MONSOON ASSEMBLAGES

THE CHENNAI IT CORRIDOR
Literature Review

Author: Lindsay Bremner
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This review examines literature on the IT Corridor in Chennai, including academic research, policy documents, municipal planning documents, reports (such as environment impact assessments) and the public media, as a reference for the Monsoon Assemblages project in Chennai. Of particular value has been the work undertaken by *Chance2Sustain*, a project funded by the 7th Framework Programme of the European Union, 2010-2014, which focused its work in Chennai on the IT Corridor (Chance2Sustain no date). A number of reports produced by this project feature in the review (Varrel 2011, Kennedy et al. 2014, Kennedy 2015, Roumeau et al. 2015, Kennedy and Sood 2016). The review also drawn extensively on a PhD thesis (Kuppuswamy 2014) and on academic papers by Arabindoo (2005, 2009), those co-authored by Coelho (Coelho and Raman 2010, Coelho, Venkat and Chandrika 2012, Coelho and Vijayabaskar 2014) and numerous other papers by a diverse range of authors, as well as reports and newspaper articles. It does not claim to be a comprehensive review of literature on the IT Corridor, but rather a way of scoping out the field for Monsoon Assemblages.

The review is structured in three sections. The first looks at the deployment of IT as a driver of economic growth and spatial restructuring in India since the 1990's. It examines the discursive apparatus - the policies and instruments - national, state and metropolitan level legislation, policies, plans and delivery vehicles - enacted to implement this and the spatial scaling that resulted. Within this, it couches the IT corridor as a mega-project driven by neoliberal agendas and appealing to global city imaginaries. Section two covers the IT corridor itself, its physical pre-history and material components - the Old Mahabalipuram Road (OMR), Corridor zone, IT Parks and adjacent residential and social infrastructure. Section three examines the Corridor from the perspective of the monsoon – the ground water, marsh and coastal wetlands it is built on and the floods of 2015, in order to draw out questions that Monsoon Assemblages will need to answer in taking its project forward.

1.Discursive Apparatus

A large portion of the literature on the IT Corridor concerns itself with the discursive apparatus emanating from global agencies, national government, state government and the Chennai Metropolitan Development Agency (CMDA) that drove the transformation of India, Tamil Nadu and Chennai into magnets for the IT industry. It is important to note that unlike Keller Easterling's (2014) characterization of such processes as "extra statecraft," while aligned with neoliberal policies and directives emanating from e.g. Asian Development Bank (2007), World Bank (2009), IMF, WTO, McKinsey Global Institute (2010) and various multinational corporations, the economic and spatial restructuring of India after 2001 was by-en-large a pro-active government-led process to align development policies and local politics with a neoliberal globalization agenda.[1]

In India, globalization was largely understood to mean integration with the world economy (Kuppuswamy 2014). It was inaugurated through reforms introduced in 2001, which "represented a change in the mind set and a broad acceptance of the idea that entrepreneurs and markets were to be given priority over government in the conduct of economic activity" (Kuppuswamy 2014:40 after Pangariya and Arvind 2004). The reforms, popularly known in India as the 'Liberalization,

[1] Globalization here refers to the free movement of international capital flows, rapid diffusion of knowledge enabled by digital infrastructure, economic interdependence world wide and the dispersal of economic activities "according to the most advantageous local environmental tax laws, labour conditions and costs" (UNCHS 2001).

Privatization and Globalization' (LPG) Agenda were aimed at industry, trade and the financial sector. Their objectives were to grow the economy and make it globally competitive, restore macro-economic stability, increase economic efficiency and integrate with the global economy (Mehta and Pathak 1999). A range of policy measures were introduced, such as encouragement of private sector investment, disinvestment in state owned enterprises, deregulation of industries, liberalization of trade and foreign investment and changes in fiscal policy (Kuppuswamy 2014).[2]

However, the adoption in India of IT as a national economic growth driver predates these neoliberal measures. It began in the 1980's with the concept of "technology induced development" introduced by the Congress Government of Rajiv Gandhi (Bajwa 2003 in Kuppuswamy 2014:5) which saw India's first Computer Policy adopted in 1984 and computerization plans drawn up by the railway, banking and other sectors in 1985. In 1986, a Policy on Software Export, Development and Training was adopted. From the 1990's onwards, export orientated IT, IT Enabled Services (ITES), also known as Business Process Outsourcing (BPO)[3] became India's economic growth mantra (Varrel 2011, Kennedy et al. 2014, Kuppuswamy 2014). Pro-IT policies were introduced at a national level (Arora and Gambardella 2005, Dossani 2005) and in the name of IT as engine of economic growth, an overlapping system of national and state level policies, laws, programs, incentives, plans, and instruments were set in place.

The first direct move at a national level was the establishment of Software Technology Parks India Ltd. (STPI) (Software Technology Parks of India 2016) by the Ministry of Electronics and IT in 1991, with the objective of promoting and boosting software exports and assisting states to develop IT policies. Headquartered in Delhi, it set up 48 centres around the country. These acted as facilitators between industry and government for the construction of premises providing 100% export oriented multi-tenant office spaces for small and medium IT enterprises. It offered a range of tax and duty exemptions, dedicated high speed data connectivity, single window planning clearances and "excellent infrastructure of global standard" to developments registered with it (Kuppuswamy 2014:57). This instrument for stream-lining investment into IT workspaces, which became known as 'IT Parks,' was closely identified with the new economy and provided a new model for urban restructuring. By 2006, more than 6,000 STPI's had been registered and constructed around the country (Kuppuswamy 2014).[4] In 1998 a National Task Force on IT and Software Development was set up at a national level to prepare blueprint for an integrated approach to IT across the country. It recommended the withdrawal of the monopoly of VSNL India Ltd. as the country's internet gateway, the reduction of customs duties, taxes, etc. for IT related developments, and that each state prepare an IT policy. This was followed in 1999 by the establishment of a Ministry of IT to facilitate e-gov and create job opportunities in the public sector and in 2000, the IT Act was passed to provide a legal framework for e-commerce and transactions (Kuppuswamy 2014).

[2] For instance, the industrial licensing regime was scrapped, the Monopolies and the Restrictive Trade Practices Act was amended, market determined exchange rates were adopted and the concept of Special Economic Zones was created.

[3] IT is a broad category of socio-technical operations, from software to hardware, from bio technology to information technology, from research and manufacturing to data processing. ITES(BPO) covers an entire gamut of web-based operations that include call centres, medical transcription, medical billing and coding, back office operations, revenue claims processing, legal databases, content development, payrolls, logistics management, GIS (Geographical Information System), HR services and web services etc. These operations are underpinned by constellations of hardware and software, cables and satellites, electricity and water, platforms, protocols, logistics, languages, algorithms, organisations, real estate, education and human resources etc.

[4] TIDEL Park in Chennai was developed under this scheme.

In 2000, along with other neoliberal reforms, India adopted a Special Economic Zones Policy. SEZ's were defined as "spatially delineated duty free enclaves that shall be treated as foreign territories for the purposes of trade operations, duties and tariffs" (Kumar and Sashi 2008).[5] In terms of the policy and subsequent legislation, SEZ's were afforded certain goods and services free of taxes and duties, a single window approval mechanism and integrated infrastructure for export production was provided, and a package of incentives to attract foreign and direct investment laid out. SEZ's could be set up by the public or private sectors or as public-private-partnerships by state governments. The IT Act of 2005 adopted the SEZ model for the IT industry, marking a shift with regard to IT related urban developments away from STPI's to SEZ's. After March 2011, new STPI units were not given the tax holidays they had previously enjoyed (Kuppuswamy (2014).[6] IT was central to India's Five Year Planning Process from 2002 onwards. The Tenth Five Year Plan (2002-2007) stressed that development planning should be seen in more than just economic terms and include the "enhancing human well being," partially brought about by "high quality employment opportunities" (Kuppuswamy 2014:47). Those sectors most likely to contribute to this were construction, real estate, housing, modern retailing and IT (Planning Commission 2002). By the Eleventh Five Year Plan (2007-2012), India had secured its niche in the IT world as a premier destination for the global outsourcing of IT and ITES. This period was seen as a "'make or break' opportunity, capable of catapulting India into a high growth orbit and on a fast track to becoming a developed nation" (Planning Commission 2008:252). IT meant that India stood poised to emerge as a "knowledge super power in the comity of developed nations" (:253).

