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Impact of IT Industry on Environment & Economic Development of Pune City

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Abstract: The IT industry was welcomed with open arms into the city as per the IT policy of the State government of Maharashtra. Many environmentalists have often stated that Pune has grown out of control because of the IT industry. That the various tax concessions and allowances have not been contributing enough, and the massive development that has taken place has affected the city's environment. - explore the realism in this perception. The main objective of the Paper is to map the range of economic and environment effects of the IT industry. In terms of environment the effects of IT industry have been explored two-fold - the industry level and the employee level. The reason to include the latter was to examine the entire gamut of environment effects due to the industry in the context of high migration and high consumption by employees. Various kinds of analysis have been used to process the data that was available, and draw conclusions. In terms of environment effects at the industry level, e waste and transport congestion come out very strongly compared to electricity consumption. At the employee level, an overview of what the additional pressures on land (housing) and basic services, electricity and transport is created. Viewed within the lens of the effect of an industry, one can summaries that these are high pressures for the city. Economic effects have been expressed through the

Taxes and revenues that the city receives from the IT industry; and the employment created. These have been classified as direct and indirect effects. From the data gathered and most importantly from the interviews, the economic effects for the city are considered to be high. Unfortunately, the city does not have a way to monitor these effects through a cost and benefit analysis.

Keywords: ESR: Environment Status Report GHGs: Green House Gases IT: Information Technology MCCIA: Mahratta Chamber of Commerce, Industry and Agriculture MSEB: Maharashtra State Electricity Board MWh: Mega Watt Hour STPI: Software

Technology Parks of India SEAP: Software Exporters Association of Pune

1.1 Introduction

Pune lies on the western side of the Deccan Plateau on the **banks of two rivers. It is 560m above the sea level and is** characterized by hills on the west and the south. Earlier known as a Hill station, Pune is now the eighth most populous cities of India and the thirteenth most Polluted city (SIIB). The Pune Municipal Cooperation (PMC), for medin 1950, covered an area of 138 km2 which held a population of 606,77,7. In 1991, the PMC area of 145.9 km2 held a population of 1,566,651. The recent population estimated is 3.5 million as per the latest Environment Status Report over an area of 243.84 sq. km. In the last 50 years, the city's Population has grown by 50% (PMC 2010). It has further been estimated that 50% of population growth has been on account of migration (PMC 2006). The driving force for growth has been attributed to the development of the Information Technology (IT) industry in Pune. During the Last five years, the national government has focused on IT related infrastructure, and fiscal incentives to IT units. These initiatives have enabled the IT industry in the state (province) of Maharashtra to establish a firm foundation in some cities like Pune for the IT sector growth to accelerate. Exports of software and IT based services from Maharashtra account for about 20% share of the Country's exports. During 2008- 09, software exports from Pune totaled $5,228 million, accounting for 60 per cent of the $8,786 million from Maharashtra (Kshirsagar 2010) All this has been facilitated by the IT policy which was introduced in the year 1999 and reinforced in 2003 and further enhanced in 2009 by the State Government of Maharashtra to boost economic growth. The policy provided an array of benefits such as stamp duty and tax reductions, land permissions and concessions for development, subsidized rates for electricity etc.

1.2 AIM

The aim of this research is to analyze what are the economic and environment effects of the IT industry in the city of Pune developing a framework of indicators.

1.3 OBJECTIVES

- Identifying and mapping the economic benefits of the IT industry to the city
- Identifying and mapping the main environment effects of the IT industry on the city.
- Identifying possible areas of change in the IT policy such that environment effects are taken into account.

2.1Methodology

2.2 Research Type and Strategy

The research is analytical as it aims to analyse facts and information that is already available to evaluate the impacts of the IT industry on Pune. The research would be largely quantitative. Within the context presented in chapter 1, the research can be defined as exploratory as it seeks to explore what are the relationships and the interactions between the IT industry and its environment impacts for the city of Pune, using a framework of indicators.

