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Regional Information Technology Industry: A case study of Gujarat

Abstract:

Industrial dynamics of Gujarat has been changing since decade, in this technological era new knowledge based industries have taken place and Information Technology industry is one of them. Paper analyzed IT industry of Gujarat-the current scenario of IT that connect it to the theory of Regional innovation system (RIS) including government initiatives with the brief historical background of industry. Research has found different regional factors, which has created thick RIS, as each state has its unique factors for growth for particular industry within, and those favorable factors related to Gujarat for IT industry, have been analyzed not only to study model of IT industry in Gujarat but also to put it on fully "Developed" mode.

Key Word

IT industry, Regional Factors and government initiatives.

INTRODUCTION

The phrase information technology (IT) effects each one of us everyday in one or another way. We live in information era so everybody uses IT nowadays. IT has huge meaning that touches over daily lives everywhere. "Information technology has been defined as "the study, design, development, application, implementation, support or management of computer based information services." (<http://www.techterms.com/definition/it>) It also includes all engineering branches like computer, telecommunication and all equipment to share, store, retrieve and transmit, making software, manipulate and develop data. These also consist of contribution to technology like television and telephones. NASSCOM Report 2000 said IT includes more than 50 activities. Therefore, IT can potentially be used in every parts of the economy.

In brief information technology covers all parts related to information and communication technology and computing. There is no doubt that IT industry is one of the dynamic flies in India, but there is regional inequality in field of IT, its growth and development is related to few states only among that mostly southern states very much are involved in it. While in western states, Maharashtra followed by Delhi and Gujarat are involved in IT activities. In Gujarat IT has been adopted in 90's and grown here despite all bottlenecks initially and with the proper institutional support later. Gujarat is also one of the most prosperous and fastest growing States in the country. With 4.93% of total population of the country, it contributes about 16% of the manufacturing GDP of country. Gujarat has emerged as India's most preferred destination for investments these days and earns the highest GSDP among top five Indian States. Gujarat is in those the top five industrialized states, It is basically manufacturing state, having more feasible factors for manufacturing industry but with timely fashion industrial dynamics have been changing and knowledge based industries are taking place, among them IT has been developed here nicely.

The structure of this paper is as follows. First it introduces the historical background of IT industry in Gujarat. In section 2 it explains regional innovation system in brief. Third section found RIS and IT development; fourth section included government initiatives and followed by conclusion in fifth section.

1. Historical Background

In Gujarat IT sectors is focusing mostly on Ahmedabad followed by Gandhinagar, Baroda, Rajkot and

Surat, since 1986, when for the first time government undertook software promotion and development policies. IT has grown up in state with the help of strong infrastructure facilities, educational institution, connectivity through Internet and mobile, institutional framework, government supports, suitable policies etc. Government has set up software technology parks for IT promotion, with recent investment in IT sector; Gandhinagar and Ahmedabad are progressively shaping into one of favorite destinations of IT companies.

First Software Technology Park (STP) was established in 1991 in state and some institutional framework of government such as Department of Information Technology, Ministry of Communication, GESIA, Infocity, Gujarat Directory, Gujarat informatics limited, Gujarat council for science and technology, department of science and technology have been formed to promote and standardize IT. Recently government has set up Gujarat international finance technology company limited (GIFT city) in collaboration with CISCO, which is functional in the state capital (Gandhinagar), to make IT industry, favorite destination for world finance. Also Infocity project in the capital city, working for providing appropriate land, infrastructure, broadband, industrial building, corporate houses along with residential places for BPO's, KPO's and other IT related fields. This project has received national best-conceptualized IT park award in 2010. Infocity meets the need of IT industry with cost and skilled human pool in Gujarat.

IT-ITES companies in Gujarat have grown from 10 in 1996 to 415 companies by 2004-05 and during the same time period software exports have grown from 4.75 crores to 200 crores. In 2011, there are 2205 IT firms working in states. Most of them are registered with the commissionerate of IT , it has exported 2250.99crore including software exports of 200crore. During time span of 2006-07 to 2010-11 total IT industry exports has been increased from 504.00crore to 2250.99crore (NASSCOM data, STP Data 2010-11), data shows upward growth rate of IT industry in state. Chronologically Ahmedabad, Baroda and Gandhinagar are top cities for industrial location for IT. Gujarat has one of the largest fiber-optic networks of more than 60,000kms. Recently in Vibrant Gujarat summit, 19 companies have registered to invest 11,067 crores in IT and in new IT policy, government has targeted to generate 200,000 jobs in IT sector.