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In answer to the national imperative, in 1997, the State of Tamil Nadu adopted its first IT policy and announced a package of measures to encourage the development of the IT sector in the state (Tamil Nadu 1997). This put it at the forefront of a trend towards fierce competition between states to attract investment by the IT sector (Varrel 2011). By 2014, Tamil Nadu was ranked third in India is in terms of IT exports, after after Karnataka (Bangalore) and Maharashtra (Mumbai).[7]

The 1997 policy reclassified IT as an industry and offered extensive fiscal, administrative and physical incentives for the creation of IT Parks through public-private-partnerships. These are worth dwelling on at some length. They included: that state assistance would be provided for land acquisition and rezoning for IT Parks and that land use restrictions would be removed for units built exclusively for software development and training. 50% extra floor space index (FSI) was permitted for units dedicated to IT and exemption was granted from tax, stamp duty and registration charges to companies setting up along OMR in Chennai, identified from the start as a target for IT development. IT Parks would be treated as industrial units and be eligible for backward area capital subsidies and

[5] The IT Act of 2005 went further and legislated IT Special Economic Zones (Kuppuswamy 2014).

[6] As of Jan 2009, there were 678 SEZ's in India, with 69 in TN, and 27 in the Chennai Metropolitan Area (Special Economic Zones in India 2009). On the IT Corridor in Chennai, the two State initiatives ELCOT and SIPCOT are SEZ's, and within SIPCOT, individual sites qualify for IT SEZ status due to their size.

[7] In 2014, IT generated about 6% of GDP in India and Tamil Nadu was ranked third in the country after Karnataka and Maharashtra for IT exports. Chennai accommodated more than 90% of Tamil Nadu's 350,000 employees in the IT and ITES sectors and almost all IT export orientated activities in the state. The IT corridor hosted about two thirds of this workforce (Kennedy et al. 2014).

sales tax benefits. An executive authority to function as the single window for all statutory clearances would be set up. All software industries were exempted from the Tamil Nadu Pollution Control Act, though hardware industries would require clearance from the Pollution Control Board. In addition, the State announced that it would build road infrastructure, facilitate 24-hour water and continuous power supply at industry rates, provide dedicated VSNL connectivity and assistance to set up cable and satellite links to IT dedicated developments. In addition, it would build IT Parks at Chennai, Coimbatore, Tiruchirappallli and Madurai through the Electronics Corp of Tamil Nadu (ELCOT) via public-private partnerships, that would include IT, commercial and residential units, schools, convention and business centres (Kuppuswamy 2014).

In Tamil Nadu, IT policies have always been subjected to the political cycle. In 2002, the 1997 policy was reviewed by a newly elected state government, whose vision was "to put the smile of prosperity on the face of every citizen of Tamil Nadu by leveraging IT to create value and wealth for a knowledge-based state" (Kuppuswamy 2014:82). A revised IT policy was adopted, with the objective of projecting Tamil Nadu as the destination of choice for IT investment.[8] It offered even more liberal incentives than the 1997 policy: exemptions from Chapters 2 and 3 of the Tamil Nadu Shops and Establishments Act, 100% FSI relaxation and 50% exemption from stamp duty and registration fees throughout Tamil Nadu. The policy again stressed the need for a single window agency to fast track necessary clearances for IT developments and ELCOT was designated for this purpose by government order. It became the certifying authority for the development of IT parks in the state (Tamil Nadu 2002). It set in place procedures that short circuited regular planning and building licensing ones. Applicants were able to obtain a 'No Objection Certificate' from ELCOT that verified their plot extent and land ownership. They could then avail themselves of benefits of an earlier government order (Tamil Nadu 1996) to commence construction on filing a planning application with the appropriate authority, not on approval. Construction could then not be stopped for want of building and planning permission, provided the applicant provided an undertaking (a letter from ELCOT) saying that all rules and regulations would be complied with. The letter was valid for 6 months, during which time planning permission was to be lodged with the relevant planning authority. Planning approval was guaranteed within 6 months, after which building plans were scrutinized by a local body like any other. However, IT projects were prioritized; in the CMDA for instance, a new division called MSB-IT was created to fast track them (Kuppuswamy 2014).[9]

A new government came in to power in Tamil Nadu in 2006 and again reviewed the state's IT policy, resulting in the Tamil Nadu Information and Communications Technology (ICT) Policy of 2008. Its vision was that "Tamil Nadu shall be the ICT Hub of South India by creating a knowledge driven ecosystem leveraging entrepreneurship and promoting socially inclusive growth" (Kuppuswamy 2014:84). It aimed to capture 25% of ICT production in India and to create direct employment for 1.1. million and indirect for 2.8 million through IT by 2011. The policy repeated a similar package of physical, administrative and fiscal incentives as the previous two policies. Notably however, it

[8] In 2005, the 2002 IT policy was extended to the ITES sector by the adoption of the IT Enabled Services Policy, aiming to capture 20% of the ITES market in India. This was as a direct consequence of the Nasscom-McKinsey report *Strategies to Achieve the Indian IT Industry's Aspiration* (Nasscom-McKinsey 2002).

[9] The policy also proposed that existing industrial estates Guindy and Ambattur be rewired for IT and proposed the creation of a special purpose vehicle to take forward Coimbatore, Tiruchirappallli and Madurai as Tier Two cities for IT investment.

recognised the need to promote housing near IT and ITES zones, whereas policies up to 2005 had focused exclusively on workspace for the IT industry.[10]

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These policies and legislative measures often overlooked or usurped the powers of local level planning authorities by encouraging political decisions disconnected from local planning process (Kennedy et al. 2014). This had major consequences for the economic, spatial and socio-political restructuring of Tamil Nadu and Chennai in particular: amongst others, urban space was rescaled, political boundaries moved, new demands and pressures were put on urban governance, utilities and infrastructure and urban inequalities were exacerbated (Varrel 2011; Coelho, Venkat and Chandrika 2012; Coelho and Vijayabaskar 2014 et al.).

Seeds of this were laid in Chennai, then Madras, in 1967, when the Tamil Nadu Department for Town Planning prepared an interim plan for a randomly delineated metropolitan area of 450 sq. miles. This was in line with initiatives to tackle rampant and uncontrolled urbanization elsewhere in post-colonial India, which adopted the concept of metropolitan planning as the axiom of urban development, and thereafter it became a standard exercise by metropolitan development authorities (Roy 2002, Arabindoo 2009).[11] In 1973, following a corruption and financial fraud scandal, elected parts of the Chennai City Corporation were dissolved and, until October 1996, the city had no local elected bodies. This occurred at the same time as the 74th Amendment to the National Constitution of 1993 devolved numerous powers to local bodies and elected representatives. In this lacuna, Tamil Nadu established the Madras Metropolitan Development Authority (MMDA) under the auspices of the Tamil Nadu Town and Country Planning Act of 1971. This body took on the task of interpreting and implementing the 1973 plan. It was not an elected body, effectively handing metropolitan planning into the hands of state level politicians and civil servants (Kennedy et al. 2014).[12] This transformed metropolitan planning into a thinly disguised instrument of state power, and "increasingly, as the state's interests converged with those of private (global) capital, planning was subordinated to the logic of profit and private property" (Arabindoo 2009:886).[13]

The MMDA acquired statutory footing in 1975 and, in 1976, drew up Madras' First Master Plan (FMP), on the basis of the 1967 Interim Plan. Metropolitanisation was adopted as the solution to the demands of a growing population and unregulated development. The plan anticipated development

[10] The 2008 Policy also proposed one IT Park and one SEZ each in Coimbatore, Madurai, Trichy, Tirunelveli, Hosur and Salem and that a master plan be drawn up for these cities, focusing on roads and physical infrastructure to improve connectivity throughout the state and to promote housing development, educational opportunities in ICT and Research Parks.

[11] These were often channeled through Bretton Woods institutions such as the World Bank's Urban Development Project, which saw Tamil Nadu institute slum clearance in Chennai to peripheral neighbourhoods in the CMA.

