From Charminar to Cyberabad -

Political Economy of Software Industry in Erstwhile Unified Andhra Pradesh

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Abstract

This article draws on primary qualitative data and secondary quantitative data from erst-while unified Andhra Pradesh to explicate how the Information and Communication Technology[1] (ICT) policies at the central and state levels led to a rise in the Information Technology (IT) ecosystem. Using mixed-methods, we elucidate how IT industry was fostered in AP. Forty-five semi-structured interviews were carried out with a cross-section of various stakeholders in the industry. A political economy framework was adopted to explicate how AP's policies changed the state's dynamic by mobilising labour, capital and played a significant role in making the job of "techies" aspirational.

Keywords: Information Technology (IT), State reforms, IT Education, Capital mobilization, Andhra Pradesh

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[1]Information Technology (IT), Information and Communication Technology(ICT) and Software Industry are used interchangeably in this article.

1 Introduction

The image of erstwhile unified Andhra Pradesh as an economic success story was built on the rise of the information technology industry. It was one of the first Indian states to advocate that IT can and should be linked directly to better governance and quality of life (Mohanty et al., 2003). The push for IT industry in India can be viewed as a quest for self-reliance. Since the 1980s, Rajiv Gandhi promoted the notion that IT is directly linked to social development (Dedrick and Kraemer, 1993). During the same period, services have overtaken agriculture to become the dominant sector that drove growth in Andhra Pradesh (AP) (Vakulabharanam and Motiram, 2014). To a large extent in Andhra Pradesh, the growth in the services sector is propelled by the emergence of private sector investments replacing or complementing the public sector (Rao and Rao, 2006).

The emergence of the software industry in Andhra Pradesh was anchored by, firstly, the creation of policies that led to development of specialized high-technology urban zones dedicated exclusively to the Information Technology (IT) sector - creating physical spaces. Secondly, the establishment of targeted educational institutions provided the necessary human capital. This development model exemplified a public-private partnership wherein physical infrastructure development was primarily undertaken by governmental bodies, while educational infrastructure emerged through capitalist investment facilitated by state support. This symbiotic relationship between state policy and private enterprise created favorable conditions for the software industry's rapid expansion in the region.

The reasons for the emergence of IT sector in erstwhile unified Andhra Pradesh range from the practical and obvious to subtler ones. The underscoring link is from the economic policy that prescribed special incentive packages that come under special economic zones[2] These zones enabled the setting up of IT parks with uninterrupted power supply, good telecommunication facilities and internet connectivity in Hyderabad and nearby locations (Government of Andhra Pradesh, 2002).

[2]Special economic zones (SEZs) are places where the regulations of trade and business are distinct from the rest of the country. These zones aim to increase trade balance, increase investment, job creation and better administration.

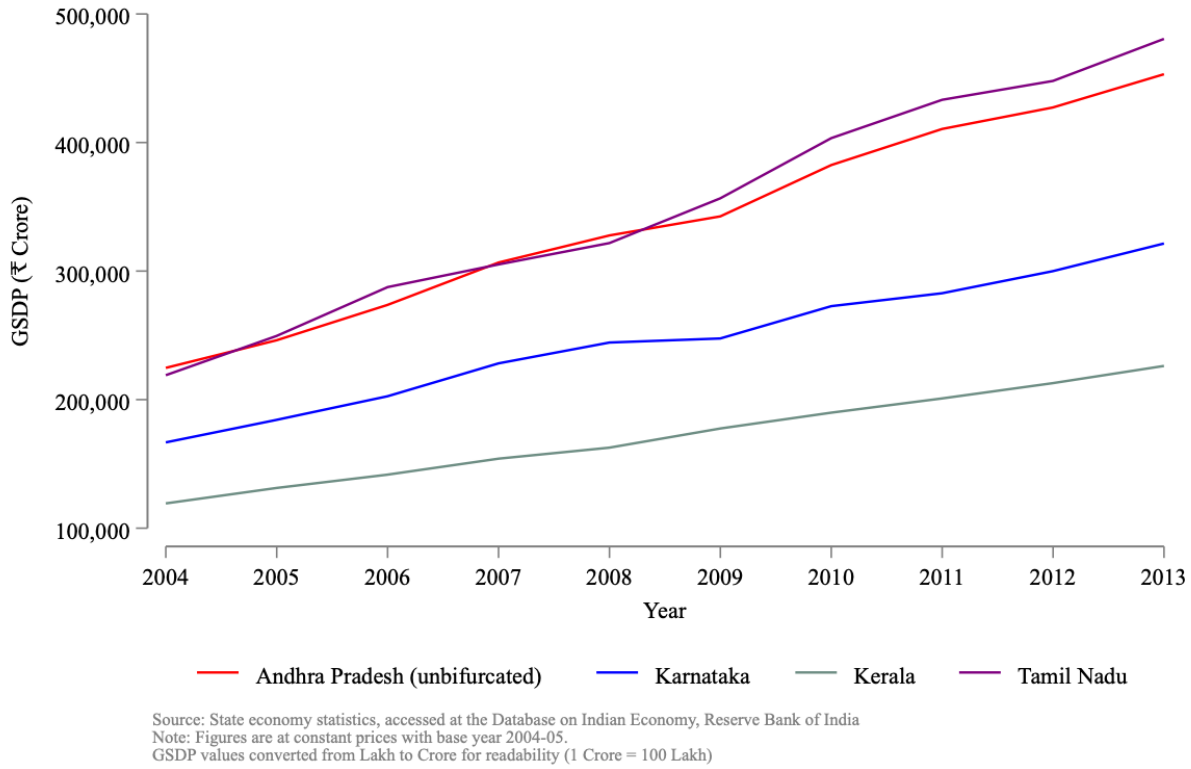


Figure 1: Gross State Domestic Product Trends in South India

Furthermore, the government of Andhra Pradesh encouraged rich agriculturists, and industrialists to invest in education and provided subsidies for setting up technical education institutions to aid the needs of the companies that came into Andhra Pradesh for setting up their enterprise (Damodaran, 2018). The promise of better social status and a better lifestyle got labour into the industry coupled with the dream of going abroad and working for foreign companies (Xiang, 2007).

Over time, not just geographical and technical factors, but a lot of political factors also enabled the rise of this industry. The promotion of policies led to an increase in state gross domestic product (SGDP) and the creation of jobs for the unemployed regionally. This is not a technical matter of information technology piggybacking onto infrastructure. This was supported by rural capitalists to invest in educational institutions and young labour to perform back-end operations required for multinational software companies.