Gujarat market size is 1.5million dollar and IT industry accounts for 70% of total market size, state spends about 780billion dollars on R&D of IT sector. IT industry was developed in Gujarat in short period of time because of industry friendly IT policy since 2000, flexible labor laws, low operational cost, premiere R&D sectors, uninterrupted power supply etc. Government also supported IT firms through joint venture and private support. ITES and IT were main focus in Gujarat IT industry. State has become fast emerging and favorite destination of IT players. Gujarat has set up venture funds for development of IT, BPO, KPO and also insured skilled man power by leading institutions as IIMA, NID, IITg, CEPT etc. state is playing major role in promoting its IT sector on global map. Gujarat government has also received Best E Governed state award.

2.Regional Innovation System

Regional factors are first condition for development of any industry. Regional factors affect industrial location and also cluster industrial estate with in region. Development of knowledge-based industry such as IT industry is depending upon regional innovation system (RIS). Research connects development of regional IT industry in Gujarat to the theory of RIS. RIS means diffusion of knowledge, skills, productive practices etc. within geographic area which is larger than city and smaller than country i.e. state, the edge or limit of RIS can be drawn conceptually and organizationally around economic, social, political and institutional relationship that generate development process within technological group or functional area. The same industry, operating in the same country may behave very differently in two sub-national regions, due to the different institutional thickness of the two RIS in which the firms are embedded (Gertler, 2010). There are so many factors behind regional inequalities of industrial growth because of that one region may have feasible factors to grow particular industry and another may not have(Chaminade and Vang, 2008; Cooke, 1992, 2001Amin, 1994 and Thrift, 1996; Asheim and Isaksen, 1997), due to these regional inequality of IT industry in India. Each region plays its unique role to develop any particular industry in nation because of regional differences in factor endowment, raw material, policy helps, infrastructure facilities, some regions remain powerhouses and knowledge hubs because of it thick RIS (Chaminade and Vang, 2008) In case of Gujarat, favorable RIS caused IT industry as significant industry these days. Prof. Krugman has related idea of RIS to economy geography. Economic geographers (Asheim and Coenen, 2005) have studied the role of knowledge-based industries in the economic geography.

Some authors have recently analyzed empirically the relationship between RIS and the geography of knowledge based firms interactions (Blažek, 2011; Chaminade, 2011; Martin and Moodysson, 2011; Sotarauta, 2011; Tödting, 2011) literature shows positive correlation between RIS and location of Firm.

3. RIS and IT industry of Gujarat

RIS supports industrial clustering of an industry and helps knowledge based industry cluster in state, RIS includes so many infrastructural, institutional, political, social and environmental factors which build thick RIS for industrial location and geography of economy and also provide role of sub national institutions in global innovation system. Gujarat has thick RIS for knowledge-based IT industry, which helped its emergence and development. This section analyzed positive correlation between RIS and IT location in state. Gujarat RIS to analyzed growth pattern of IT industry are discussed below.

i. Educational institution

Knowledge is first condition of technological development and its growth. Technical, management and other education institutes are responsible to provide regional skilled manpower. These institutions are the first condition for availability of skilled labor in region. An industry can grow if skilled manpower is easily available in locality. According to Asheim (2011) less urbanized regions are usually characterized by weakly developed RIS subsystems such as a lack of dynamic firms and knowledge-generating organizations, which play significant role in development of knowledge, based industries like IT. There is often a "thin" and less specialized structure of knowledge suppliers and educational institutions. IT industry resulted from a combination of a deep existing skills base, coupled with increasing international demand for those skills. The private sector is also rapidly moving into education and some MNCs offer basic IT education opportunities to thousands of people, latter they can join that company. New universities are also sprouting in state, but the main issue is quality, not merely quantity. Education institute in state is different in number and also in technical standard. Technical knowledge related to IT helps industry to grow rapidly. Data of educational institutions in state are given below.