[12] The Chennai Corporation and other local bodies within the metropolitan area share responsibility with the CMDA for various services - maintaining roads and pedestrian ways, street lights, solid waste collection, micro drainage and parks, to the extent that agencies appointed by the state or the CMDA do not take them over. This mans that relations between the two levels of government are extremely opaque and the state is present in all local service delivery matters (Kennedy et al. 2014).

[13] Roy (2002) delivers a similarly scathing criticism of the Calcutta Metropolitan Development Authority, formed under Presidential Ordinance in 1970. She sees the ulterior motive of the master-planning process as one of blurring the periphery, enabling it to be included or excluded and easy prey to powerful or vested interests.

within the region along 3 corridors: The Grand Southern Trunk Road (NH45, SW), Thiruvallur High Road (NH205, W) and Erukkancheri High Road (NH5, NW). Three satellite towns were planned, one on each road, in addition to two urban nodes on each corridor to absorb rural-urban migration. Industrial development was to follow these corridors which would be connected by three new ring roads (termed the Inner, Intermediate and Outer Ring Roads) (Kuppuswamy 2014). Significantly, OMR did not feature as a growth corridor in this plan. This vision guided Chennai's development until its Second Master Plan was adopted in 2008 (Kennedy et al. 2014). Over this period, growth was monitored periodically by the CMDA (successor to the MMDA). It had the monopoly over implementing the First Master Plan and used development control rules to steer development changes in line with politico-economic decisions and class dynamics (Arabindoo 2009).

In 1998, after the adoption of the 1997 Tamil Nadu IT Policy, Chennai's Metropolitan boundary was extended to the south and FMP development control rules were amended via government order to encourage IT and ITES related development in this part of the city (Arabindoo 2009, Kuppuswamy 2014). These amendments are worth dwelling on briefly. They granted permission to build multi-story IT parks in any of the six land use zones in the metropolitan area: primary res, mixed res, commercial, industrial, light industrial and general industrial (previously they had only been permitted within the City Corporation Area); a Floor Surface Index (FSI) of 50%, excluding covered car parking up to the first floor (1.5 times more than usual); a maximum height of 2 x the width of the abutting road or 60m, whichever was higher (for other multi story buildings, it was 1.5). These were applicable only to IT developments on plots a minimum size of 2000 sq. m abutting roads a minimum 18m wide (Kuppuswamy 2014). The spatial restructuring of the city was thus set in place through innocuous tweaking of existing development control rules. This encouraged development beyond City Corporation limits as large plots on 18m wide roads were limited within them. Permission to build multi-story buildings with increased FSI and height became hugely attractive to developers, who began to focus their property portfolios on IT related developments in peripheral parts of the city. However as housing and other social infrastructure were excluded from development control amendments, they did not follow apace. In 2003, this situation prompted the CMDA to draw up an Action Plan Report for the Thirupporur IT Corridor (CDMA 2003), in which the potential growth of the IT industry beyond the CMA limits and its housing and social infrastructure requirements were assessed. Amongst proposals was to widen the OMR to 30.5m along its full length from Madhya Kailash to Thirupporur, a distance of 30 kms, in order to unlock more IT related investment and to apply general industrial land use zoning along the road to a distance of 500m on either side. The report proposed to designate this zone 'The IT Corridor' (Kuppuswamy 2014). This as the first time this term was used.

In 1995, the CMDA had prepared a Second Master Plan (SMP) for Chennai. It was delayed by a petition in the High Court, dismissed in 2001, after which it was returned to the CMDA for modification to take into account urban development and amendments to the development control rules enacted since it was first prepared. The revised draft SMP was submitted to the state government in December 2005 for approval, with a request for public and local authority comments. Many public objections and suggestions were made and some incorporated into the plan, which was finally approved and gazette on 2 September 2008 (CMDA 2008). The objectives of the plan were to "optimize the utilization of land by channelizing development in the right directions and locations … recognizing existing growth trends and strengthening infrastructure links" (Kuppuswamy 2014:106).

The plan promoted a vision of urban development along economically specialized corridors of circulation: the East Coast Road as an 'Entertainment Corridor,' the NH4 as an 'Automotive Corridor,' and OMR as the 'IT Corridor' (Kennedy et al. 2014). Strategies to encourage growth outside the CMA along these corridors were to create new towns at Thirpporur (at the southern end of the IT corridor) and Sriperumbudur (to the west) and to manipulate zoning strategies to promote development. The alignment of these measures with the neoliberal processes of capitalist restructuring and real estate development promoted by national and state level policies is clearly spelled out in the preamble to the first version of the SMP of 1995:

> In the last few years, there has been a tremendous change in the approach to development, and the perception of Government/Agencies vis-a-vis urban development. The economic development of the country is undergoing a change as part of the globalisation initiatives and consequent liberalisation policies of the Government of India. . .the approach to the preparation of the Master Plan has been in tune with the liberal economic and industrial policies being followed by the Government of India and Government of Tamil Nadu which only can lead to development of the Metro area in a meaningful sense. (MMDA 1995:1-2, in Arabindoo 2009:886).

In 2011, the CMA boundaries were extended southwards to include Perungudi and Semmencheri, the main purpose of which was to accommodate the expanding IT Corridor.[14] This meant, amongst other things, that more control over and revenues and costs for infrastructure for the IT Corridor fell under the CMDA, and that new structures of representation through ward councillors rather than local governments reduced the strength of local populations to negotiate (Kennedy et al. 2014). In 2012 in a further proposal was made by the CMDA to expand the metropolitan area into a 'Chennai Mega Region' to include Sriperumburdur, Kelambakkam, Tiruvallue and Maraimalai Nagar (with the possibility to incorporate the whole of Kancheepuram, Tiruvallur and Arakkonam Taluk in the Vellore District) under the planning authority of a Chennai Regional Development Authority (CRDA). This was to be along the lines of the Mumbai Metropolitan Region Development Authority in Maharashtra and the Bengaluru Metropolitan Region Development Authority in Karnataka. The argument was that in the absence of such a body and its regulatory mechanisms and controls, expansion was increasingly unplanned and fragmented, growth haphazard and infrastructure poor and uncoordinated (Mariappani 2015). Arabindoo (2009) argues differently: that what the metropolitan condition does is to "conjure up" an ever expanding peri-urban interface as a site where rural-urban linkages are reshaped from zones of survival to zones of investment (Arabindoo 2009:881).[15] The metropolitan master plan is one of several instruments used to create new spaces of accumulation to enhance the potential of metropolitan regions to serve as national economic growth engines (World Bank 2009). From a macro-structuralist perspective, this process is known as "rescaling" the processes of political-economic restructuring and socio-spatial reorganization based on the assertion of the strategic role of cities in economic growth (Swyngedouw 1996, Brenner,

[14] These boundaries are elastic and not precisely adhered to eg. a major part of SIPCOT Park is beyond the boundary of the CMA. Officials consider it an extension of the CMA as part of it is inside (Varrel 2011).

[15] This is graphically illustrated in maps of the CMA, which display two development lines, a red one (current) and a blue one (future). Within the future blue line, land use change from agriculture to urban uses have not yet taken place, but are projected to do so (Kennedy et al. 2014).

1998, Jessop 2002 etc.). In India, this involved attributing to state governments more significance than in the past for shaping the conditions for capital accumulation and circulation and curtailing the involvement of democratically elected local bodies in these processes through the "industrial township" "loophole clause" (Article 243Q of the 74th Constitutional Amendment Act) (Sivaramakrishnan 2011: 169, Sood 2015, Kennedy and Sood 2015). In Tamil Nadu, this took place against a backdrop of long term stagnancy in the agricultural sector, growing landlessness amongst marginalised farmers, a resultant move towards non-farming employment, and education policies that favoured a degree of social mobility amongst marginalised castes, meaning that systematic resistance to these processes has been low (Vijayabaskar, 2010).

