factories, shoe designers, textile fashion cluster, athletic footwear and others (Porter, 1998). The most interesting thing is that these firms compete against each other, but they also cooperate within the cluster.

(Porter, 1990) explains that within the cluster there are horizontal and vertical relationships. The former are between similar firms and the latter exist across the supply chain. These relationships help individual firms reduce costs through pooled purchasing and more efficient supply chain management, but also enhance innovation, sometimes through pre-competitive collaboration on product design issues. (Pouder & St. John, 1996) and (Bell, 2005) find out that firms inside the cluster innovate in greater levels than the ones outside the cluster. (Porter & Stern, 2001) argues that related industries concentrated in geographical regions improve the innovation process. The networks established within the cluster also increase communication (Podolny & Page, 1998); (Porter 1998)). This flow of communication among firms nurtures the learning process (Powell, Koput & Smith-Doerr, 1996) and creates knowledge (Maskell, 2001).
Finally, Porter’s model (1990) argues that only internationally competitive indigenous industries can increase country productivity and country competitive advantage (Porter, 1990, p. 678). Indigenous industries are more preferable than foreign owned MNEs, as the latter usually choose the host country for reasons of either lower cost of production, access to natural resources, or access to the market, thereby only providing a temporary economic development to the host country. The advanced benefits for the host country such as technology transfer to other indigenous industries are less likely. The MNEs in a host country usually perform assembly activities that do not require advanced technology, skilled workers, or collaborative high tech projects with indigenous industries. Only in the early stages of development are they expected to be a source of competitive advantage (Porter, 1990, p. 679) because MNEs bring some technology to the host country, employment, and some requirements to local authorities with respect to infrastructure conditions that are useful for other industries. However if a foreign owned MNE chooses the host country to set such core decisions as R&D, production of sophisticated components or strategic decisions, then it is possible that they will transfer knowledge, technology and skills to indigenous industries.

5.4.3 Chronological Dynamics

Porter affirms that though a cross-sectional perspective on competitive advantage will be of some value, a longitudinal perspective will be better because “the system is ... constantly in motion. The national industry continually evolves” (Porter, 1990, p. 144). Based upon this perception, the stages of competitive development are thereby built by Porter. Countries usually go through a series of stages in their industrial /economic development (shown in the figure below), moving from the factor-driven stage, to the investment-driven stage, to the innovation driven stage and finally to the wealth-driven stage. In each of these stages, the industries which are successful in competition with those of other nations are those whose competitive strategies are appropriate for the country’s stage of development. Porter applies this at the level of nation. However these thoughts may comfortably fit at the level of the industrial sector.
Industry Competitiveness in Porterian Terms

Figure 5.3: Stages of economic development.

There are three main stages:

a. **Factor-driven**: An industry would draw its advantage “almost solely from basic factors of production” (Porter, 1990, p. 547) like natural resources or semi-skilled labor. In this stage, factor conditions are the sole determinants of interest. Domestic demand is humble or non-existent with the foreign firms providing the source of technology and market access. The issue of supporting/related industries does not apply. Porter sees such industries as susceptible and as a poor base for sustained productivity growth. Most nations – particularly developing countries – have factor-driven development as the beginning of most of their competitive industries.

Thus, in the factor-driven stages successful companies compete on the basis of low-cost, arising from cheap labor or low-cost natural resources. Wages are relatively low and the nation is not prosperous. Competitive advantage derives from only one corner of the diamond, namely factor conditions (Porter, 1990, p. 547)

b. **Investment-driven**: “In this stage, national competitive advantage is based on the willingness and ability of a nation and its firms to invest aggressively” (Porter, 1990, p. 548). Investments are made in new technology (particularly foreign technology). The higher-skilled workers develop who in turn absorb, use and improve that technology. Investments in modern infrastructure also result. Domestic rivalry help to continue the investment drive, but factor conditions – particularly more advanced/specialized factors and the means for creating them domestically – remain significant. Domestic demand conditions may be somewhat unimportant, but Porter sees the best prospects in those industries where home
Industry Competitiveness in Porterian Terms

demand is supportive. The importance of the related/supporting industries also remain trivial, with continued dependence on foreign sources. Government may play a substantial role in creating/upgrading factors, promoting domestic competition and aiding in technology acquisition. Porter visualizes this to take place in relatively mature sectors with high labour costs, fairly standardized products and technology that is easily transferable. In 1990s Porter saw a few signs of developing nations having reached this stage.