From my fieldwork, the distinctive feature of the IT industry at that time was the barriers to entry were lower when compared to other industries, individuals with bachelor's

degrees pursued popular computer courses and got placed to perform back-end operations. Migration to Hyderabad from other parts of Andhra Pradesh in search of jobs and better living conditions is upholstered by the capitalists by setting up educational institutions to assist the IT industry. This paper analyzes how the government of Andhra Pradesh successfully balanced these socioeconomic factors to create a thriving IT ecosystem. How did this uprise of the software industry affect the general public and what kind of role did each of the stakeholders (such as the government and labour) have in setting up and running this industry?

This paper analyzes the period from 1999 to 2014, from the inception of the policies to the bifurcation of the unified Andhra Pradesh into Andhra and Telangana. To map out this phenomenon, a mixed methods technique was employed - I analysed government policy documents and conducted key-informant interviews with policymakers, IT workers and IT entrepreneurs along with a review of secondary data and existing literature. Much has been written about the emergence of the IT industry in India. Research focussing on the development and promotion of the IT industry on Andhra Pradesh remains sparse. This paper aims to fill this gap and push for a holistic approach when it comes to understanding an economic phenomenon without losing sight of history, politics, institutions, and most importantly, people.

2 Background: State politics and the genesis of the IT Industry

Following 1991's liberalisation policies, Andhra Pradesh was the first state to procure an independent loan from the World Bank under the AP Economic Restructuring Programme (Reddy and Prasad, 2014). According to the National Sample Survey 50^{th} Round (July 1993 - June 1994), rural poverty in Andhra Pradesh was 15.9% and urban poverty was 38.3%. In reference to this period, Balagopal (2004) wrote, "jobs in the non-agricultural sector in rural areas are not being created". Andhra Pradesh was struck by over 60 cyclones in four

decades, resulting in reduced produce and farmers' suicides (Suchitra, 2011). Cotton grower's suicides in Guntur and Prakasam districts and farmers' suicides in Srikakulam or Rangareddy districts were a result of the cyclones and farmers being debt struck (Kumar, 2006). The government of Andhra Pradesh (GoAP) focussed on the IT sector as a solution (Chowdary, 2002) & (Vaditya, 2017). Telugu Desam Party (TDP) headed by Nara Chandrababu Naidu came to power in AP in 1995. This marked the onset of World Bank mandated - Singapore aspirations pushing for structural change and an attempt to build a professional city-centred capitalism with the aid of foreign capital (Yeoh et al., 2004) & (Reddy and Prasad, 2014). Figure 2 is a political map of AP before bifurcation.

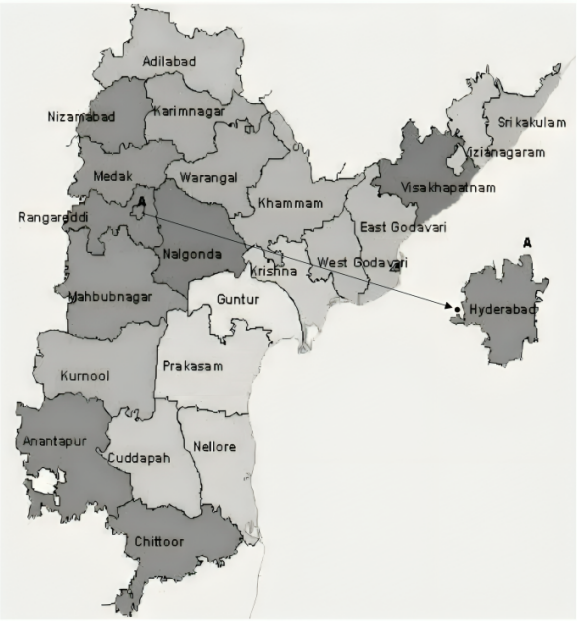


Figure 2: Administrative Division Map of Andhra Pradesh (Census - 2011)

Vakulabharanam and Motiram (2014) map the growth and distribution patterns from the creation of Andhra Pradesh in 1956. Combining secondary data analysis with fieldwork, they aim to understand the structural breaks in Andhra Pradesh's economy. They divide the regimes into four periods: 1956 to 1969-1970, 1970-71 to 1981-82, 1982-83 to 1994-95 and 1995-96 to 2010.[3] The focus of this paper is on the third regime where the IT boom took place. Vakulabharanam and Motiram (2014) writes, state gross domestic product (SGDP) from services overtook agriculture during this period. The growth from services was followed

[3]These periods are not statistically comparable, they have been identified based on changes in growth patterns, and structural changes in the economy.

by industry and then by agriculture. Figure 3 explicates that in the third regime - both rural and urban inequality fell, which was not the case in previous regimes.

Table 1: Dominant Characteristics by Period

Periods	Dominant characteristics
1956 - 1970	Dominated by agriculture and characterised by low growth
1970 - 1982	Dominated by agriculture, but experienced better growth due to the introduction of green revolution technologies
1982 - 1995	Services overtook agriculture and became the dominant sector in the third regime
1995 - 2010	Growth in all sectors

Summarised by the author from Vakulabharanam and Motiram (2014)