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In 2009, a Comprehensive Development Plan for the Chennai Metropolitan Area drawn up for the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), stated: "Chennai is the capital of Tamil Nadu and India's 4th largest metropolitan area with a strategic position in international trade of both goods and services. Chennai is an important centre for the automobile industry producing for both domestic and export markets, an expanding IT industry relying extensively on global outsourcing and one of India's largest ports … All of these factors suggest that *Chennai must think globally, and strive for internationally recognized standards of development in order to further promote Chennai in the world*." (CDP 2009:25 in Kennedy et al. 2014:10, emphasis mine). This marked a shift "from developmentalist visions of cities as sites of social and economic mobility and catalysts of modernity to neoliberal visions of cities as strategic nodes for the operations of global capitalism" (Coello and Raman (2010:21). Key to achieving this vision was the Jawaharlal Nehru National Urban Renewal Mission (JNNURM 2011) launched by the government in 2005 (Varrel 2011). This was a financial assistance scheme to "reform" urban infrastructure to create an "investor friendly environment" and enable "cities to realise their full potential and become effective engines of growth" (JNNURM 2005:3,4). To participate in the scheme, cities were required to draw up City Development Plans, which identified infrastructural projects for funding through loans or grants from the state. Public private partnerships were encouraged. In Chennai's City Development Plan, written for the JNNURM in 2005 (CDP 2005), water bodies - erys, ponds and marshes - began to feature for the first time. Previously seen as "land in the making" to be filled and built on, they came to be seen as "lakes in the making" to be cleared, dredged, desilted and beautified. The concept of "ecological value" began to overlap with that of "economic value," (Coelho and Raman 2010:21). Significantly, this interest in water bodies was taken as an opportunity to clear the poor out of city. In the same CDP, some 35,000 households were identified as squatting on "objectionable locations" such as river banks and as having to be removed (Coelho and Raman 2010:21). Beautification, flood mitigation and projects to revive storage capacity in water bodies were increasingly linked to visions of a slum free Chennai. The Tamil Nadu Tank Encroachment Act of 2007 followed. It vested unprecedented powers in the Public Works Department and the District Collector's Office to effect evictions of the urban poor to peripheral locations, subverting the authority and long standing policies of the Tamil Nadu Slum Clearance Board to upgrade settlements in place. Ironically, these relocations were almost always sited on low lying marshlands or flood plains, increasing likelihoods of flooding and reducing ground water in other parts of the city. It was clear that the urban poor had no part in global city imaginaries except as scapegoats for urban ills and to be shifted around in urban space according to the law of value.

Introduced by Saskia Sassen in her now classic *The Global City: New York, London, Tokyo* (1991), the "global city" was a key element in a new conceptual apparatus to account for the rescaling of territory by emerging global economic dynamics and processes. Whereas previously cross-border economic processes were articulated by nation states, privatization, deregulation, the opening up of economies to foreign firms and the ascendance of ICT promoted cities and city regions to become strategic sites in the articulation of global economic activities (Sassen 2005). Literature and debate on the global city is vast and will not be reviewed here. However, references to the global city abound in the literature on the IT corridor in Chennai. Following Sassen, Kuppuswamy (2014) argues that global cities, as the preferred destination for corporate headquarter functions and advanced financial services, are sites that articulate the global economy and acquire new meanings as the global economy is organized through them. As a result of their new strategic status and in efforts to attract global investment, cities, via their governments, are required to become entrepreneurial and to package, market and sell themselves to compete with each other for global investment. They do this, in part, through infrastructural "megaprojects" (Flyvberg 2014) that cater to the needs of global capital and enhance a city's global image-ability. These usually follow "international templates of metropolitan infrastructures meant to enhance the city region functioning, but not necessarily well adapted to local conditions" (Kennedy et al. 2014:10). Amongst these formulae are expanding IT networks, new transportation facilities (particularly airports, ports and high speed rail), financial districts, housing enclaves, "technology orientated modern buildings" with their distinctive architecture of glass facades and metal cladding, "innovative Milieu" such as corridors and campuses, and quality cultural and tourism offerings (Kuppuswamy 2014:4).

In India, these signifiers of global citiness have usually been constructed as state driven megaprojects that themselves attract international financing.[16] In Chennai, these included a new Government Secretariat designed by German architects Gerkan Marge and Partners in 2003 (now converted into a hospital), a Metro Rail Transport System partly funded by Japan, the extension of Ennore port under PPP with Singapore and Gulf based companies, desalinations plants, the rehabilitation of rivers and canals and the beautification of beaches and estuaries and so on (Arabindoo 2009, Coello and Raman 2010, Varrel 2011). These both "engineer the landscape" and "signal a new mode of urbanisation" (Coello and Raman 2010:21). They reflect the changing role of infrastructure, "from being a simple precondition for production and consumption to being at the very core of these activities" (Flyvbjerg et al 2003: 2). Amongst these, the corridor features as a powerful symbol of the global city. Information Technology (IT) corridors, hi-tech corridors, metro corridors and elevated corridors are seen as "emblems of new urban visions in which flows are channelled and strategically optimised for mobility, connectivity and speed" (Coello and Raman 2010:20).

In her development of a typology of the physical spaces for the IT economy, Forsyth (2014) quotes from (Castells, Hall and Hall 1994:1): "There is an … image for the new economy that has taken its place in the last years of the twentieth century, but it is only just imprinting us on our consciousness. It consists of a series of low, discrete buildings, usually displaying a certain air of quiet good taste,

[16] There is a great deal of literature on infrastructural megaprojects in India and their status as political symbols. This includes Vijayabaskar and Babu (2016), Banerjee-Guha (2009) et al.

and set amidst impeccable landscaping in that standard real-estate cliché, a campus-like atmosphere." Whether planned at a large scale as comprehensive, multiuse developments, or more incrementally built, such developments often have a similar look: "they do have a somewhat predictable character - at the site, technology subdivision, campus, core, clump, or corridor scale. Because many high-tech companies, and local governments and developers hoping to attract them use a similar aesthetic, one might have an overall impression of low shiny buildings, large berms with monumental signs and tastefully designed security guard shelters (Forsyth and Crewe, 2010). This reflects less the generic needs of IT research and manufacturing than the expectations and aspirations of global businesses and workforces, and developers or city authorities and branders out to attract them (Forsyth 2014).[17] In similar vein the high-rise gated community has become an enduring image of contemporary urban transformation around the globe. In Indian cities, premised on a decisive break from earlier ways of urban life and located on the former urban periphery, they serve, along with IT corridors and shopping malls as visible motifs for the underlying economic and structural transformations underway (Kennedy and Sood 2016).

The IT Corridor

A large proportion of Tamil Nadu's IT industry flanks the Old Mahabalipuram Road (OMR), renamed the Rajiv Ghandi Salai, now also known as the IT Expressway. This road is an unfinished, constantly evolving assemblage of imaginaries, policies, politics, institutions, plans, materials and practices performed on a daily basis by drivers, researchers, vehicles, vendors, traffic lights, bus stops, traffic jams, toll plazas, cables, drains and underground pipes. It serves as a dynamic armature that has restructured the southern portion of the Chennai Metropolitan Area from a coastal fringe into an urban corridor since the 1990's, in line with the neoliberal policies and agendas of successive national and state governments (Kennedy et al. 2014). Associated with "visibility and their appeal to modernization," transport related megaprojects (metro rails, intra-city trains, tolled intra-urban highways etc.) have been important in India since independence. They are seen to project an image of the country as a modern state and "serve the interests of well-documented collusions between politicians, bureaucrats and contractors by fuelling the cash machine embedded in large-scale road works" (Kennedy et al. 2014:17). They often attract funding from international agencies as they can be labelled as development driven, but also attract private foreign companies with funding from their national governments. Tamil Nadu has a history of transport related megaprojects initiated by the State (the Ennore Port project, the Chennai-Chittoor-Bangaluru corridor, Chennai's MRTS etc.). These have usually been linked to ruling party politics by being associated with a prominent politician who proves his/her commitment to the populace with a 'pet project' (Varrel 2011). Thus linked to the political cycle, they are usually ad hoc and often abandoned or shelved. The transformation of OMR into the IT Expressway is no exception to this.