In nutshell heavy investments are made in factories and infrastructure and new industries emerge in this stage. These sectors which are successful arestill competing on cost, but that is now achieved through scale economies and state-of-the-art manufacturing practices applied to mature products, rather than low wages. Competitive advantage is based on three corners of the diamond, factor conditions, demand conditions and firm strategy, structure and rivalry (Porter, 1990, p. 550). The standard of living is higher but still relatively low.

c. **Innovation-driven:** In this stage the full diamond is in place – advanced factors are created and deployed; strong supporting industries appear; demand is internationalized; global strategies and strong competition surface. Firms are innovating new product/process technologies and attracting foreign investment. Government’s role change to a more indirect one that helps to improve the quality of domestic demand and encourage local start-ups. Competitive pressures build up. Progress depends on elements such as factor-creation mechanisms (such as good universities), strong domestic rivalry, upgrading of demand in the domestic market, selective factor disadvantages that give an impetus to innovation, the motivation of managers and staff to make money and the capacity for new business formation. This is not a stage that Porter attributes to developing nations.

Nations to achieve prosperity must reach the innovation-driven stage, where competition takes place on the basis of both product and process innovation. In this stage the nation
has strengthened all four corners of the diamond. Prosperity is achieved and maintained unless the nation proceeds to the wealth-driven phase, in which it essentially lives on its past and goes into decline. In the wealth-driven phase, the country’s firms are run by stewards, rather than entrepreneurs. Belief in the value of competition is less intense and rivalry is reduced, as powerful firms seek protection through government policy. The motivation to innovate is reduced, employees become more interested in non-economic aspirations, and national goals become more concerned with wealth distribution than wealth production.

5.5 EXAMINING COMPETITIVE ADVANTAGE OF INDIA’S IT INDUSTRY USING PORTER’S DIAMOND MODEL

Having recognized Porter’s theory as a pertinent model for researching competitive advantage, we now relate it to the Indian IT industry. Explicitly, we now attend to two important issues. Firstly, if the industry demonstrates competitive advantage; and secondly, what explains its competitive position. Porter’s work presents at least three possible measures of competitive advantage in a sector: productivity, exports, and outbound investment. Of these, exports seem to be a useful measure of competitive advantage for IT industries, in general and for the Indian IT industry, in particular. The share of the Indian IT industry in total Indian exports (merchandise plus services) increased from less than 4 per cent in FY 1998 to about 23-25 per cent in FY 2013. The total export revenue of about USD 84-87 billion was expected to be generated in FY 2014, registering a growth of about 12-14 per cent over FY 2013.

Indian IT industry rates as the developing world’s most flourishing (competitive in Porterian terms) industry. Global market is estimated to grow at 45% annually to reach ~ USD 25 billion by 2015. Indian market is estimated to grow from ~ USD 200 million in 2012 to ~ USD 1.0 billion in 2015, a CAGR of ~ 83%. India maintained its leadership position in the global sourcing arena. Its market share increased from 52 percent in FY 2012 to 55 percent in FY 2013. Whereas, the global sourcing market grew by USD 11-12 billion in FY 2013, India accounted for over 90 percent of the incremental growth
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(NASSCOM, 2013). New global delivery centres added in 2014 recorded an impressive growth of 49 percent with over 27 percent addition being in India (NASSCOM, 2015). Therefore, it seems reasonable to say that, “India’s IT industry is indeed competitive and does demonstrate global competitive advantage”. Consequently, we move onto examine the sources/determinants and the factors influencing competitive advantage of Indian IT industry.