2.3 Unit of Analysis

The unit of analysis of the research is the area that falls under the jurisdiction of the Pune Municipal Corporation (PMC). Within the PMC, some departments would be looked at

2.4 Data Source and Collection Means

The main sources for doing the data that will be used in the research would be secondary data. Secondary data would be gathered from

• Various departments functioning within the PMC such as accounts, water supply, solid waste and sanitation, building dept. and the Environment cell. The departments have been selected based on the data needs of this research.
• The Maharashtra State Electricity Supply dept.
• The Directorate of Industries
• Archival data would be collected from the Environment Status Reports that the city produces every year.
• IT company Annual reports
• Desk study

2.5 Operationalization of Data

To enable data collection, the following variables and their respective indicators have been selected based on the literature review and focusing on the PSR framework.

2.6 Validity and Reliability

The validity of the data will be confirmed through the interviews and through sources from Secondary data. The author has already filed in Right to Information seeking data for some of the above questions. So most of the data, if available indeed, will be from the government Records themselves, and if need be further validated from the respective authorities and

2.7 Data Analysis

Data analysis would be a crucial component which will test the framework of indicators that would be applied to this research.

3.1 Understanding the It Policy:

The IT Policy of Maharashtra 2003 (IELD2003) defines Information Technology Industry as a composite of IT Software, IT Hardware, IT Services and IT Enabled Services.

3.2 IT Software:

IT Software is defined as any representation of instruction, data, sound or image, Including source code and object code, recorded in a machine readable form and capable of being manipulated or providing interactivity to a user, with the means of a Computer.

3.3 IT Hardware**:**

IT Hardware covers approximately 150 IT products notified by Directorate of Industries.

3.4 IT Services and It Enabled Services (ITES):

IT Service including IT Enabled Service (ITES) is defined as any unit that provides services that result from the use of any IT Software over a computer system for realizing any value addition such as web based sale and marketing, customer service, and billing and accounting transactions.

The main objective of the IT policy is to make Maharashtra the most favored destination for Investments in the IT industry referred to as IT and ITES units in the policy. Quite naturally, the policy assumed that the growth of the IT and ITES units in cities will benefit the cities themselves in many ways, therefore the policy categorically states that the city governments need to take the extra effort in promoting business and enterprise in the IT industry. Some of the crucial changes that the policy aims to achieve are outlined through some of the following means

- Levying of power charges on IT and ITES units at industrial rates
- As IT and ITES units do not cause any pollution they would be exempted from environment clearance.
- IT and ITES units would be exempted from paying octroi tax on all capital goods and raw materials purchased by them.
- Property tax on all establishments/properties/buildings/premises of IT and ITES units would be levied on par with residential premises.
- 100% additional Floor Space Index would be given to all IT and ITES units in public IT Parks.

4.1 Problem Statement

There is no doubt that the IT policy has worked for Pune, and the IT industry has grown by leaps and bounds spreading across the city. The industry has attracted a lot of migrants and increased incomes of many a households. Pune has a burgeoning software industry with over 1000 IT and ITES units employing around 220,000 people, 60% of which is migrant population (MCCIA 2009). During the last eight years, this sector has grown from Rs 25 million to Rs. 650 million Almost all of the major software players in the country have a base in Pune. This growth in itself has led to the growth in other complementary sectors, for example the rise in construction activity and educational institutions has been widely attributed to Pune's new face as the emerging IT hub of India (PMC 2010). On one hand as the industry has provided economic benefits, while on the other, directly and indirectly there have been ripple effects on the environment through the rapid economic Growth. This is due to the surge in demand for land, energy, housing, transport, waste, water and sewage, for the industry itself and for its employees who live in the city. The latest Environment Status Report (ESR) 2010 of the PMC states that air and water pollution is on the rise of the total sewage generated in the city, the PMC treats only 55 percent while 45 per cent sewage is released untreated into the river. For every 1000 people there are 473 private vehicles which implies that there are two vehicles in every family in the city. The Groundwater Survey and Development Agency, has pointed to the depleting levels of ground water. Again according to the ESR, the PMC body supplies just ten per cent of the total demand of water for commercial purposes from the reservoirs.