The road between Chennai (then Madras) and Mahabalipuram had its origins in British colonial times, when it was laid alongside the Buckingham Canal from Adyar to Muttukadu. The original road is still visible in parts as a panchayat road parallel to the existing one (Chennai Realiy.biz blog. 2013). Until the 1960's, the route was not an easy one (OMR Rider 2014) and was described as being "full

[17] In the early 1990's, IT companies occupied commercial office blocks in central Chennai, such as Sterling Towers in Anna Salai, with government providing network infrastructure (Kuppuswamy 2014).

of pits, mounds and cattle" (Chandrasekaran 2014). The road became the 'Old' Mahabalipuram Road in 1998, when the parallel East Coast Road was upgraded, becoming the 'new' road of choice to Mahabalipuram (OMR Rider 2014).

In 1980, the Chennai Metropolitan Development Agency rezoned 300m on either side of Poonamalle Byepass Road (going west) and the OMR (going south) for industrial use, in line with the planning objectives of the 1976 First Master Plan (FMP). This was later described as having created a "finger like urban form with the city as a hub" (CMDA 2008) and boosted industrial activity. OMR was not selected as one of these development corridors in the FMP, but was included later due to its connectivity to the airport and the East Coast Road and in anticipation that it would attract electronics industries as the Vikram Sarabai Instronics Estate was locate at Perungudi (Kuppuswamy 2014). This was boosted in 1987 when the Kotturpuram Bridge was constructed over the Adyar River, facilitating easier access from Chennai to Tarimani and linking the city to the OMR (OMR Rider 2014). These changes predate the 1997 adoption of IT as an economic growth sector by the Tamil Nadu government and the package of fiscal, administrative and physical incentives offered to attract the IT industry. In 1997, as a direct consequence of this policy, OMR was widened by the Tamil Nadu Highways Department from two to four lanes from the Madhya Kailash Temple in Adyar to Sholinganallur. This brought it in line with the minimum road width (18 m) stipulated in Tamil Nadu's IT policy for concessionary incentives to IT companies, as covered in the previous section. Land for this road widening had been acquired by the State for an earlier project to pipe water to Chennai from Veeranam Lake in south Tamil Nadu. When this project was shelved, the acquired land was handed over to the Tamil Nadu Highways Department (Kuppuswamy 2014). In 1998, a new state special purpose vehicle, the Tamil Nadu Road Development Corporation (TNRDC), was set up to undertake the road widening project and to develop other road sector initiatives under public-private-partnership arrangements. The TNRDC was a 50:50 joint venture of the Tamil Nadu Industrial Development Company (TIDCO), the investment arm of the government of Tamil Nadu, and Infrastructure and Leasing and Financial Services Ltd. (IL&FS), an all India infrastructure development company. The land acquisition for the road widening was conducted under new legislation, the Tamil Nadu Highway Act of 2001. This effectively replaced the colonial Land Acquisition Act of 1894 and allowed the state to fast-track the land acquisition process, taking possession of the land within 30 days after public notification, without waiting for compensation payment nor for court decision in case of litigation. Acquisition was conducted by a special team inside the TNRDC and the entire process took less than two years. (Kennedy et al 2014). In 2004, to "further give a boost to real estate developments pertaining to the IT industry," (Kuppuswamy 2014:128) the state decided to extend the six lane expressway to Mahabalipuram, a distance of 45 kms from Madhya Kailash, based on the estimates of the 2003 Action Plan Report. It was named the IT Expressway and its implementation was given to a wholly owned subsidiary of the TNRDC, IT Expressway Ltd (ITEL). The expressway construction was partially funded by the State, partially by the private sector and partially by bank loans (Varrel 2011) and divided into two phases. Phase 1 was a 20 km stretch from Madhya Kailash to Siruseri, which was due to have opened in 2005, but only did so in 2008. It included a link to the East Coast Road at Sholonganallur.

Phase 1 of the Expressway is 41m wide and includes 6 traffic lanes, 2 service lanes and 2 pedestrian lanes. The symbolic gateway to the road at Thiruvanmiyur is given added value by formal

landscaping and a large roadside sculpture titled 'Flame-thrower' by designer Dashrath Patel.[18] The traffic lanes in each direction are separated by a continuous planted median defined by zebra-striped concrete curb stones and housing street lights. A narrower planted median, also defined by zebra-striped curb stones separates the traffic lanes from service and pedestrian lanes. These medians serve as crash barriers and barricades, streamlining traffic movement and preventing crossing or u turns except at major junctions. Traffic lanes widen at 26 points to include lay-byes for bus stops. The road is crossed by 15 pedestrian bridges (some at inappropriate places) and has 6 major intersections, at Madhyakailash, Thiruvanmiyur, SRP, Shollinganallur, Kelambakkam-vadapalani, Kelambakkam-ECR (Sipvaprakash 2015), It is tolled at Seevaram in the north and at Egattur, just before SIPCOT Park in the south. Three satellite plazas toll entry and exit from the road on the Thoraipakkam-Pallavaram radial road, Sholinganallur-Medavakkam link road and Sholinganallur-ECR link road (Varrel 2011, Wikipedia 2016b). Underground services, including water, sewage, electricity and fibre optic cables run in trenches under the pedestrian lanes, an arrangement that was partly responsible for delays in completion of Phase 1 as underground pipework and pavements could not be laid at the same time. This situation was described as "a muddy verge … much care is given inside the boundaries (of IT Parks), but the area outside is less cared for" (Mariappani 2015).

Even though Phase 1 was in some important respects not yet complete (it was missing service lanes, sidewalks and drains, especially in the southern section), the decision to authorize Phase 2 was made by the State in 2009 (Varrel 2011). It will be a 25 km long 60 m wide road extending from Siruseri to Mahabalipuram. Land acquisition of approximately 156 acres in 13 revenue villages was required and assigned to the Kancheepuran District; money was sanctioned for this by the state in 2012. Project delays leading to the tripling of the cost of the Phase 1 however meant that revenue from its tolls barely covered the cost of interest, operation and maintenance. Estimates for Phase 2 doubled. Clearly return on investment was unlikely and the project's viability was in question (Wikipedia 2016b). In February 2014 the *Hindu* reported that, according to a Highways Department source, land acquisition for Phase 2 would be accomplished in 3 months and construction was likely to take around two years. Residents, however, were sceptical "Though they have been collecting toll for over five years, they haven't completed work on that stretch as yet," said a resident of Navalur (Ramakrishnan 2014). Phase 2 is currently under construction.

Chance2Sustain's work on the IT Corridor (Chance2Sustain no date) indicated that the road was used daily by nearly 200,000 IT commuters and others indirectly employed by the IT industry such as those transporting people, water, goods and services. An image is created of an enormously busy and congested corridor:

> Tankers transporting water, autorickshaws transporting passengers to and from locations on the IT Corridor to older residential neighbourhoods and villages located off the IT Corridor, shared autorickshaws and vans run by private operators, private cars of middle and higher ranked IT employees driven more often by paid drivers than by the owners themselves, public transport buses carrying passengers who are predominantly working in the many

[18] Patel studies fine art in Chennai and served as the secretary of the National Institute of Design in Ahmedabad for its first 20 years (Wikipedia (2016a).

> non-IT jobs (with lower wages than those paid to the IT sector employees) in this area, or long term residents returning from work in other parts of the city, private air conditioned buses carrying IT employees, private cabs engaged by IT firms for senior staff and for those employees private vans and cabs carrying call centre and back office processing employees, heavy vehicles carrying construction material for the various ongoing works on this road, in addition to the large number of two wheelers (motorcycles, scooters) divided between IT and non IT employees all vie for space on this what has been increasingly recognized as a traffic hotspot in the city (Kennedy et al, 2014:20).

Congestion, lack of traffic management and the road accident rate on the road are frequent sources of complaint by road users and residents of the area. A poll conducted by Chennai Patrol (Chennai patrol no date) in 2013 found that for 55% of residents, traffic regulation on the OMR and ECR was the most pressing problem they faced (topping water supply problems) and that poor traffic management had resulted in lack of safety for road users. In 2012 there were 35 fatal and 143 non-fatal accidents on the OMR. In order to avoid the barricades and tolls on the main roads, road users had started to use service roads and side streets, resulting in broken manhole covers and damage to their surfaces (Kumari 2013). These and similar problems have produced a burgeoning knowledge industry of reports, studies, academic papers and real time information systems on road users, traffic congestion, travel times and delays, traffic accidents, air pollution, pedestrian environments etc. (e.g. Manaikandan, Lakshmi and Bakiya 2016, Sivaprakash 2015, Department of Civil Engineering, IIT Madras 2012, Rakesh and Mohamed 2010) grappling with the challenges of increased road usage. It is as if the road has fallen victim to its own success.