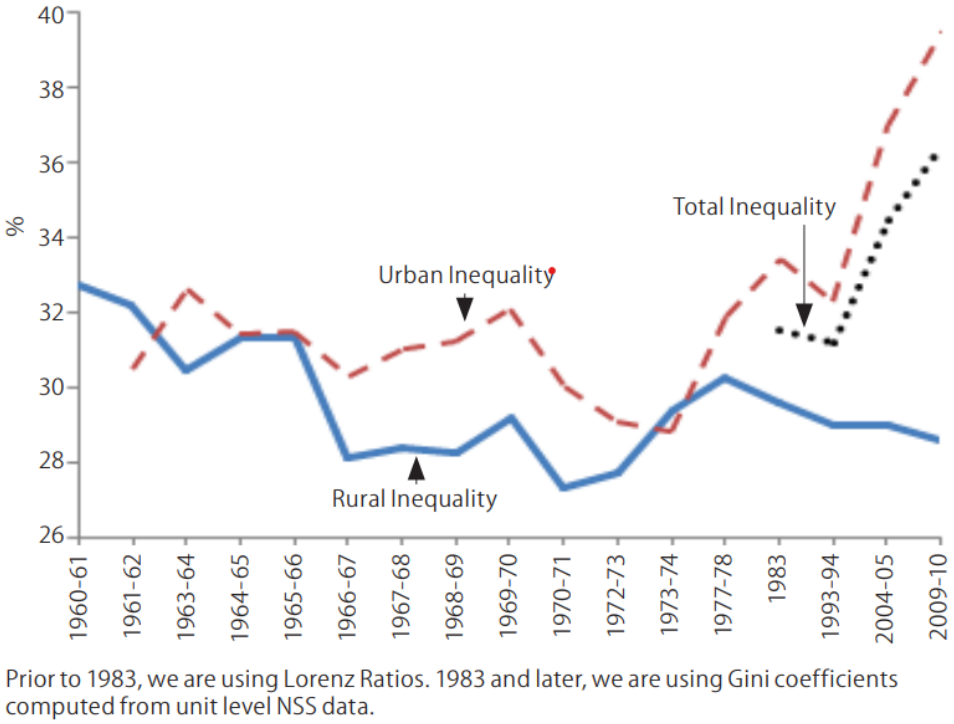


Figure 3: Inequality in Andhra Pradesh from Vakulabharanam and Motiram (2014)

Damodaran (2018) notes, during the TDP regime, capital flourished in urban AP, i.e. Hyderabad and Visakhapatnam. This is in various avenues such as the film industry, private healthcare, private education, information technology, hospitality industry, pharmaceuticals, real estate...etc. This continued to occur mostly through special economic zones.

In 2004, the TDP party crashed because of neglecting the rural sector, agrarian distress,

and unpopular structural adjustment policies (Vakulabharanam and Motiram, 2014). Congress party's Y.S. Rajasekhar Reddy (YSR) put forth populist schemes such as Aarogyasri (108) and educational subsidies for young students from backward castes (Suri, 2004). During these years, state resources and institutions were used to promote private capital in urban areas. The main difference noted between the approach of the TDP and Congress was that - the TDP improved infrastructure and encouraged foreign investment and Congress pushed for more educational institutions.(Reddy, 2002) As a result of these policies, next to Bengaluru, Hyderabad has become a premier global destination for the IT and ITES industry of India (Upadhya, 2020)

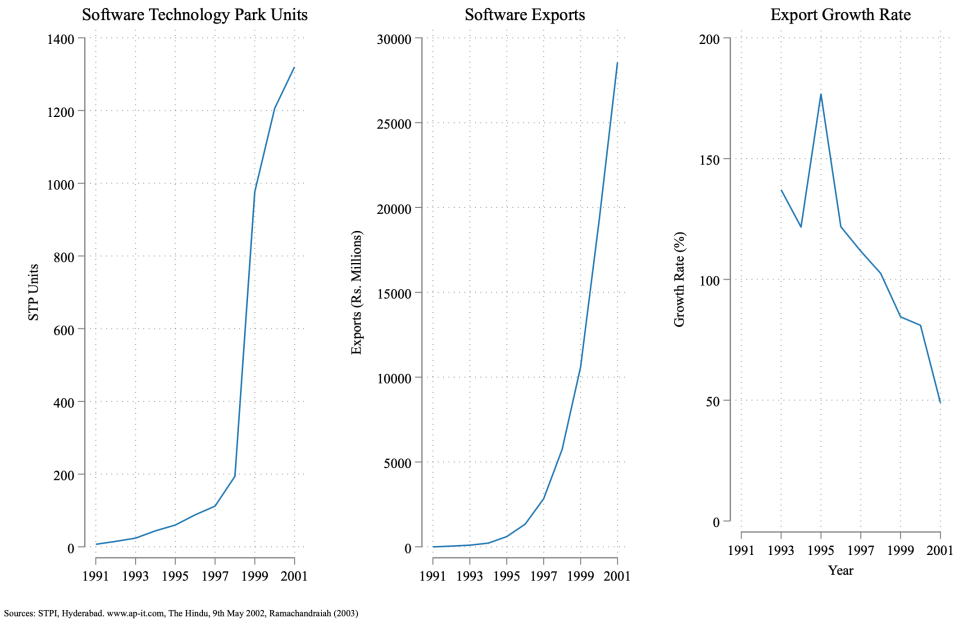


Figure 4: Growth of Software Industry in Hyderabad 1991-2001

The growth of the software industry has been spectacular in Andhra Pradesh. "The total value of software and software services exports from the state grew from only US $7.1 million in 1994 to US $2,828.3 million in 2005"(Kumar, 2009, p 107 line 2). Figure 4 indicates the rise in software technology parks (STPs), exports (Rs. Millions), and a rise in 1995 and a secular fall of export growth rate later. By the time of bifurcation, there were, "1,300 IT units employing as many as 3.7 lakh professionals in the state, with an annual export turnover of Rs 68,258 crores in 2014-15" (Nageshwar, 2016, line 49). This paper investigates the impact of this phenomenon and the policies that went into creation of the software industry.

3 Methodology

I adopt mixed-method techniques to explicate how the software industry was built in erstwhile unified Andhra Pradesh. I weave primary field surveys with insights from Information and Communications technology (ICT) policy documents, and secondary literature to elucidate how GoAP bridged the gaps between job-seeking graduates and foreign software companies.

3.1 Fieldwork

The chosen fieldwork site was Hyderabad. To understand the political economy of the software industry in erstwhile unified Andhra Pradesh, I created targeted questionnaires for different demographics and interviewed them. They are as follows:

- Engineers, Human Resource (HR) personnel, Technicians and Managers
- Middlemen
- Government officials
- Andhra Pradesh/Telangana native IT Entrepreneurs

Before interviewing, informed consent was obtained from all the respondents. 33 Engineers, HR personnel, Technicians, and Managers; 5 middlemen[4]; 2 government officials; and 5 Andhra Pradesh/Telangana native IT Entrepreneurs. I used purposive sampling and made efforts to focus on different kinds of IT companies ranging from Software designing, IT-enabled services (IT-es)[5], and Customer Care[6]. The existence of actual product design companies by Andhra Pradesh/Telangana native IT Entrepreneurs was sparse amongst multinational companies. All the interviewees were chosen for the potential insights they could provide into the underlying tensions involved in the Information Technology policies, their formulation,

[4]Middlemen facilitate services to keep the industry running. They have information regarding procuring licenses and dealing with the government. They help in managing clients and have information about many services that the industry renders. They refer to themselves as middlemen.

[5]ITes mostly involves testers and coders

[6]Customer Care companies are mostly service-based or product-based

the goals, and the actualisation of said policies. Every interviewee, from each of the four groups, were asked a set of open-ended questions thereby allowing the respondents to talk freely about the issues posed. During the interviews, modifications were made to some questions as and when they prompted limited answers, while other questions were added as some respondents volunteered additional responses.