4.2 Scope and Limitations

The study is currently limited to sourcing information on the city level which is defined as the area within the jurisdiction of the Pune Municipal Corporation. It also does not extend to analyzing the links and flows outside the city such as the provincial and national levels such as the contribution to growth rates, financial benefits, inter-regional benefits etc. The study would have a more strong basis if the direct, indirect and trickle down economic benefits could have also been analyzed in depth, for example benefits at the employee level; for landowners and builders who have profited from the real estate development; local economic growth as a result of the larger expansion of the city; and ancillary industries and services that have grown as a result of the IT industry. But this would not be possible to cover in this thesis. The thesis will be a static study, as the aim of the thesis is not to make an analysis of the Effects of the IT industry over time, but to explicitly break down the kinds of effects that this industry can have for the city. Still, the need to compare information based on previous years was considered in this study, but given that the focus of the study is to develop a set of

indicators that would help analyse what are the effects of the current IT industry on the city, Current information would also suffice. Such a mode of research is also carried out in other forms of research and studies that have been reviewed during this thesis. Also the relationship between the effects and the growth of the industry are directly proportional in terms of service needs and resource use, and such a comparison may not necessarily add value to the study. The study would have benefitted by looking at the social aspect as well, more in terms of the change in working patterns, and lifestyles such as call center jobs, late working nights for women, change of roles etc. Additionally, it has also been pointed out that the IT sector's fast growth has worked more to the advantage of the well-educated section of society. That would also be important to put into perspective while looking at the beneficial aspects of the IT industry.

4.3 MAIN RESEARCH QUESTION

What are the economic and environmental effects of the IT industry in the city of Pune?

4.4 SUB-RESEARCH QUESTIONS

• What are the main economic benefits of the IT industry to the city?

• What are the main environmental effects of the IT industry on the city?

Industry	Employment	Revenues	Per person contribution
IT industry	1.96 million people	USD 52.1 Billion,	USD 26555
Agriculture	660 million people	USD 214 Billion	USD 324
Manufacturing	62.8 million people	USD 245 Billion	USD 3896

5.1 Background

The IT industry is one of the biggest and fastest growing industries in Pune. Forbes magazine has included Pune among the 10 fastest growing cities of the world. Pune's Software exports have increased 6 times from the financial year 2003 to financial year 2007. And Software exports as a percentage of Pune's GDP has grown more than 3 times from the financial year 2003 to financial year 2007. IT companies are also spread throughout the city concentrating in certain locations or administrative wards like Vimannagar, Aundh, Dhole Patil Road, Ghole Road, and Hadapsar. The latter two having some of the larger concentrations of IT companies. The red circles in the picture below show the IT company concentrations, while the yellow circles depict the locations of the two big IT parks that this thesis will reference. As mentioned above, Hinjewadi is located outside the city limits.

5.2 Economic Effects of the It Industry In Pune

The range of economic benefits that the Pune Municipal Corporation (PMC) receives from the IT industry. Primary indicators of this information were tax revenues and employment generation. NASSCOM (2007) stated that every 1 Indian Rupee (INR) spent by the IT sector (on domestically sourced goods and services), translates into a total output of about Rs 2 in the economy - driven by derived demand from firm-level expenditure such as capital expenses as well as operating expenses (CAPEX and OPEX); and high levels of consumption spending by professionals employed in this sector. In terms of productivity, it was found that the per person contribution in the IT industry was many times higher than that of the agriculture and manufacturing industry.

5.3 Tax Revenues

5.3.1 Property Tax

Property Tax consists of general tax on properties, fire tax, tree tax, water tax, water benefit tax, conservancy tax, special conservancy tax, sewerage benefit tax and street tax. It is charged as a percentage of Annual Rateable Value (ARV). ARV is the amount of rent a property can receive over a period of one year and is calculated as - area in sq feet * basic rate per square foot. Since 2003 IT Companies have benefitted from a reduced property tax rate of INR 2.60 per sq. ft. While the commercial property rates are INR 4 onwards. This concession been withdrawn from the 1st of April 2010, and the IT industry has now to pay property tax at a commercial rate.