5.5.1 Factor Conditions I: Labour/Skills

Labour is mentioned as a decisive factor in each one of the range of analyzes of India’s software industry development ((Balasubramanyam & Balasubramanyam, 1997); (Barr & Tessler, 1997); (Krisha, Mitra & Chinoy, 2001); (Kapur & Ramamurti, 2001); (Dayasindhu, 2002); (Kambhampati, 2002); (Athreye, 2005)). Software work requires a range of diverse skills that can be characterized through a variation on Porter’s perception of the value chain (Porter, 1985) (Figure 5.4):

![Figure 5.4: Software firm value chain](image)

Source: Adapted from (Porter, 1985)

- **Core operational skills:** These are characterized in terms of the software lifecycle (Analysis–design–construction–implementation–maintenance). A demarcation is made between relatively lower-skilled downstream skills (necessary for the programming work within construction and maintenance)
and relatively higher-skilled upstream skills (associated with analysis and design).

- **Other primary skills:** These relate to project management skills (linked with the internal management of software development) and client contact skills (ranging from lower-skilled sales/marketing to higher-skilled client account/contract management).

- **Support activity skills:** The array of skills required to administer the finance, human resources and technology management within the software firm, along with the higher-level skill required for senior/strategic management.

India IT industry is moving up the value chain, initiating non-linear play and extending cost advantage through multifarious offerings to sustain competitiveness. The industry is offering enterprising solutions – IP led, multi-platform and customer centric productized services. Higher revenues are generated as industry has moved from technology providers to strategic business partners with enhanced, refined and upgraded skills (NASSCOM, 2013).

India has had a tradition of strong scientific and technical institutions and skills that pre-dates but was significantly strengthened after Independence (Lema & Hesbjerg, 2003). It provided the groundwork for development of the hardware, consulting and in-house software activity. The initial foundation for growth was a large supply of graduates (often from engineering colleges) who either had programming skills or who could rapidly develop them through company training. It is an advanced factor in Porter’s terms, albeit one that is somewhat generalized, in being utilizable in a wide range of industries, not just software (Heeks, 2006).

This factor source is created not inherited source of competitive advantage. India made ongoing attempts to strengthen this factor. India has emerged as a global “Digital Skills Hub”. It has successfully created a future ready digital workforce, with more than 150,000 employees with SMAC skills, ~50,000 employees skilled in analytics, 30,000 people in enterprise mobility and >50,000 in cloud and social media and collaboration (NASSCOM, 2015). The labor/skills factor which Porter has termed an advanced factor
has been turned around to a specialized factor thereby providing an enduring basis for competitive advantage.

The pervasive presence of English in Indian higher education and business, including the software business is an acknowledged source of skill-related competitive advantage. Since English has emerged the global business and IT language a 100 million English speaking demographic made it easy for Indian companies to align themselves with businesses in US and UK (CII PwC, 2010). Software industries in competing developing countries with potentially lower labor costs have found it difficult to imitate this source of competitive advantage (Heeks, 2006). India’s strong emphasize in mathematics in its basic education is yet another factor that most nations have found difficult to replicate. The current demographic status indicates that a large percentage (almost 45%) of Indians shall be under 25 years of age in 2015(CII PwC, 2010). This pool of manpower, if tapped correctly can sustain the cost advantage. With its large population it cannot be denied that India has provided world-class intellectual capital in abundance. The country has the world’s largest employable pool estimated at 5.3 billion in FY2014 with the most diverse skill base and second highest number of English speakers in the world. India continues to lead in cost competitiveness, is 7-8× cheaper than the source locations and 30 percent cheaper than the next nearest low-cost country (NASSCOM, 2014). Nations like Malaysia and China are emerging with competitive rates. Nevertheless, India has retained the first mover advantage and the cost differential might is not significant enough to force a change of location. Interview and other evidence show that clients and investors rate labor skills, their motivation and ability to close their labor demand-supply gap as more important than costs.

5.5.2 Factor Conditions II: Other Factors

As summarized in Figure 5.5, other important input factors for software production include a base of hardware and software systems/tools, finance, telecommunications infrastructure, other infrastructure such as utilities and transportation and—at least for software products—a sound R&D knowledge innovation base. All of these follow a fairly similar trajectory in India. In the initial days of the industry, in the 1980s, they were a source of competitive weakness rather than strength: the ICT infrastructure
was very limited and outdated, financial institutions did not understand software financing, power cuts affected firms and so on (Schware, 1992).