The questions posed include details of working conditions, family background and their views on the industry, their views on gender, caste, workplace norms, modes of payment, and the progress of the industry over time. Most of the Engineers, H.R., Technicians, and Managers provided similar narratives that shaped my perspective on how an IT company functions.

Interviews were conducted face-to-face, over the telephone, and via email. The small sample size does not lend itself to larger claims but provides a bird's eye view of how the industry conducts itself. Their experiences provided me with a broad understanding of how labor and capital mobilisation occurred and the role of government in all of this.

In my sample, there are 6 Managers/Executives, 14 Consultants/Team Leads, 5 from Human resources management and 8 coders/testers. Business Process Outsourcing (BPO) jobs are usually done by young men and women who are just out of educational institutions. There were very few Andhra/Telangana-based IT, entrepreneurs. The startups owned by Andhra/Telangana-based IT, entrepreneurs had few employees and some were working alone. These 5 IT Andhra/Telangana-based entrepreneurs are males, who set up their IT companies from pre-existing capital from agriculture or the capital they earned working for an IT company abroad. All the Telugu IT entrepreneurs I surveyed were Hindus and had post-graduate education. 80% of the companies in the are product or service-based.

3.1.1 Fieldwork site

The site of fieldwork was Hyderabad, mainly, Cyber Towers and Nanakramguda in the Financial district. One can spot the large cylindrical building that was the very first and

the core building that houses several IT companies in Hitec city [7]. In 1999, Hyderabad was described as, "a city where a phone line can be ordered and installed in 15 minutes, with constant power at steady voltage, with pure tap water, banks with cash dispensers, restaurants, a hotel and a conference centre in easy reach" (Popham, 1999, line 11). As noted by Nageshwar (2016), Hyderabad did not have an international airport till 1998. It was chosen because of the promise of potential and availability of cheap labour and the government's enthusiasm.[8]

Hitec City became a defining infrastructure of Hyderabad. The projection Hyderabad has shifted from Charminar to Cyberabad, over time (Ramachandraiah et al., 2008). During my fieldwork, I noticed very small companies that occupy only one room and some international companies which are easily recognisable, take up more than half of the building. The display of company names, the signs of financiers, of property-development capital, and the endless advertisements of hostels painted upon the scattered rocks, all bear witness to the fact that this "development" is significant.

Built on a hill, one can see almost anything from this altitude. The hi-tech city is both hugely impressive and wearyingly dispiriting at the same time. It is impressive in its scale, in its energy and self-confidence, in its sheer achievement. It is dispiriting in its inequalities, in its apparent exclusion, geographically and economically. By the time of my fieldwork, the industry had been present for more than 10 years, still, there was a sense of newness to the buildings, one could smell cement from everywhere as there was a constant construction of new buildings.

3.2 ICT Policies

How does a government manifest a policy that drives change in the long term but also reaps benefits quickly for the masses to witness? The government of Andhra Pradesh (GoAP) seems to have struck a balance between the two by catering to the needs of the global economy by

[7]The abbreviation of Hitec is Hyderabad Information Technology and Engineering Consultancy City

[8]In Chandrababu Naidu meeting Gates & Chandrababu Naidu mentioning about his friendship with Gates this is shown.

creating a knowledge economy. To enhance understanding, I chose to analyse the policies that contributed to the rise of the software industry.

Table 2: Policies with a focus on the IT industry in Andhra Pradesh

Policies with primary focus on the IT industry in Andhra Pradesh	Policies that indirectly helped the IT industry in Andhra Pradesh
Vision (2020)	EXIM policies (1985, 1992-97, 2002-07)
ICT press release (2002)	Industrial policy (1991)
IT-ITes promotions (2002-2005)	Labour Reforms policy
ICT policy (2005-10)	SEZ policy (2005)
Notification of ITIR (May 29th 2008)	Science, Technology and Innovation Policy (2013)
ICT policy press release (2010-15)	Foreign Trade Policies (2001-14, 2015-20)
ICT policy (2014)	Technical Education policies (1968, 1986, 1992, 2015)

Source: Prepared by the author on the basis of information obtained from MOSPI, RBI, GoAP, ibef.org, NASSCOM, www.ap-it.com. Template taken from Das and Sagara (2016).

Table 2 shows the set of selected policies at the national and state levels that indirectly and directly helped the software industry in Andhra Pradesh. I have analysed ICT policies specific to Andhra Pradesh from 1999 to 2014 (targeted until 2020). The policies at the centre might have propelled the creation of policies at the state level and policies at the state level might have affected the policies at the centre, given how the composition of exports in the services sector has been changing. Claims on how a single policy could affect the economy of AP are unfounded.

4 Public policy and labour mobilisation

Structural change is technically, an alteration of underlying mechanisms that shift an economy from one sector to another - agricultural to manufacturing and then to services. In most developing nations, the transformation is facilitated by the government(Amsden, 2007). In the case of Andhra Pradesh, the government pushed the labour and capital away from agriculture towards services rather than industry.

My proposition is that the set of people that benefitted from ICT policies also benefited from the agrarian policies preceding that. In the case of Andhra Pradesh, the green revolution led to improvements in agricultural incomes and the emergence of an agrarian class that

can supply labour and capital to the nascent IT industry (Upadhya, 2016). Damodaran (2018) explicates, at the beginning of the 1990s, rural capitalists and agriculturists played an important part in mobilising labour and capital from rural coastal Andhra to develop in urban erswhile unified Andhra Pradesh (Current Telangana).The channelling a significant surplus from the agricultural sector to setting up educational institutions by rural agriculturists and capitalists was integral in this change. The dominant castes, Kapus, Kammas, Reddys, Rajus and Velmas, influenced the government and capital which manifested in mobilising labour. They owned the majority of industries like sugar factories, hospitals, educational institutions, mining, eateries, and the film industry. Then came the technical education and software industry which was also dominated by Rajus (Damodaran, 2018, p 117). The regional and/or local capital took over the cities and other developing parts of the state by investing in various industries. The capital-owning classes settled in Hyderabad enabling changes in the education sector[9] and setting up IT firms[10].