Period	Property Tax collection in Indian Rupees (INR)
2003 -2004	715,162
004-2005	9,192,584
2005-2006	29,760,677
2006-2007	69,739,799
2007-2008	63,586,795
2008-2009	84,566,223
2009-2010	84,505,672
2010-2011	118,452,792
2011- 13th July 2011	93,553,039

Table reflects the property tax received from the IT industry between 2003 and 2011.

property tax that the PMC has to receive. The average collection Performance of the PMC stands at around 72 percent of the total demand (PMC 2006). Based on the data received of actual collection of property tax from the IT industry,

Table looks at the year wise percentage contribution of revenue from the IT industry to the PMC budget.

The potential property tax figures for the year 2011-2012 as provided by the PMC stands at around INR 313 million (31, 31, 55,098). If we assume that the PMC will have a hundred percentage collections this year, then this amount is almost 1% (0.96) of the total PMC budget of INR 32,47,00,00,000.00 or INR 32 Billion for the year 2011-12.

5.3.2 IT Premium

IT premium is a one-time payment by the IT companies against the grant of 100% additional Floor Space Index (FSI) to all IT and ITES units in all private IT Parks of specified sizes. The premium amounts to 25% of the present day ready reckoner. Of this 25% goes to the state government and 75% to the respective municipal corporation, which is to be used for the development and up-gradation of off-site infrastructure required for IT companies.

5.3.3 OCTROI TAX

Octroi is a local tax charged on all goods entering the city; it is levied based on the category of goods (weight, numbers,

etc.). It is the single largest source of income accounting for 42 per cent of municipal revenue income (PMC2006).

5.3.4 Development Charges

Some of the people interviewed stated that the PMC benefits from high development charges

`from the IT industry. Development charges are one time charges paid by the developers to the Civic body while starting a new construction project. Development charges can be termed as an indirect revenue source from the IT industry. It is at the rate of Rs 6 per sq ft for residential constructions and Rs 12 per sq ft for commercial constructions. Due to the unavailability of valid data, no exact or approximate figures can be given. Based on the field work and interviews, additional economic benefits (including financial) have been looked at in this section. Figure 15 summarizes the main economic benefit.

6.1 Environment Effects of the IT Industry in Pune.

Two levels of effects were to be looked at to map and assess the range of environment impacts that the IT industry has on the city of Pune – industry level and the employee level. This information will be analyzed using the Pressure State Response framework. Provides a description of all the indicators that are used in the thesis to demonstrate Pressure and the State for both the industry and the employee level.

6.1 Environment Effects at the Industrial Level

Based on the literature review in the previous chapter, three main environments related effects were identified.

• Electricity consumption and Emissions
• Green zone development
• E-waste generation

6.2 Electricity Consumption and Emissions

The electricity supplier, MSEB for the city of Pune was contacted twice for electricity consumption information for the IT industry in Pune. Two Right to Information (public disclosure) applications resulted in no data. Ideally one would expect the

Information to be categorized with the electricity supplier by sectors but that is not how the information is stored. An entire list of companies with the address and contact details was also provided, but no information was given and unique consumer ids for each of the company were asked for which was impossible to do.

6.3 Green Zone Developments

Based on the recommendation so the IT policy 2003, allowances were given to the IT companies to be built on No Development Zones/Green Zones earmarked in the 1987 development plan of the city. The IT policy states the following Only 0.20 FSI to be allowed Development of IT companies with ancillary residential development, the latter of which should not exceed one third of the total built up area.500 trees per hectare should be planted

6.4 E-WASTE Generation

Pune ranks among the top ten Indian Cities, which are repositories of WEEE (Waste from Electrical and Electronic Equipment's). Specific data including scenarios for e-waste Generation by the IT industry is not available. PMC authorities and various experts were contacted to see if they had any specific data for the IT industry vis-a-vis e-waste generation. Though they all agreed that it was high, no specific numbers or ranges were available. The problem of e-waste was also acknowledged by some of the IT company representatives who were interviewed. NASSCOM stated that e-waste is a big concern and added that the big companies would have formal processes to deal with e-waste, but small and medium size companies do not entirely deal with it. The experts and the recycling firm representatives stated that most IT companies do not have internal policies to deal with e-waste. The Wast Collection Co-operative representative in Pune also confirmed that a large part of the e-waste can be sourced from the IT industry. According to NASSCOM headquarters in New Delhi, since the awareness about improper handling of e-waste has risen amongst mass consumers of IT equipment's, the common practice of giving away old electronics to the informal sector has plummeted considerably. Housekeeping departments in most IT companies are conscious about the end cycle of waste electronics. However a lot of companies are still ignorant about the e-waste menace and continue their old practices which are mainly more value generating.