Its sheen dulled and saturation point reached, and for reason that it had been initiated by the previous AIADMK regime, in 2013 the new Tamil Nadu government announced plans to build an elevated four lane corridor alongside the road. This had been one of the proposals in the SMP and was revived as a component of Chief Minister J Jayalalithaa's *Vision Tamil Nadu 2023* that had been prepared with the support of the Asian Development Bank (Kennedy at al. 2014). This would, it argued, "decongest the chaotic traffic emanating from the large number of IT firms, multi-storied buildings and educational institutions along this road." The State allocated money for a detailed report and a consultant was appointed (Mariappani 2015). Preliminary studies of soil conditions and traffic count commenced. Many residents were however not in favour of an elevated corridor. They said it would be better if the Mass Rapid Transit System (MRTS) was extended or an underground train system built. Traffic experts, too, said such a project would not be feasible and prove to be too cumbersome (Ramakrishnan 2015).

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The term IT Corridor, while referring in the popular imaginary to the upgraded OMR itself, in fact refers to the 500m on either side of the OMR proposed in the 2003 'Action Plan Report for the Thirupporur IT Corridor' and reclassified as industrial land use for IT related development (CDMA 2003). It was a peculiarity borrowed from a project developed by a Singaporean urban planning consultant at the end of the 1990s for the eastern suburbs of Bangalore, which, after a long debate on its inclusion in the Bangalore Master Plan of 2007, was rejected (Kennedy et al. 2014). It was adopted in Chennai's Second Master Plan (SMP) as follows: "Lands adjoining OMR up to Buckingham

Canal on the east and to a depth of about 500m on western side from Kottivakkam and Perungudi villages to all other villages within the CMA boundary" (CMDA 2008 in Kuppuswamy 2014:127).[19] The corridor overrode previous zonings and came with a generous package of fiscal, administrative and infrastructural incentives for IT related real estate development within it. It was further classified in the SMP as an "Area of Special Character" attributing to it cultural as well as economic status in the city's idea of itself (Kuppuswamy 2014:127). The ambitions were clear: "to create and nurture world class infrastructure to preserve the state's position as one amongst the most favoured investment destinations in the country" (Malmarugan and Narayan 2006).

Literature on the Corridor paints a sketchy picture of the geology, landscape and human settlement patterns that preceded it. We are told that it was located on a section of the tsunami-prone paleo-tidal flats that run down the South Chennai Coast, and was subject to intertidal action and flooding during the monsoon (ABC Techno Labs 2015).[20] It was bordered by a canal-cum-laguna to the east (the Buckingham Canal and Muttukadu Laguna) and by a major water body to the west, the Pallikanarai Marsh. The area was referred to as being "covered with wetlands" (Varrel 2011:10) and as "a vast pastureland with many small lakes" (Admin 2015). Because of its high water table, the retreating monsoon rainwater was still present in these lakes when the next monsoon arrived (Admin 2015). This marshy coastal environment was inhabited by hamlets, revenue villages, pilgrim towns and agricultural lands (Kuppuswamy 2014). Land was divided amongst small landowners and used for agriculture or salt pans. It was a semi-rural fringe of the city that had been free of industrial and urban development as it was protected under a Coastal Regulation Zone provision (Varrel 2011). In the 1995 version of the Second Master Plan however, it was considered by planners as a "vacant space" available for development and designated for the location of high profile service activities. (Varrel 2011:10). Interviews with former agriculturalist, now residents of the IT corridor suggest that drafts of the later 2008 version of this plan were leaked, triggering massive land grabs. Middle men bought small agricultural plots from farmers who were not aware about the development about to take place. These were accumulated into land banks by individuals, often prominent politicians and their companies, for sale for vast profit 15 years later (Varrel 2011).

From 1994 onwards, the Tamil Nadu government initiated a number of construction projects in South Chennai "to convey the intent of the State in promoting and accelerating the growth of the IT industry and to act as a catalyst for private developers … to set up their operations and invest in IT" (Kuppuswamy 2014:115). The first were El-Net Software Park (1994) and TIDEL Park (1998-2002) at Taramani, followed by the Knowledge Industry Township (ELCOT) (2005-2009) at Sholinganallur and SIPCOT IT Park (2005) in Siruseri. These were more or less equally spaced 10 kms from one another along the 45 km stretch of what became the IT corridor.

[19] At the time of the SMP, the IT corridor passed through 7 villages outside the Chennai City limit, but within the CMA boundary (Kottivakkam, Palavakkam, Seevaram, Oggiyan Thoraippakkam, Karappakkam, Sholinganallur and Semmancheri (Kuppuswamy 2014, from CMDA data). Beyond this, the IT corridor was not yet designated, but recognised as such because of the SELCOT development. It passed though a further five villages (Navalur, Egattur, Kazhipattur, Kelambakkam, Karunguzhi, and Kilkottaiyur). Development here fell under the authority of the Tamil Nadu Directorate of Town and Country Planning. In 2014, 21 21 IT Parks in this area had been issued Notices of Consent by ELCOT (Kuppuswamy 2014).

[20] Evidence of tidal action came from the occurrence of remains of gastropods and lamellibranches shells that are characteristic of marine and marginal marine environments (ABC Techno Labs 2015).

El-Net Software Park was constructed in 1994 as a joint venture by state agency ELCOT and private sector company New Era Technologies. This was shortly after the establishment of STPI Ltd., the vehicle set up in 1991 by the national Ministry of Electronics and IT with the objective of promoting and boosting software exports. It was built at Taramani, an area known for its educational campuses, but also associated, in the popular imagination, with waste (adjacent to the "vast garbage dump land of Thiryvanmiyur" (Admin 2015)). This project was built on 1.28 hectares of state owned land, providing a built area of 18,500 sq. m of multi-tenant office space in modules of 500 sq. m suitable for small and medium sized IT firms. An additional floor was added within one year of completion. It was fully occupied in 2014 and employs 2,500 people. Amongst its occupants in 2014 were CTS, TCS, Electronics Technologies and Tata Communications Ltd. (Kuppuswamy 2014).

In 1998, through its subsidiaries the Tamil Nadu Development Co. Ltd. (TIDCO) and ELCOT, the State of Tamil Nadu partnered with Ascendas India Ltd, a Singapore based Company and Asia's biggest supplier of business space, to construct TIDEL Park. This project was built in two years on a site close to El-Net Software Park at what would become the gateway to the IT Corridor. It was the largest IT Park in India at the time and started operations in 1998, at about the same time as International Tech Park in Bangalore and HITEC City in Hyderabad (Varrel 2011). Typical of of the early days of the IT boom (Aranya 2008), it offered what was called a "plug and play environment" to attract IT companies with state of the art services and infrastructure, tax holidays and legal relaxations (Varrel 2011:3). It comprised 13 floors of office space, providing a total of 120,000 sq.m of space in modules of 420 to 8,300 sq.m. It had a dedicated power supply through a 100KV substation and 10.5 MVA diesel generators for back up and secured telecommunications connectivity from seven independent sources. It was instantly occupied by firms such as Cognizant Tech Solutions, HCL Technologies, Tata Consultancy Services, Verizon Data Services India, Satyam Computer Services, iNautix, Sify, Electronic Data Systems, SCM Microsystems and Accenture Services amongst others (Kuppuswamy 2014).

On the basis of the state's 2002 IT Policy, two further Tamil Nadu government initiatives were launched in 2005, which came to be considered "beacons for the software industries" in Tamil Nadu (Kuppuswamy 2014:84). For the first, ELCOT acquired 377 hectares of land at Sholinganallur midway between OMR tolls and at a major crossroad connecting the IT Expressway to the airport. This was developed as ELCOT Park and recognised by national government as an IT SEZ. Unlike TIDEL, it was not a building, but provided roads, infrastructure and long-term property for rent to IT companies for development. The project was launched in 2005, but moved at a slow pace, due in large part to the fact that "it was located on a marshland, and was being built as a polder" (Kennedy et al. 2014:16). It is dominated by Indian IT companies, though also houses multi- nationals Wipro, HCL, Satyam and Cognizant (Varrel 2011).