During my fieldwork, when I further inquired about why Hyderabad was chosen, Prof. C. Ramachandraiah mentioned

> "The software industry started in Hyderabad in early 1990s along with the other major cities (except Bengaluru). Software Technology Parks of India (STPI), Hyderabad was set up in 1992. It functioned from a floor in a building called Mytrivanam in Ameerpet. Probably this may be one reason why a number of computer-training and repair related activities came up in this area over the years. Hyderabad was already a 4 million-plus city by then. It had a number of educational institutions including a few universities, and a number of public sector undertakings. The availability of required manpower was not a problem. It just needed a push."
>
> Q: What kind of push?
>
> "Any push was a welcome move in those days. It was needed. To begin with,

[9]In 1986, after returning from England Sri Chaitanya Techno Schools are set up by B.S. Rao in Hyderabad. He is from Tadigadapa, near Vijayawada, Andhra Pradesh.

[10]In 1987, Satyam Computers were set up by Byrraju Ramalinga Raju in Hyderabad. He hails from Bhimavaram, Andhra Pradesh

probably, the push was for infrastructure, a place with plug-and-operate facilities from where new companies can make a beginning. Later on it was a policy push with providing an enabling environment and incentives." - *Dr C. Ramachandraiah, Professor, Centre for Economic and Social Studies (CESS)*, Hyderabad

At the local level, this led to the expansion of their social networks and these networks played an enormous role in shaping policy outcomes (Mooij, 2003). Biswas (2004) explicates the role of informal social networks in that led to investments in specific regions like Hyderabad.

From the perspective of the industrialisation with motive of development, Amsden (2007) argues, for late industrialization, developing nations use successful strategies based on learning and adapting technologies of more advanced countries. In some nations, industries themselves might be latecomers, hence, the state supports them by providing opportunities for venture capital and subsidized finance to latecomer firms. Andhra Pradesh created bureaucratic agencies to fasten the initiation of the IT industry. The implementation of policies for setting up this industry is an indication of how central and regional governments can play a role in industrial advancement in knowledge-intensive and innovation-based industries (Yeoh et al., 2004). Without involving itself directly in the production of IT services, the government facilitated industrial investment through rural capitalists and industrialists (Suri, 2004). Miller (2001) puts forth a "leap frogging" argument, that India transformed directly into a knowledge economy skipping manufacturing industry-based developments. Andhra Pradesh followed suit and created a knowledge economy that supported the IT industry.

Telugu Desam Party (TDP) and After

After the death of Nandamuri Taraka Rama Rao (NTR) in 1995, Nara Chandrababu Naidu led the state representing the TDP. He was the chief minister of Andhra Pradesh from 1995-2004. Referring to Chandrababu Naidu's Vision 2020 for Andhra Pradesh, (Bandyopadhyay, 2001, p 903 line 4) writes, "where landlessness and exploitative informal tenancy relationships are the major causes of acute rural poverty and where the bureaucracy has a proven track record of not reaching the lowest layers of poverty", enormous investments will yield sub-

optimal social returns. Naidu's agenda didn't include much about reviving the agriculture sector in the state, which has been in a precarious condition.(Vaditya, 2017)[11] He lost the subsequent elections as the YSR's congress party assured focus on irrigation projects to alleviate the suffering of farmers in the state. (Reddy and Prasad, 2014)

Chandrababu Naidu's government tuned itself to align with international financial institutions such as the World Bank for promising development. This leads me to question, in line with Mooij (2003) and Horowitz (1989), "Is there a Third-World Policy process?". Horowitz (1989) lists several differences between developed and developing nations in policy formulation and implementation. A notable difference is, that in developed nations, policy contestation occurs in formulation, and in developing nations, it occurs in policy implementation. This holds true in Andhra Pradesh's case as well. In 1999, with consultancy from McKinsey & Company, Inc., Andhra Pradesh formulated its first IT policy called *Vision 2020*, This was instrumental in laying out the plans of Andhra Pradesh regarding the initiation of the software industry. This is the first policy that created a framework for the improvement of the software industry. The policy states, that the aim is

> "Andhra Pradesh will move into the new millennium inspired by this vision and fortified by the knowledge that, implemented successfully, it will bring happiness, prosperity and fulfillment to its people." (Government of Andhra Pradesh, 1999, p 338)

Furthermore, the document promises an increase in literacy, empowerment of women, gainful employment, and environmental protection and aims to make the government and governance transparent and accountable. The aim was to "telescope into one generation what it took decades and possibly centuries, for other societies and other countries to achieve" (Bandyopadhyay, 2001, p 900, line 20). The policy is critiqued for its highly value-loaded statements that laid a lot of faith in the process of globalisation (Bandyopadhyay, 2001). The Government of Andhra Pradesh (1999)'s Vision 2020 for IT industry in Andhra Pradesh was to "develop world-class communications infrastructure" to create "an information-based

[11]The government provided compensation to the farmers' families who died by suicide.

society in which IT is a way of life" through "pioneering electronic government applications".

Drawing from interviews with government officials, it was evident that digitizing the government records was the preliminary idea in pushing the IT industry in AP. This can be noted in the Government of Andhra Pradesh (1999)'s Vision 2020.

> "The state wanted to bring to the citizens of Andhra Pradesh a 'SMART' government, which was defined as a government that is simple, moral, accountable, responsive and transparent" Government of Andhra Pradesh (1999)

Suri (2004) critiques that these statements were created as "recipes to cure the ills of the state and society". Using the National Election Study (2004), he writes that people rated Nara Chandrababu Naidu negatively on the deliverance of his promises and for neglecting irrigation facilities and a lack of employment opportunities. The GoAP *Vision 2020*'s Government of Andhra Pradesh (1999) aim was to set in place infrastructure that attracts the "world's top 500 IT companies and get the maximum number to locate in Andhra Pradesh." Achieving this involved targeted promotions in silicon valley, developing alliances with countries such as Japan, Singapore and Germany and encouraging their countries to setup IT centres in Hyderabad, Tirupati or Visakhapatnam. This also involved launching Andhra's own venture capital funds. To create infrastructure, the aim was to build a Hi-tec city in Hyderabad with living conditions comparable to any other location in the world (Government of Andhra Pradesh, 1999, p 282). These are supported by contributions of 'knowledge worker' (Government of Andhra Pradesh, 1999, p 286)[12]

The idea of 'knowledge corridors' and 'knowledge workers' were drawn from Research Triangle Park (RTP) in North Carolina, USA and the Hsinchu Science-based Industrial Park in Taiwan. These have been conceptualised to foster research, establish "world-class universities" to create a labour force that caters to the running of the software industry. This setup also aims to nurture entrepreneurship and start-ups. During fieldwork, when enquired