7.0 Conclusions and Recommendations

7.1 Conclusions**:**

The process of data analysis is slightly constrained by the lack of concrete and substantial data for the IT industry from the Pune Municipal Corporations and from the institutions that represent the interest of the IT industry. Ranges and assumptions have been mostly provided on the basis of the information/data received.

7.1.1 Economic Effects of the It Industry

The purpose of mapping the economic effects was to understand the flow of benefits that Pune receives from the IT industry. Based on the field work conducted, different economic and financial gains were highlighted by the different interviewees. There is a range of economic benefits that the city receives from the IT industry, while the initial hypothesis looked only at very limited sources of economic Benefits.

7.1.2 Environment Effects of the It Industry

Detailing the environmental effects of the IT industry has been difficult as there is no sectorial level information maintained by the city's administration. Four aspects of the environment were looked into – electricity consumption, e-waste generation, green zone development and overall pressures of the IT industry on city infrastructure

7.2 Recommendations:

It is indeed ironic that in a city that has its identity tied to the IT industry does not make apparent good use of the information systems that could help organize data, and get suitable feedback.

7.2.1 City Administration and Authorities

A fundamental recommendation for the PMC would be to organize information according to IT industry, tracking the economic data and the land use data from various departments. This will enable the comparison of economic benefits vis-a-vis level of expenditures that need to be undertaken to service the IT industry, and deal with certain pressures. IT premiums received henceforth need to be maintained in a separate fund or account to ensure that the areas around private IT parks have suitable infrastructure. This will also help the PMC to track the level of infrastructure needs of the IT industry and the costs incurred. A more detailed cost and benefit analysis would help the PMC and the State authorities with further policy level decision making. Ideally all the income received from the IT industry such as property tax, Octroi, development charges and the IT

premium must be retrievable under one account. With this a comprehensive information system for the IT industry could be put in place to incorporate a sophisticated cost and benefit analysis for more informed decision making. The MSEB which is the electricity supplier for the city needs to organize information on a sectorial basis which includes the IT industry.

7.2.2 IT Policy

Both the state and the city level administration should conduct a periodic review and assessment of the IT policy to assess the implementation of the policy in Pune. The revised IT policy of 2009 incorporates certain clauses that merely touch upon E-waste and greener principles such as Green IT Parks but overall it does address the other pressures at the industry level such as energy and transport. It also continues with the Tax concessions to the IT industry. The clause that allows for the development of IT on green zones needs a proper review. Cities like Pune are constantly losing their open spaces to development activities. Green Zones and No Development zones provide some provision to preserve these areas. Open spaces besides parks and gardens play a vital role in protecting the physical environment of the city, and perform important ecosystem services (water filtration, micro climate, recreation, wildlife habitats etc.). Policies that enable economic development on these areas can be regressive and need to be looked into. Current electricity charges for the IT industry are at industrial rates which are lower than commercial rates. The policy could deliberate on a certain amount of electricity supply at the industrial rates, beyond which commercial rates could be charged. There also needs to be a resolution on the collection of the Octroi tax, which in one sense can be expressed as the non-implementation of the IT policy, and is a strong bone of contention between the IT representatives and the PMC.

7.2.3 IT Industry

The IT industry constitutes enlightened professionals, and in some of the larger companies green practices and efforts are already in place. Such systems and practices need to be Institutionalized more strongly and not only through basic level of Corporate Social Responsibility. The IT industry at the individual level can easily track some of the environment effects from electricity use, e-waste and transport for employees. This could be consolidated on a yearly basis and through joint planning and action most of these issues could be addressed as an industry which would have a wider outreach and would be very effective.

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