Figure 5.5: Software industry value chain.

For domestic-oriented production, this constrained the competitive performance of the industry. Whereas for export-oriented production—as per Porter’s formula—these were factor disadvantages that catalyzed innovation: the development of body shopping which, at the time, was a new model for international trade in services (and one, incidentally, not included by Porter in his own typology of service trade models).

During the 1980s these factors were enhanced and further improved during the 1990s. Restrictive policies were liberalized by the government. The software firms in India imported to a larger extent. Heavy public and private investments in telecommunications and other business infrastructure was witnessed. India’s venture capital industry became operational. It was induced largely by the growth of the software industry and related IT sectors. There has also been a upsurge in software R&D work, especially by multinational firms (Patibandla and Petersen, 2002), though the true depth of this work and its spillover effects are dubious.

Nevertheless, it is not clear that these improvements in other factors were a source of competitive advantage for India. This build-up, however, has allowed the gradual development of domestic-oriented software production and a gradual change of dominant
business model from body shopping to offshore management in exports. The creation of “offshore development centers” (ODCs) enabled India to keep ahead of new entrants. The significant distance from all major export markets is neutralized by these ODCs that can run significantly in virtual/asynchronous mode. Approximately 640 ODCs across > 78 countries have catalyzed business transformation for global clients (NASSCOM 2015). The locational disadvantage of the Indian IT industry is thereby resolved. The time zone difference has further brought significant advantage to the industry. Indian staff could return solutions to problems posted by North American and European clients before they returned to work the next day. India’s infrastructure development landscape is expected to transform to the next level in the coming years, driven by the government’s massive thrust on over USD 1 trillion in investments (2013-17) on infrastructure development (NASSCOM, 2013). It is to be noted, that strategic investments alone will enable differentiation. As has been rightly pointed out by (Teese, Pisano & Shuen 1997, p. 529), ‘competitive advantage is not just a function of how one plays the game; it is also a function of the assets that one has to play with and how these assets can be deployed and re-deployed in a changing market’. Will the supportive ecosystem’s ability to sustain competitive advantage as envisaged by NASSCOM show results? It is the dynamic capabilities defined by (Teese, Pisano & Shuen, 1997, p. 72) which can ensure sustainable competitive advantage. He defines it as ‘the ability to sense and then seize new opportunities and to reconfigure and protect knowledge assets, competencies and complementary assets and technologies to achieve sustainable competitive advantage’.

5.5.3 Demand Conditions

According to Porter, domestic demand is “perhaps the single most powerful determinant of national competitive advantage in services today” (Porter 1990, p. 258). Since the late 1990s, India’s IT industry witnessed steady growth in domestic demand. The simplification of laws and regulations, large-scale investments in e-Governance projects and focus on establishing the national cyber security policy, the IT-BPM industry is well poised to maintain its growth trajectory in the domestic market. The domestic IT-BPM market is rapidly approaching the USD 50 billion mark. In FY2015,
the market is expected to be a little over USD 48 billion, set to grow faster than exports market at 14 percent, driven largely by the addition of eCommerce segment.

To sell India’s domestic market for software as a factor advantage has been futile. Domestic market size has been persistently inhibited by low spending on ICTs and has been seized back by high rates of piracy. The restraints of the domestic market—its petite size and small profitability—have driven entrepreneurs into exports. Alongside this push has been the pull of global demand. The story of domestic demand that fits far better, then, is that of its role as a factor disadvantage, rather than advantage. The great leap in Indian IT began not with home demand. The demand of some US companies such as American Express and General Electric worked for India advantage. The Indian connection in Silicon Valley, the intellectual capital in India and the trend of outsourcing in current global competition altogether brought India a great competitive advantage. Export revenue from the US is likely to grow by over 17 per cent in FY2012, driven by higher demand for IT services and support. Europe has gone through a tough period in the last couple of years. However, growth is returning gradually and this region is expected to show good performance in FY2013. APAC region exhibited fastest growth at nearly 18 per cent as customers in that region showcase increased adoption to IT as they aim to compete on a more even scale in the global market (NASSCOM, 2013).