In the same year, through the State Industries Promotion Corporation of Tamil Nadu (SIPCOT), the State launched SIPCOT IT Park on 405 hectares of land at Siruseri, a revenue village 30 kms south of TIDEL Park. At the time it was outside the CMA boundary and development did not get under way fully until 2009, probably because of its remote location from the city (Kennedy et al. 2014). Rather than providing office space, SIPCOT, like ELCOT Park, provided serviced plots for private sector development. Because of the >10 ha size of the plots, most qualified for IT SEZ status themselves, an attraction over building individual IT Parks on smaller parcels of land. Like TIDEL, SIPCOT was

serviced by a dedicated substation, telephone exchange and high speed data connectivity. Development of the park was boosted by India's top IT company, Tata Consultancy Services, when it relocated its 20,000 Chennai employees there in 2011, into a glossy, high-tech purpose built "architectural marvel" (ColourLibraryBlogspot no date) designed by Uruguayan architect Carlos Ott. At the time this was the largest IT office complex in Asia and resulted in the mushrooming of more that a dozen large scale residential complexes in the vicinity.

In addition to these initiatives, the government of Tamil Nadu convened a number of meetings with the private sector to generate interest in investing in the Corridor (Kennedy et al. 2014). The first was at the end of 2004, when the Tamil Nadu Road Development Company (TNRDC) and ELCOT convened a meeting with all major real estate developers in Chennai. ELCOT presented projections of IT growth and the TNRDC presented the OMR upgrade project. Developers were asked to "accompany" the road upgrading project by building new office space for IT activities, taking advantage of relaxations on floor space index (FSI) etc. under the STPI scheme (Kennedy et al. 2014:17).[21] A second meeting was an initiative in 2011-2012 when the IT group under the Steering Committee of the State Planning Commission responded to demands raised by IT companies for e.g. completing road works, improving bus transport, providing power etc. PPP style projects were proposed wherein IT companies would fund some secondary infrastructures and operate public transport along the IT Expressway. This group was apparently short-lived (Kennedy et al. 2014), but indicates the kinds of coalition between the State, real estate developers, construction companies, IT companies and service providers that took shape around the IT Corridor, which parties were enlisted into it and which were left out.

The Corridor and its incentives attracted many private developers to focus their property portfolios there. Often these took the form of 'campuses,' comprising stand alone multi-story buildings with modular office spaces of various sizes set in landscapes of parking and planting (Kuppuswamy 2014). Examples of this are the Polaris campus at Nevalur, Infosys at Sholinganallur and Cognizant Technology Solutions at Thoraippakkam. "Visually," observes Forsyth (2014:814), "these developments demonstrate order through the continuity of the main road and the similar boxy buildings set in landscaped parcels. But there is also a level of chaos or disorganization. Traveling along a street, or examining aerial photography of the corridor, it is apparent that high-tech businesses are spread out along the road and not at all continuous." This morphology, coupled with the height exception for IT buildings and their "globalised architecture," i.e. "high-rise glass front commercial complexes, built with state of art technology" (Kuppuswamy 2014: 148; Admin 2015) began to give the IT corridor the 'special character' anticipated by the SMP.

An example of such an IT Park is SP INFOCITY at Perungudi Village, sited on 5 ha of land 2 kms from Tidel Park. A review of the Environmental Impact Assessment (EIA) for an amendment to this development submitted in 2015 (ABC Techno Labs 2015), is revealing of the development process and typical characteristics of such private sector IT developments. As of September 2006, the National Ministry of Environment and Forests (MoEF) required environmental clearance from a State Level Environmental Impact Assessment Authority (SEIAA)[22] for all large construction projects, to

[21] During the 1990's, the IT sector occupied commercial office blocks, such as Sterling Towers on Anna Salai, in central Chennai. The State provided network infrastructure to these premises.
[22] If a State did not have such a body, the MoEF was required to assess it.

cover a 10km radius of their site boundary (ABC Techno Labs 2015). These assessed the present status of the air, noise, water, soil, biological and socio economic status of the area; quantified significant impacts on these environments during construction and operation; and prepared appropriate environment management plans to minimize the adverse effects of development. IT Parks were not exempt from this procedure.

in its EIA, SP INFOCITY is described as an "Integrated Park Environment" comprising a 14 story building of rentable office space for IT services, a food court, shops, ATM's, a gym etc. in a "well-landscaped park with water features" (ABC Techno Labs 2015:7). Parking is provided for 2800 cars and nearly 6,000 'two-wheelers' in three parking basements or on grade parking, and the perimeter of the site is surrounded by a concrete wall and a "plantation of trees" (ABC Techno Labs 2015:72). The EIA claimed that this development would provide "a memorable public space," and a "sense of vibrancy and connectivity," for its tenants, whom it would attract like a "magnet," by creating the notion of an "integrated international campus" (ABC Techno Labs 2015:4). Features described as contributing to the building's environmental performance are the collection and treatment of rooftop and terrace rainwater for domestic purposes; the treatment of wastewater in an on-site sewage plant for use for flushing and landscaping; the use of sewage sludge as manure; the segregation of solid waste on site and its disposal through authorized recyclers; the routing of storm water to recharge ground water through percolation pits on the site's periphery, with excess directed to the "public drain" (:21). Power was to be supplied by the Tamil Nadu Electricity board, with back-up provided 16 diesel generator sets.

This description somewhat belies the assurances made by the government of Tamil Nadu of high quality infrastructure and public services (including water supply, drainage and sewerage) to private sector developments in the IT Corridor. To meet these expectations, the State mandated Chennai's water agency, Metrowater to implement a special ad hoc project to provide constant 24/7 water supply and efficient sewerage infrastructure to the IT corridor. Metrowater is a parastatal formed by an Act of the Legislature of Tamil Nadu in 1978 to implement water projects within the Chennai Corporation Area. In theory, the Tamil Nadu Water and Drainage Board (TWAD) caters to areas outside the Chennai Corporation and would normally have been the agency in charge of the IT Corridor, except that Metrowater was assigned this jurisdiction. Its IT Corridor project to build sewerage treatment plants and lay water supply mains commenced in 2007 and was only 90% complete in 2011. That year, the CMA boundaries were extended to include the stretch of the IT Corridor from Kottivakkam to Semmmencheri, and the Greater Chennai Corporation was expanded to incorporate the entire stretch to Siruseri. This made Metrowater responsible for storm water drainage, sewerage and water supply along the entire length of the Corridor. Research in 2015 indicated that it was overwhelmed by the magnitude of the task and unable to keep up with demand (Roumeau, et al. 2015). Field work undertaken by Chance2Sustain (2010-2014) found that while uninterrupted power and water supply was available along some parts of the Corridor, particularly in State developed SEZ's, this was not ubiquitous, and that most IT complexes, just like the rest of Chennai, had to diversify their sources to ensure sufficient water supply (Roumeau, et al. 2015).[23] Water and power provision had not kept up with IT related real estate development and most facilities ran on tanked water and diesel generators (Kennedy et al. 2014, Roumeau et al., 2015).

[23] Most households in Chennai are limited to 3-4 hours of water per day (Roumeau, et al. 2015).