[12]In Vision 2020, "A knowledge worker is an individual with specialised knowledge and skills in fields like software, medicine, accounting or engineering. The more an economy can utilise and attract knowledge workers, the faster is its development." (Government of Andhra Pradesh, 1999, p 286)

about policy formulation, the Principal Secretary of IT Department in the erstwhile unified AP stated,

> "The initiation of the promotion of IT as an industry with a great potential for AP, happened during 1996-99, with the vision of the then Hon Chief Minister of AP. The hypothesis was that AP and Hyderabad had significant advantages in terms of infrastructure, human resources and pro-active government, which could be leveraged effectively to make rapid strides for the growth of IT Industry."
> - *Principal Secretary of IT Department in the combined state of AP*, during 1999-2004 (Source: Field Notes)

The Government of Andhra Pradesh (2002)'s ICT policy reveals the promotion of three sectors of the information technology industry, technical higher education institutions, and electronic government to attain economic and social development and digitization of government services. The Government of Andhra Pradesh (2002)'s ICT policy focuses on incentives available to IT companies. The exemptions from statutory power cuts, pollution control investment subsidies and 50% reimbursement of registration fee, stamp duty, exemption from zoning regulations (Government of Andhra Pradesh, 2002). Dabla (2004) notes that, "integration with the global economy is a beneficial and necessary factor for economic development". The economic linkages of developed nations with less advances economies provides, "the best avenue for third world development". The ICT 2002-2005 policy also includes application for grant of incentives to IT Industries (Government of Andhra Pradesh, 2002, p25).

The underscoring thread across all policies promoting IT services and IT-enabled services was to promote technical education. Ramesh Loganathan, a professor at the International Institute of Information Technology (IIIT), Hyderabad stated "Andhra Pradesh was seen as a potential state as it was endowed with large and technically competent manpower" (Source: Field Notes). The IT and IT-enabled services (ITES) sectors have been entirely concentrated in Hyderabad since the 1990s and have contributed hugely to IT exports and employment generation (Ramachandraiah, 2016). Today direct employment is estimated to

have an increase of 16.29% year-on-year [13].

During this time, the Indian School of Business (ISB) and the International Institute of Information Technology (IIIT) started functioning in Hyderabad. The government wanted to generate technically skilled professionals to be employed in, and to fuel the growth of, the private information technology industry. The barriers to entry into the industry are low with computer coaching centres training any interested candidates irrespective of academic background. IT Software industry is exempted from zoning regulations enabling them to establish in any location desirable. The units can be established in the STPI Complex/Hitec City or in owned or leased accommodation, that is ready for industrial use. This easy availability of acted as a catalyst in setting up the industry and encouraged investment (both technically and financially).

The 2002-05 policy charts out the growth clearly, "the IT industry grew significantly during the last 3 years, at a compound annual growth rate of over 80%, with the exports of software reaching Rs.2,855 crores for the year 2001-02, from a level of Rs.574 crores for the year 1998-99". Employment in the industry has improved from 12,000 to 64,000, which is a 433% increase (Government of Andhra Pradesh, 2002). They promoted the mobilisation of rural capital and investment of state resources to promote private capital in urban areas.

Bandyopadhyay (2001) notes that the promise is to demystify governance to the common citizens and make them partners in the governing process. Making India, an "IT superpower" was the main intention of creating the policies by the state governments that ignited the initiation and development of the industry. The places that were flag bearers to the development of the IT industry are Bangalore, Hyderabad and Mumbai.

This was also made possible because of the Government of Andhra Pradesh (2005b)'s Special Economic Zones Act at the central level. Drawing from this policy, Government of Andhra Pradesh (2005a)'s ICT policy focuses on eGovernance and investment promotion. Policies such as "Ideas from Citizens (IC)" were also enabled. IT/ITES Special Economic Zones (SEZs) were developed on 25 acres or above in other parts of Andhra Pradesh such as

[13]The statistic is from *Why Invest in Telangana IT-sector?*. Can be accessed using link

Vijayawada, Tirupati, Kakinada and Warangal. The incentives and facilities offered to the units in SEZs for attracting investments into the SEZs, including duty-free import/domestic procurement of goods for development, operation and maintenance of SEZ units, 100% Income Tax exemption on export income for SEZ units, exemption from Service Tax and Exemption from State sales tax. The creation of Software technology parks in Information technology investment regions (ITIR) was instrumental in the growth of the industry(Government of Andhra Pradesh, 2005a).

It is crucial to note the projects and programs Andhra Pradesh has launched to extend IT benefits to the majority of the population, even if they are not direct technology users or owners. These are called, "One shop, Non stop IT services" (Government of Andhra Pradesh, 2002). These include the Chief Minister's executive information system, which is an online database, implemented in 1998, that provides information on electricity, water, health, finance, and so on, which decision-makers use to gauge the daily progress of various infrastructure projects and government services statewide. The Eseva program, piloted in December 1999, made bill/tax payments and applications to receive government licenses and services easier (Government of Andhra Pradesh, 2002) & (Government of Andhra Pradesh, 2005a).

The Software technology parks promoted software exports with a special focus on medium-sized enterprises and start-up units. The STP Scheme which is a 100% export-oriented scheme has been successful in fostering the growth of the software industry. The exports of STPs have grown as this scheme enables software companies to start operating based on convenience at cheaper costs. This is noted in figure 4.

Defining these technology parks helps us understand why their establishment had a huge role in the advancement of the software industry. Technology parks are deliberately established business areas, that aim to induce economic growth by attracting high-tech manufacturing firms to a privileged space. Innovation functions are of less importance in those parks because they are inclined toward business and economic development. While studying high-tech spaces, it is important to keep in mind that these should be seen in the

context of competition between localities for attractive (knowledge-based) types of investment. Here investing in an attractive locality (often by the government) will help in improving employment conditions regionally. Table 3 provides a pithy summary of policies that were analysed.

Table 3: Summary of Policies

Time Period	Policies	Summary
1999	Vision, 2020	Formation of software technology parks, creation of SEZs and cyber towers
2002-2005	IT-ITes promotions, 2002-2005	Setting up software parks, digitizing administrative data
2005-2010	ICT policy, 2005- 10	Promoting educational institutions - engineering colleges and coaching centres.
2010-2015	ICT policy press release, 2010-15	Promotion of entrepreneurship in the state. Focus on providing more jobs. Push for startups and planning to increase special economic zones (SEZs).
2015	ICT policy, 2014	Providing more IT employment and subsidies for women and SC/ST entrepreneurs preferably in rural areas.