Table 1 Technical Institution in Gujarat (As on 2009-10)

Type	Degree		Diploma	
	Institutions	Intake	Institutions	Intake
Government	16	9630	27	13575
Regional Engineering College	1	510	NA	NA
Grand In Aid	4	1356	7	1865
Semi Financed	6	1440	1	300
Self Financed	58	18749	42	14880
Total	85	31685	77	30620

Source: Industries in Gujarat Statistical Information, 2010
(www.ic.gunarat.gov.in)

Table 2 Technical Institutions for Post Graduation in Gujarat (As on 2009-10)

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Type	Institutions	Intake
Government	1	30
University	13	510
Self Financed	40	2490
Total	54	3030

Source: Industries in Gujarat Statistical Information, 2010
(www.ic.gunarat.gov.in)

Table 3 Management Institutions in Gujarat (As on 2009-10)

Type	Institutions	Intake
University	7	530
Grand In Aid	1	40
Self Financed	67	5750
Total	54	3030

Source: Industries in Gujarat Statistical Information, 2010
(www.ic.gunarat.gov.in)

Table 4 CAGR (from 2007-08 to 2010-11)

Degrees	CAGR
Diploma Engineering	26%
Degree B.E	31%
Master Degree MCA	31%
MBA	33%

Source: Service-Sector-Profile
(http://www.vibrantgujarat.com)

Situation of educational institutions such as schools, collages, technological institutions, management institutions etc. of state are given above in tables. Table-1 shows No. of institution for engineering degree and diploma, table-2 shows no. of master degree (M.E) institutions and table-3 shows management institutions along with their intake. State government formed Gujarat technical university in 2007 for producing technical knowledge and quality labor. Government is also planning various incentives like launching new engineering branches and new institutes, which will impart specific skills, needed by IT sector and collaboration with NASSCOM.

Gujarat also focuses of knowledge processing outsourcing (KPO) along with BPO's. Educational institution's framework is provided not only by government but also by private finance. This first factor of RIS is initial condition for IT industry in state, and day by day increasing educational institutes build basic framework for IT.

ii. Skilled manpower

Educational institutions in region decide density of skilled manpower. Skilled manpower is important for any industry and if it's available in locality due to educational institutions in region and it leads to low production and transportation cost and high productivity. The labor market, their may be gains from locating in a thick labor market, and in location where other firms have already trained a supply of skilled workers (Marshall, 1890; Krugman 1991).

Table 5 CAGR (from 2007-08 to 2010-11)

Year	Employment
2009	142992
2010	320000

Source: Service-Sector-Profile
(<http://www.vibrantgujarat.com>)

iii. Migrated skills and Migration of skills

Development of IT industry in Gujarat attracts skilled labor from other region but on other hand it enlightens the fact that sufficient manpower is not available in state and total development and rate of employment in IT industry of Gujarat attract migrant workers toward it that determine the stock of total IT firms in the states. In Gujarat IT industry development migrated workers are as important as local skilled labor because available skilled labor is not sufficient. The stock of technical migrants workers provide the maximum imputes for firms to cluster in particular area. Migration also has a significant and positive impact on firm location pattern in Gujarat. In the most recent times, there is increasing evidence shows that a large number of non-resident Indians (NRIs) have returned, bringing skills, knowledge and financial capital with them, which has positive effects on IT industry in state. In state migration of skilled worker toward it is less than migration of skilled labor out side of state. Because of low salary issue in Gujarat IT industry, there is positive trend of migration outside of state has been noticed by census report 2011.

iv. Infrastructure

Infrastructure is not only required for social welfare but strong industrial infrastructure is welcomed for all industry, literature argued both as reciprocal. Firms of the increasing returns sector will tend to locate in states with the best domestic infrastructure in order to take advantage of economies of scale. Some Regional scientists (see for example Christaller, 1933; Losch, 1940; Isard, 1956; Biehl, 1986; Vickerman, 1989, 1990) and economic historians (Chinitz, 1960) have studied the role of public infrastructure in regional development and in the process of industrial concentration as emphasized by Krugman (1993). Better domestic infrastructure earns a lower price and a higher relative demand for the goods produced. A differential in domestic infrastructure in country determines the direction of location and relocation for industry. Infrastructure interacts in an interesting way with the other determinants of industrial location examined in the economic geography literature (Krugman, 1991; Krugman and Venables, 1990; Bertola, 1992). Gujarat has well built infrastructure and with government support infrastructural facilities has been improving year by year.

State also has Regional infrastructure aid program that improves infrastructure brings more rather than less industrial concentration, and May therefore contribute to regional divergence. A state with poor infrastructure may restrict industrial location that follows trade integration. IT industry growth in Gujarat is due to suitable infrastructure facilities which also leads to strong infrastructure ahead within. Strong infrastructure is the first condition for growth and

development anywhere. IT firms usually located in metropolitan areas because of its infrastructure. These regions count also on strong organizational, institutional and infrastructural support in that industry (Hansen & Serin, 2010; Ptak and Bagchi-Sen, 2011).