5.5.4 Related and Supporting Industries

Related and supporting industries can produce inputs which are important for innovation and internationalization. These industries provide cost-effective inputs and they also participate in the upgrading process, thus stimulating other companies in the chain to innovate.

The most important input is skilled labor, provided by the most important “supply industry”— the educational establishments in India. The size and, in part, quality and relevance of their human capital output has been continuously upgraded with strong interactions between IT companies and education providers (Patibandla & Petersen, 2002).
There have been relationships with suppliers of other input factors, such as telecommunications and finance, but there are no signs that these have provided any particular competitive edge for the industry. Except that the opening up of telecom and internet connectivity brought down the cost of communication for existing firms engaged in software exports enhancing their competitiveness.

Hardware is another important supply input. The hardware sector is not providing particularly low-cost or high-quality or innovative computers on which software is written, but instead, the links mainly relate to the software work of hardware companies; especially their systems integration activities, which provide a (small) market for domestically produced products (Heeks, 2006).

Lastly, under “related industries,” the most obvious candidate is IT-enabled services both inside the IT sector, such as back–office processing, and outside, such as call centers. There is a definite relationship: software’s offshore development center model particularly has fostered a build-up of management skills, client contact skills, reputation and ICT infrastructure, all of which have had a strong pull-through that has helped establish IT-enabled services as a fast-growing sector in India (KPMG/NASSCOM, 2004). The presence of a local software sector has therefore been a strong source of competitive advantage for development of IT-enabled services which is estimated at USD 18.9 billion in 2012. Other related businesses that developed included IT Hardware (USD 13.1 billion) and Software Products (USD16.7 billion) in the same year (NASSCOM, 2013).

5.5.5 Firm Strategy, Structure and Rivalry

Firm strategy, structure and rivalry constitute the fourth determinant of competitiveness. The way in which companies are created, set goals and are managed is important for success. But the presence of intense rivalry in the home base is also important; it creates pressure to innovate in order to upgrade competitiveness.

The extent and impact of domestic rivalry in India’s IT industry is difficult to pin down. There is evidence of competition, with relatively low barriers to entry. Thousands of firms jostle for a place in the market. Competitive pressures are strong in the domestic-
oriented work and margins are low due to constant price-cutting. The pressure imposed by growing numbers of other developing country locations for software development and perceived cost threats from locations such as China, Russia and Vietnam is also immense.

Yet, the competition in the industry has not fostered the kind of factor/quality improvements or new product/process developments that Porter envisaged. Other than encouraging entry into the export market competitive pressures have little visible contribution. The continuing strong growth of demand left Indian firms feeling they are "pushing at an open door". The MNC subsidiaries serving the captive markets of their parent organization, isolate themselves from competition with other Indian firms (Athreye, 2005).

The fact that firms have been driven to differentiate and innovate in a number of ways—adopting certifications like the capability maturity model (CMM), building specialized skills in market niches or project management, and developing new HR practices and incentive structures in the competition to recruit and retain skilled labor (Arora & Athreye, 2002) strongly resemble the kind of outcomes of competition that Porter predicts, imitation of such tactics is inevitable. The paradigm shift of the IT industry from the "traditional" model of Indian business, supportive government policy regime, the core vision of what the industry could achieve for the nation of Government officials and private entrepreneurs alike, financing and ownership models supporting entrepreneurship, the flatter hierarchies, greater linkage between reward and performance and a more less paternalistic style contributed to the differentiation of the industry organization structure and processes (Krishna, Mitra & Chinoy, 2001). Some commentators also perceive that competitive advantage is rooted in deeper national institutions or supposed characteristics: the "natural propensity for Indians to succeed in activities that require mental rather than physical skills, and flexible rather than standardized behavior" and their "natural liking for sciences and mathematics" (Krishna, Mitra & Chinoy, 2001, pp. 188,190). These sources of national competitive advantage remain "not proven". Could these institutional foundations be simultaneously supportive of both the traditional Indian sectors and the very different structures and processes seen
in the IT industry? The convincing chain of evidence of these sources of national competitive advantage needs to be explored further.
5.6 DO ALL THESE DETERMINANTS WORK AND INTERACT WITH EACH OTHER TO CREATE A HUGE IT POWER IN INDIA?