During my fieldwork, I interviewed a native Telugu entrepreneur about the schemes, STPs and creation of IT industry in Hyderabad, he mentioned:

> 95% of IT is concentrated in Hyderabad. There is absolutely nothing IT in Andhra Pradesh. A very few projects came up in Andhra. There are two kinds of jobs you usually find in IT, one is developer community and the other is support services. Support services in IT industry has seen a phenomenal growth. Most of those jobs are low paid, the developer community is growing at a steady pace. The developer community or any knowledge base in IT has not grown substantially. There is still a lot of potential. If you compare with other industries or companies, their knowledge base seems to be larger. Only one in ten jobs or two in ten jobs contribute to the IT base. The base is not growing at the right pace. - *Vice president for technology management for a big conglomeration*

A common theme that emerged in my interviews with Engineers, HR personnel, Technicians, and Managers is the sense of security IT companies provide. Madhav (name changed), a software engineer who has been in the industry for 8 years said, this place gives him a weird sense of security that becoming a "techie" means life is good socially and economically. Madhav explained, that the IT employees have a specific amount of working hours but they end up doing more than what they have agreed for, to be in the good books of the employer.

In India and specifically AP, the respective ICT policies are promoted as an antidote to poverty (Suri, 2004) & (Vaditya, 2017). The kind of policies that promoted the IT industry were rigid policy restrictions (before 1984), eased restrictions (1984-90), and proactive promotion of the IT industry (Das and Sagara, 2016). The government bridged the gaps between the common public, computer coaching centres, engineering colleges and foreign companies. According to the IT policy in 2014 targetted till 2020,

> "an effective policy for the development of IT should base itself on the four pillars, namely, human capital, infrastructure, incentives and above all, a system of good governance". (Government of Andhra Pradesh, 2014b, p 12, line 40)

One of the main propositions in the later policy documents was - taking Giga bit to rural areas. Government of Andhra Pradesh (2014a)'s policy press release is perhaps the first document to mention this. Entrepreneurs are encouraged to set up their IT companies in rural areas by providing power subsidies, land abatement, and subsidies on bandwidth for connectivity.

The Government of Andhra Pradesh (GoAP) wanted to build a society that creates opportunities for every citizen and improves business conditions in the state. The crux of the prior policies is providing low-cost real estate, a talented pool of manpower, a pro-business government, and good technical and social infrastructure to foreign IT companies.

The state focussed sharply on digitising government data and making policies that attract foreign software companies. The states took initiatives to allow privately run technical education in engineering and computer science disciplines. One main reason for more foreign software companies outsourcing their work is the availability of large numbers of skilled personnel, the availability of adequate skilled labor and The leadership of the chief minister of Andhra Pradesh was particularly successful in persuading a number of large multinational firms to open their subsidiaries in the state. This, in turn, was helpful in attracting a number of other firms to the state (Kumar, 2009). The government took a keen personal interest in implementing e-governance projects and promoting the software industry in the state (Ramachandran and Ray, 2005).

One of the strong critiques of Government of Andhra Pradesh (1999)'s Vision 2020 is that the projections that are drawn from the data are not corroborated by independent studies (RV, 1999). The Vision 2020 does not mention any methodological decisions they have made about the number published. In a state, with history of agitation (Simhadri, 1997), naxalbari uprising (Ravikanti, 1995), farmers' suicides (Kumar, 2006) and regional struggles (RV, 1999). The GoAP's any policy didn't envisage a plan that contends with these issues.

5 Labour creation and Mobilization

To fulfill the aim of creating a knowledge economy that caters to the global economy - the government of Andhra Pradesh pushed for an increase in computer coaching centers and engineering colleges.

5.1 Producing IT engineers for IT industry in Andhra Pradesh

The IT industry has multidimensional needs, and the labor force needs to be populous and flexible. The implementation and push towards technical education and the availability of short-term courses were a catalyst in giving what the IT industry needed. The relationship between the local software industry and global information technology (IT)–production networks represents how firm specialization drives new opportunities for the development of backward economies(Kumar, 2009).

The four critical factors noted for the rise of the software industry are the availability of surplus labor inclined towards learning computer courses, specialized infrastructure, proactive labor and policy reforms facilitating production linkages (Aghion et al., 2008) and the presence of related and supporting industries. ()

Xiang (2007) in his "Global 'body shopping', An Indian labour system in the Information Technology Industry", pioneers an anthropological study on understanding the movements of educated labour from one industry to another or across states or countries. Body shops facilitate this movement in the information technology industry. Body shops can be thought

of as conventional coaching centres for learning computer languages that help the labour become a part of the IT workforce. This can be understood as a global system for training managing and circulating skilled labour across states and countries.

Body shops reduced the friction between companies and the government by circumventing it, they enabled labour to get into the industry. The surplus capital and labor from the agricultural sector made the higher education institutions that enabled the making of the IT industry (Xiang, 2007, p 31). There is certainly a progression in the flow of labor and capital, IT corporations generally require a smooth flow of immediately available short-term or long-term skilled labor into the industry. These body shops created a space for people who did other courses such as Bachelor in Arts or Commerce to pursue computer courses and get into this industry. As the opportunities expanded, the people of Andhra Pradesh "produced IT people as a family business"[14]. Xiang (2007) relates it to an increase in dowry demands among the Telugus. He notes, "A bride's father may offer to pay an IT boy's college fees or sponsor his emigration on the condition of a subsequent marriage"[15] (Xiang, 2007, p 37 line 17)

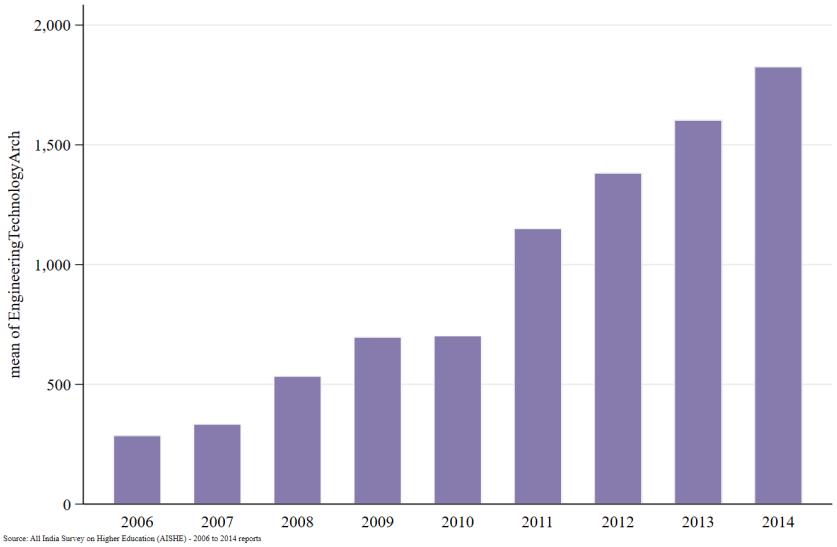
5.2 Education

An overarching theme in Upadhya and Vasavi (2008), Upadhya (2014), Upadhya (2016), Upadhya (2020)'s work is portraying the range of strategies the IT industry deploys in search of youth to be transformed into ITES agents, associates, consultants, representatives, customer service representatives, and desk engineers. The routinized nature of work is popularised because there was a desperate need for a large pool of labour to feed this growing industry, many companies hold open walk-in interviews, where young people are encouraged to come with their resumes and take a test and an interview (Upadhya and Vasavi, 2008).