After foundation of IT industry, Gujarat has had overcome many other impediments, such as weak telecommunications, roads, land, transportation and other infrastructure, and the poorly functioning nature of the rest of the economy which is generally inefficient or operating older-vintage capital. Some STPIs provided means to overcome these impediments in state. STPIs provided reliable electricity, telecommunications, Internet facility and land etc. Recent closed-economy models of public infrastructure by Arrow and Kurz, 1970; Barro, 1990 have stressed the substitutability of public infrastructure and private capital in the production function. These models cannot easily be adapted to analysis of regional integration, putting government capital into the production function fails to capture the role infrastructure plays in facilitating trade between countries.

Regional infrastructure has been improving by regional policies; Industries will relocate more easily to take advantage of new infrastructure conditions. State also has been emphasizing on its policies to build up better and better infrastructure in it, industrial infrastructural facilities has been improved by government to boost IT firms to locate with in state. Krugman can thus be extended to the issue of public infrastructure to points out a double causality relation between industrial concentration and public infrastructure. In term of IT public infrastructure policies are used as a strategic instrument to attract IT firms. Regional government has built special industrial houses for IT firms. In Gujarat government has built "Infocity" especially to give required infrastructural facilities to IT firms in state.

v. **Electricity**

Whole IT industry is dependent on computer, laptops and mobile, which work through electricity. Regional power supply is one of the important factors for IT industry. Regional power supply is available at cheap rates help lowering cost of production of IT industry. IT industry prefers uninterrupted power supply at cheap rate. Electricity is matter of infrastructural facilities and related to that. In Gujarat electricity is available with any disturbance and government tax structure also support to provide electricity to industries at low rate and less paper formalities.

vi. **Connectivity through internet and mobile**

As mentioned before this is information era, an era in which huge number of people are connected through Internet and media, it has become part of every business now. Virtual information develops business activities but in IT's case connectivity through Internet, broadband, Wi-Fi or mobile is raw material for industry. Number of mobile and Internet connection easily available in state is another feasible factor for IT. Internet and mobile networks are cheaply available with high speed Internet access speed and at low rates as taking these as raw material for IT, leads to low production cost and high level of productivity. Government information and communication policies in state help these factors to serve efficiently. Major 10 mobile service operator including private service providers such as Airtel, Vodafone, Tata Docomo, Idea and unior along with government service provider BSNL are available in state. The October 2010 subscription data report of the Telecom Regulatory Authority of India (Trai), says Gujarat has the mobile subscription of 4,01,58,662 with 158315 BSNL Internet subscribers and 605239 gross ADSL broadband connections in 2010. Number of subscription of mobile and Internet connection in offices and household show high infrastructure for IT, as it is required for laptops and computers for programming languages, coding, making software or transitive data. Internet is source of unlimited knowledge, which is not useful only as raw material for IT but also for universities and colleges to develop skill labor.

vii. **Transportation facility and Transportation Cost**

Samuelson, 1954 concluded from his studies that transportation infrastructure can be classified as domestic infrastructures, these facilitates not only domestic trade but international trade too. It is included in direct and indirect production cost. Well build roads, which reaches not only to mega cities but also remote areas of state and country, number of airports, railway stations, subways, metro train and local and state transport buses are included in transport

infrastructure. Transportation facilities affect migrant labor within country or region. It confirms migrants, help in labor migrating process and required for export-oriented industry. Transportation facility provides mobility to factors of productions. IT has been adopted business for attracting migrants from inter country or out side of country transportation facilities are must, as IT is export-oriented industry. Transportation is the first condition for diversity in the business activities of a location (Jacobs 1969). Transportation cost is related to transportation facilities, transportation cost incurred on tradable good, it is direct cost, which is related to distance from main industry located. Low transportation cost leads to low cost of production; it is favorable for any industry, which is especially related to export oriented business. High transportation cost resulted in rising up cost and large distance from main industry reduces business, sometime shutting down trade. Limao and Venables concluded that total transportation costs reduce total trade volume. The trade reducing effect is the strongest for transport intensive business activities that are dependent upon exports for sales like outsourcing business of IT industry.

viii. **Entrepreneur skills**

Entrepreneurship is also necessary ingredients and equally important as technical skills in some instances of success, Entrepreneur skills and organizational capabilities equally played a vital role in the IT industry's growth. Although many economists would argue that the IT industry initially grew in spite of the Government restrictions during the early protectionist periods. But recently, venture capital has been necessary to stimulate further growth of IT in state, particularly of startups and further growth.