To answer this question, we need to analytically discuss what makes India so powerful in IT. Do these determinants interact with each other to create conditions where innovation and improved competitiveness occurs? Has government influenced each of the four determinants of competitiveness? Has government influenced the supply conditions of key production factors, demand conditions in the home market and competition between firms? Has the government intervention occurred at local, regional, national and international level? Have the chance events (which are occurrences that are outside of control of a firm) influenced the Indian IT industry? These are important because they create discontinuities in which some gain competitive positions and some lose.

The abundance of world class intellectual capital in India at a low cost is the biggest determinant of India’s success in IT. This is the factor condition in the Porter’s Diamond Model, specifically, the advanced factor. The industry achieved high growth rates in the 1990’s by catering to the demand of skilled personnel and services in western markets. Cost advantage was the key factor here. With the entry of US companies hungry for Indian workforce coupled with Indian companies’ appetite for growth resulted in spiraling attrition rates and rising salary bills. In high-end areas of software development, silicon chip designing and R&D, the cost advantage is negligible. Anticipating erosion in competitive advantage, Indian companies begun exploring avenues that yield high revenue per employee such as consulting and product development. They also started to explore newer revenue models such as transaction-based payment and licensing of software. In the emerging scenario, IT services firms are taking over IT infrastructure of their customers and managing it, instead of just developing software applications for them. In addition they are also looking at buying out the IT infrastructure of large customers for long term management. These are certainly signs of the maturing of Indian IT services and application software development companies.

What about the demand condition? Unlike Porter’s Model, the India great leap in IT has not begun with great home demand. The global competition made global company search for low cost alternative to stay competitive in global market. The alternative was found; they had to find other parties that could provide same products/services with lower
cost. India emerged as a viable outsourcing destination. The opportunities created by the millennium bug and the Euro currency conversion brought a large number of American and European corporations in direct contact with a host of large, medium and small software firms in India. These projects opened the doors for Indian firms. The Indian diaspora played a major role in bringing in technology, skills, capital and contacts during the 1970s and the 1980s. In the 1990s a younger generation of Indian-Americans played an important role in boosting software and outsourcing industry in India. The Indian connection in Silicon Valley, the intellectual capital in India and the trend of outsourcing in current global competition altogether bring India a great competitive advantage.

The third determinant in the diamond model is the related and supporting industries. The opening up of telecom and internet connectivity brought down the cost of communication for existing firms engaged in software exports further enhancing their competitiveness. With GOI boosting R&D activities and the liberalized policies adopted further contributed to the IT competitiveness. The STPI’s set up by the government provided a fair chance to all global IT players to come to India and give it a try!! The government’s role in seeding, nurturing and developing first the electronics and computer hardware industry and then the IT industry is vital. The growth curve of the Indian IT industry-- right from development and transfer of skills, capabilities and technology to creation of demand for indigenously built computers and software would not have been possible without the adequate support of the government. In the post 1980 period the ruling elites recommitted themselves to a more sharply capitalist path of development from the hitherto socialist path of 1970s .The idea of promoting software exports through satellite based data links with overseas computer was approved by the government and announced in the new computer policy unveiled on 19th November,1984 by Mrs. Indira Gandhi. Once the Software Technology Parks [STPs] were functional, software exports witnessed exponential growth. Software export industry was the first of its kind which did not depend on physical infrastructure of roads, ports and airports to earn dollars. Bits and bytes of information could be exported via computers connected through satellite data links. Also it was a people, not capital-intensive export industry. The overall conducive environment created due to economic liberalisation policies contributed a great deal to the success of STPs and the growth of the software industry in the 1990s and the 2000s.