From the time of Rajiv Gandhi, IT development in India was one of the major goals (Dedrick and Kraemer, 1993), but data communication facilities were not adequate and India didn't have credible software engineers (). Figure 5 shows the increase in engineering colleges

[14]This is the title of a chapter in Xiang (2007)
[15]This is also beautifully captured in *Dollar Dreams*, a movie by Shekhar Kammula

Figure 5: Engineering and Technology colleges over time in Andhra Pradesh



from 2005 to 2014[16].

> Since high-quality high-volume human resources were key to success, adequate efforts were made to increase the number of institutions of technical training, to promote quality of education and to establish Knowledge Centres in various engineering colleges. The emergence of IIIT Hyderabad as a premier IT institution is an example of such efforts. Sustaining the initial momentum required special efforts in the form of regular promotional visits to the Silicon Valley, keeping liaison with global IT majors and making significant efforts in the use of IT by the Government itself in the form of innovative e-Governance projects. - *Principal Secretary of IT Department in the combined state of AP*, during 1999-2004 (Source: Field Notes)

The increase in technical education institutions was a must from the government's perspective. Engineering courses and syllabi were upgraded to develop 'industry-ready human resources'. IT training institutes were set up and online certification and courses were provided for familiarising young students with the industry, internships/apprenticeships are made mandatory. The course curriculum was promised to change constantly to be in tune

[16]Data are drawn from State level Specialisation-wise number of colleges (Table 4a in most of the reports)Ministry of Education, All India Survey on Higher Education (AISHE)

with emerging technologies and pushed to meet the requirements of the industry. This led to many young people becoming a part of the IT workforce. Gundemeda (2014) analysed the socioeconomic profiles of the students who opted for IT education. He finds that caste, class, father's education, income, soical networks are key in accessing IT education. In Seemandhra and Rayalaseema region, IT aspirants are from upper castes. Whereas in Telangana, they are from backward communities.

Gopal (name changed), who has been working in the IT industry for the last 3 years, one of my key informants pointed towards the road and said, "Anyone in the street who puts his shirt inside his trousers is an IT professional." Upadhya (2014) writes about the "IT craze" in AP. She captures a particular out-migration from Andhra Pradesh to Hyderabad for a 'techie' life. She argues that out-migration for a software job has shaped the private primary and seconday schools to cater to exams like Engineering Agricultural and Medical Common Entrance Test, most commonly called as EAMCET. One one side, the culture is shifting to cater to the IT industry, on the other side, there has been over production of engineers trying to make it to the IT industry but are left unemployed. Jeffrey et al. (2007) argues that students are left 'unemployable' because of the poor quality of colleges they are from. Gundemeda (2014) assessed the expectations of students. He found that "students did undergo tensions and shared a sense of despair about the future prospects of IT employment, especially in the wake of slowdown in IT industry" but even when employment conditions are grim, "those students hail from the upper and middle classes with a proper social capital were confident about their prospective employment chances" (Gundemeda, 2014, p 325). When asked, what government could have done better,

> I don't know. Government from a social standpoint did. Coaching culture is the single biggest problem. Almost every 11th and 12th student in the country is preparing for entrance exams, They are just filling mcq's. There is no knowledge, no inspiration, no motivation, no stimulation. They do mcq's from morning to evening. They are throwing away two years of development for a whole generation. If we have to fix things that is where we should start. Every one need not prepare for IIT. My kids are not writing IIT and I am okay with that. 1/3 of engineering

colleges in the state are good they are enough. - *Ramesh Loganathan, a professor at IIIT, Hyderabad* (Source: Field Notes)

I also note that, resonating with policies that cater to multi-national companies, the whole IT industry mainly runs on client satisfaction. During my fieldwork, I was explained, that a software engineer from Rajahmundry, East godavari district living in gachibowli going to hitech city, working for Infosys is actually working for Goldman Sachs who is a client of Infosys. The way teams are formed or chosen in Infosys is influenced by Goldman Sachs. This is mainly because of the excessive dependence on export market. Suchitra (name changed), one of my key-informants notes *benching*[17] as a common practice in the software industry. For sake of equality to satisfy the clients, women are part of the teams, but "they are not made as team leads or project heads because they can't be on call 24/7".

The critiques on the IT industry and operations that have emerged during my fieldwork are, the overdependence on export market that has been built in the industry, overproduction of engineers, lack of foresight in moving from back-end operations to produta and/or service designs, excessive migration from Andhra to Hyderabad. The creation of access to the local educated labour pool was the backbone in setting up the IT industry. Kumar (2009) writes, the knowledge creation and diffusion through linkages with local public and private institutions have not been significant. These relatively weak linkages are the result of the industry completely focussing on the export market right from the beginning. According to my interviewee, Raju (name changed) who facilitates relations between clients and companies noted that the "government was promoting only the bigger companies by providing them labour and infrastructure. There were so many small companies that came up but remained small". Overall, this led to weaker local linkages and these firms were given preference only after the state bifurcated in 2014.

From my fieldwork, it is evident that people who have graduated in arts or commerce and are tempted towards the IT sector after its initiation. The nascent IT industry needed a workforce that is flexible, mobile and disposable. This workforce from agriculture, industry

[17]Benching includes having someone on the team for a project but not given any responsibilities.

and other informal sectors to this industry in search of jobs and better opportunities. The movement of labour from other industries to IT enabled services guaranteed significant improvements from the beginning (Source: Field Notes).

From analysis of policies, insights from fieldwork and secondary literature, it intuits that the neoliberalist policies of the state reformed the economy, privitising knowledge and subverting public education splicing social justice from economic development.

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