Various management and risk managing skills are needed for starting up business in IT such as source venture capital and how to get it, manage a startup, form alliances and otherwise understand the process of bringing an idea to its maturation. Entrepreneur skills also include new products requirements analysis, knowledge of market and customer needs and innovative and creative abilities. Entrepreneurial skills can be developed only through learning by doing and failing and by practical experiences. Entrepreneurial knowledge includes as much an attitude, a natural ability, or an environmental or cultural factor than a book learned knowledge and skills. The knowledge of where to find venture capital and partners, and how to negotiate and manage these, all are learning by doing process. To Support the entrepreneur at the initial stages by regional government encourage further growth of IT industry and the institutionalization of regulatory policy practices. Regional government often supports the capacity to establish programs and policies to support entrepreneurship and complement the positive effects of industry. Entrepreneurs starting up a business sometimes need advice on the type of business to start, management implications, formalities to comply with, and planning required, among other things. Government trains the formation of the enterprise and its management. It can be developed by Training and financial support provided by governments.

4. Government initiatives and Political Framework

If we talk about IT policies in Gujarat, government holds two policies i.e. IT policy 2006-11 and 2012 but government has been modifying their policies according to current trends and global demands, not only IT policy pay concern about industry but every year IT has special concern in regional Industrial policies too, such as single window operation, FDI, infrastructural facilities etc. Gujarat government has built many regional body to promote IT sector globally, to develop IT for hanging need of technology and for proper boots of sector, government has built some important institutions which are as under.

i. Infocity

This developing project is to provide IT plots, residences, education facilities, and life style. This project is global hub that gives world-class infrastructure to KPO, BPO, IT firms, ITES, software, outsourcing companies. This project also received award for 'Best Conceptualized IT Park. Infocity is for meeting needs for next phase IT, BPO demands.

ii. Department of science and technology (DST)

It has been constituted in 2002 and been operational since 2003, DST looks after growth and development of new technology and responsible for making technology policy of state concerning specially IT and biotech.

iii. Gujarat Informatics Limited (GIL)

GIL is responsible for promoting, Growth and development of IT industry. It serves as consultant and provides raw material and inputs to IT industries and also manages training programs for industry.

iv. Gujarat Council on Science and Technology

It was established in 1996, and started functioning as autonomous body since 2000. It serves to promote and spread of science and technology in state, also identify areas where science & technology can be utilized, gives policy guidance for strengthening the planning of industrial policy. It encourages R&D process; identify new areas of sciences and technology.

v. Gujarat Electronics and Software Industry Association (GESIA)

It was established in 1997, to spread IT and software industry in state. It has 300 members. It works in partnership of Gujarat government to promote software, BPO, KPO, ISP in Gujarat. It has partnership with MAIT, NASSCOM etc. GESIA has achieved many destinations as constitution of electronics and quality development Centre, software testing.

5. Conclusion

The Research has created broad framework of RIS to understand potential of IT industry in Gujarat. Thick RIS are always plus point for related industries research has analyzed those factor irrespective of Gujarat and IT industry with regional political touch and government special institutions. RIS, which has boosted IT in Gujarat initially, more care of it can further make it as "fully developed" industry as such as Karnataka. While data is limitation here and research can be expanded to future of IT industry in Gujarat and support of subnational policies.

REFERENCES:

1. Abelson, P., 1999. Economic and Environmental Sustainability in Shanghai (accessed on 13 November 2011 at http://www.appliedeconomics.com.au/pubs/papers/pa99_shanghai.htm).
2. Amin, A., Cohendet, P., 2004. Architectures of knowledge: Firms, Capabilities and Communities. Oxford University Press, Oxford.
3. Amin, A., Thrift, N., 1994. Living in the global: in Amin, A., Thrift, N., (eds.), Globalization, Institutions, and Regional Development in Europe Eds. Oxford University Press, Oxford, pp. 1-19.
4. Amin, A., Thrift, N., 1995. Globalization, institutions, and regional development in Europe. Oxford University Press, Oxford.
5. Asheim, B., T., Moodysson, J., Tödtling, F., 2011, Constructing Regional Advantage: Towards State-of-the-Art Regional Innovation System Policies in Europe? European Planning Studies 19 (7), 1133-1139.
6. Asheim, B.T., 2009. Next generation regional innovation policy: how to combine science and user driven approaches in regional innovation systems. *Ekonomiaz*, 70 (1), 106-131.
7. Asheim, B., Coenen, L., 2005. Knowledge bases and regional innovation systems: Comparing Nordic clusters. *Research Policy* 34, 1173.
8. Asheim, B.T., Gertler, M., 2005. The Geography of Innovation: Regional Innovation Systems, in: Fagerberg, J., Mowery, D., Nelson, R. (Eds.), *The Oxford Handbook of Innovation*. Oxford University Press, Oxford, pp. 291-317.
9. Asheim, B.T., Isaksen, A., 1997. Location, agglomeration and innovation: towards regional innovation systems in Norway? *European Planning Studies* 5, 299-330.
10. Asheim, B.T., Isaksen, A., 2002. Regional innovation system: the integration of local 'sticky' and global 'ubiquitous' knowledge. *Journal of Technology Transfer* 27, 77-86.
11. Blálek, J., #íalová, P., Rumpel, P., Skokan, K., 2011. Where Does the Knowledge for Knowledge-intensive Industries Come From? The case of Biotech in Prague and ICT in Ostrava. *European*

- Planning Studies 19 (7), 1277-1303.
12. Chaminade, C., Vang, J., 2008. Globalisation of knowledge production and regional innovation policy: Supporting specialized hubs in the Bangalore software industry. *Research Policy* 37, 1684-1696.
 13. Gertler, M. S., Levitte, Y. M., 2005. Local Nodes in Global Networks: The Geography of Knowledge Flows in Biotechnology innovation. *Industry and Innovation* 12(4), 487-507.
 14. Gertler, M.S., 2010. Rules of the game: The place of institutions in regional economic change. *Regional Studies* 44, 1-15.
 15. Hansen E. R., 1983 why do firm locate? Where they do? Water supply and urban development, discussion paper UDD 25, World Bank, Washington DC.
 16. Marshall A., 1890 Principle of economics, London MCMillan
 17. Moodysson, J., 2008. Principles and Practices of Knowledge Creation: On the Organization of Buzz' and 'Pipelines' in Life Science Communities. *Economic Geography* 84(4), 449- 469.
 18. Moodysson, J., Coenen, L., Asheim, B.T., 2008. Explaining spatial patterns of innovation: analytical and synthetic modes of knowledge creation in the Medicon Valley life-science cluster. *Environment and Planning A* 40, 1040-1056.
 19. Sotarauta, M., Ramstedt-Sen T., Seppänen S.K., Kosonen K.J., 2011. Local or Digital Buzz, Global or National Pipelines: Patterns of Knowledge Sourcing in Intelligent Machinery and Digital Content Services in Finland. *European Planning Studies* 19(7), 1305-1330.
 20. Tödting, F., Lengaver, L., Höglinger, C., 2011. Knowledge Sourcing and Innovation in "Thick" and "Thin" Regional Innovation Systems. Comparing ICT Firms in Two Austrian Regions. *European Planning Studies*, 19(7), 1245-1276.
 21. Tödting, F., Trippl, M., 2005. One size fits all?: Towards a differentiated regional innovation policy approach. *Research Policy* 34, 1203-1219.
 22. Tödting, F., Trippl, M., 2011. Regional Innovation Systems, in: Cooke, P., Asheim B.T., Boschma R., Martin R., Schwartz, D., Tödting F., (Eds.), *Handbook of Regional Innovation and Growth*, p.155-163. . Edward Elgar, : Cheltenham, pp.155-163.
 23. Wang, C., C., Lin G.C.S., Li, G., 2010. Industrial clustering and technological innovation in China: new evidence from the ICT industry in Shenzhen. *Environment and Planning A* 42, 1987-2010.
 24. Yang, G., 2002. Shanghai's Economic Development: Its opportunities and Challenges in the 21st Century. *Global Urban Development Metropolitan Economic Strategy Report* /accessed November 4 2011 at (<http://www.globalurban.org/GUD%20Shanghai%20MES%20Report.pdf>).
 25. Vernables A.J., liamo N. 1999. Geographic Disadvantage: hekcher Ohlin thunen, model of specification. Policy research working paper 2256, World Bank, Washington DC.
 26. www.ic.gunarat.gov.in
 27. www.NASSCOM.com
 28. www.NASSCOMdirectory.com
 29. www.ic.gunarat.gov.in
 30. www.vibrantgujarat.com

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