Research into the direct and indirect employment and local economic linkages generated by the IT corridor to date (Kennedy et al., 2014; Coelho, Venkat and Chandrik, 2012) indicated just how socially disruptive this mode of city making has been (Kennedy nd.). Chance2Sustain's research into direct employment in IT and Indirect employment in transport services, food supply, security, housekeeping and housing[24] showed that, while the IT Corridor opened up opportunities for upward social mobility for some, for others it entrenched urban inequality. A significant number of IT employees are not from Chennai, but from small towns and rural areas. This is largely because the Tamil Nadu's affirmative action higher education policy favours candidates from backward, most backward and scheduled caste households, resulting in upward mobility for those with IT skills (Kennedy et al. 2014). Coelho, Venkat and Chandrika's 2012 study of the impact of the IT corridor on employment opportunities for residents of Kannagi Nagar however found that their position of economic peripheralisation had been entrenched. Kannagi Nagar is Chennai's largest slum resettlement colony, located adjacent the IT Corridor at Semmmencheri. It was built in the 2000's after intervention by the World Bank via the JNNURM overturned longstanding Tamil Nadu policies towards the urban poor based on limited evictions, to favour relocation to tenement clusters on the outskirts of the city (Raman 2011). The study found that residents of the settlement had been integrated into the economy of the IT Corridor on "unfavourable terms" (Coelho, Venkat and Chandrika's 2012:55). This was due to a number of factors such as the casual nature of low skilled jobs, the range of strategies by employers to break continuity of employment and various types of ceilings on upward mobility, including the stigma attached to a Kannagi Nagar address. The economic precariousness of the urban poor, exacerbated through relocation policies was perpetuated by the spatial reorganisation of economic activity. The restructuring of urban space by the new imperatives of urban capital had created not only new socio-spatial configurations of work, but also of poverty (Coelho, Venkat and Chandrika's 2012).

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The large, rapidly expanding work force on the IT corridor so catalysed the further restructuring of South Chennai's coastal fringe through the construction of residential, commercial, educational and other amenities of urban life, that one developer claimed that the Corridor would be the core of the city in 10 years (Jain Housing no date).

In 2008, there were 270,000 direct and 600,000 indirect employees on the IT Corridor, projected to grow to 400,000 and 880,000 by 2011 (Kuppuswamy 2014.) The Action Plan of 2003 had been the first to assess the demands of this new population. It projected that the bulk of the employees of the IT sector would be young, "world class professionals" with small families and that "in order to keep the area attractive for them, upper class housing, transport and good social facilities would need to be provided" (Kuppuswamy 2014:188); 50% of the workforce was expected to want to settle in the area. It was estimated that 214,000 housing units and 5583 ha of land would be required by 2011. The Action Plan recommended that 25% of this be covered by the Tamil Nadu Housing Board and 75% by the private sector and that certain concessions like tax relief, reduced interest rates and an

[24] The project conducted interviews with cab, bus and autorickshaw drivers, security guards, restaurant, grocery and shop owners and employees, hawkers and managers of working women's hostels.

additional FSI of 0.5 be used to incentivise such construction. Following this, the State's IT Policy of 2008 recognised the need to promote housing developments near IT / ITES zones for the first time, but this was not developed into an urban development policy or plan and by 2014, there was no plan to address the cascading effects of the IT industry on the city. Housing needs were being met entirely by private developers (Kuppuswamy 2014) in what was described as a "haphazard manner" (ChennaiRealty.biz blog. 2013).

Kennedy et al. (2014) classified this residential development into four types: a housing boom (for rental and purchase), which translated into a constant increase in density and raised land values along the Corridor and in nearby localities; the development of houses/villas in all neighbourhoods and of apartment buildings in selected locations, especially at the two extremities of the Corridor (Adyar in the north and Egattur and Kazipattur in the south); multi-story houses built by house owners in previously rural localities that included single rooms for rent to bachelors; and a mushrooming of women's and men's hostels, with single or shared rooms rented on a monthly basis.

The IT workforce in Chennai is characterised by large numbers of unmarried men and women from outside the city (Admin 2015). Even when married, many tend to leave their spouses and children in their place of origin. Initially there was reluctance on the part of property owners to offer their houses for rent to this sector, but high demand backed by relatively high salaries resulted in a growing preference for such tenants as they could afford to pay more than the previously prevailing rates, especially when two or more rented a single apartment. Demand for rental accommodation from high paid software employees led to tremendous increase in the price of housing rentals and land/apartment values in the Corridor area (Kennedy et al. 2014). Rental tenants indicated a preference for neighbourhoods like Tiruvanmiyur, Velachery, Taramani and Navalur. Whereas the first three are very close to the IT Corridor, Navalur is directly on the IT Corridor and witnessed large scale commercialization, a real estate boom, and the rise of several high rise apartment complexes, including one of 42 floors (Kennedy et al. 2014, Admin 2015). There was also a massive surge in residential development beyond the southern limit of the IT corridor and the CMA boundary, where building rules were lax and not enforced. Here development norms, stipulated by the Directorate of Town and Country Planning (DTCP) permitted multi-storeyed buildings subject to certain conditions (Kuppuswamy 2014). Residential development became a way of unlocking the value of peripheral land and buildings of up to 30 stories were built, anticipating occupation and regularisation when incorporated into the CMA. In 2011, many of these were standing empty, meaning that local villagers had lost their access to land, with no replacement employment opportunities (Varrel 2011).

Kuppuswamy (2014) and Sivaramakrishnan (2014) give detailed breakdowns of residential developments in various stages of completion along the Corridor, based on those falling within the CMA and those outside of it. Within the CMA, 20 residential complexes, ranging from 48 to 3,493 units each, totalling nearly 6,200 units had been proposed for Kottivakkam, Perungudi, Oggiyan Thoraippakkam, Sholinganallur and Semmancherri, interspersed amongst IT Parks. Most of these were three to four storeys high and most comprised three bedroomed apartments. In addition, in villages surrounding the IT corridor within the CMA (Medavakkam, Kovilambakkam and Rajakilpakkam), 3,600 apartments were proposed in 7 complexes, ranging from 70 to 2,600 units each. In villages outside the CMA (Siruseru, Navalur, Egattur, Kazhipatttur, Padur, Kelambakkam,

Thaiyur, Kalappakkam, Kangappattu and Mambakkam), a total of 11,600 units were proposed in 21 complexes, ranging from 80 to 3,500 units each, the latter in 6 multi-storeyed buildings. Most of these were multi-storeyed buildings, in sharp contrast to those within the CMA boundary which did not exceed four storeys, and most were gated communities. This housing was all delivered by the private sector and, despite large numbers, still fell below projected demand. Based on his survey, Kuppuswamy (2014) estimated that only 4.3% of a projected demand of 500,000 housing units was being met in 2014. Over 85% of this demand was from the IT/ITES sector, included senior management and Non Resident Indians, but employees of the banking and financing, health and public sectors were also buying in the Corridor (Adlakha 2015).

In addition to housing, malls and mega-malls, hotels and entertainment complexes were being built to catered to the new demographic, along with privatised health care facilities, hospitals and schools (ChennaiRealty.biz blog. 2013). In patterns similar to middle class enclave development around the world, leisure facilities in the form of social clubs, beach clubs, recreation clubs and golf courses were either privatised or built inside residential complexes, conceived as self contained communities (Kuppuswamy 2014). These were marketed as being "reasonably priced premium homes" built in a "scenic place" with "sea views" and the "modern amenities and facilities" of 24 hr. electricity, drainage and no shortage of ground water (Adlakha 2015, Admin 2015). "When you prefer OMR as your residential area" buyers were promised, "you will be the most blessed in Chennai to travel smoothly to your office and home without any disturbance" (Admin 2015).

Jain Housing and Construction Ltd., one of the leading residential property developers in South India, and provider of high end developments on the IT Corridor gave a number of reasons for buying a property on or close to the Corridor: firstly, the State had given priority for infrastructure developments like water and sewage connections along the OMR; secondly, proximity to a number of major projects such as 'Financial City,' a proposed development at Sholinganallur to bring all banks under one roof and 'Sports City,' a proposed 1,500 acre development in the Chengalpattu Taluk by the Tamil Nadu Industrial Development Corporation Ltd (TIDCO) to house a multi-purpose outdoor and indoor stadia, training schools, sports facilities, hostels for sports persons and sports medical centre (Simhan 2010); thirdly, future improvements to transport infrastructure such as an extended MRTS link and 5 new flyovers over the OMR. It claimed that OMR and its surroundings had more reputed schools planned than any other area and that property prices were still reasonable compared with the rest of the city, especially south of Siruseri, where plenty of available land parcels were available for new investment. It projected that IT employees would start moving to the residences that would be ready to occupy there in 2012-13, driving absorption rates and demand and that this would continue given new jobs being created in the IT corridor on an ongoing basis. Finally, it reiterated the significance of a "sea view" and anticipated that OMR would become one of the city's "posh neighbourhoods" and "drive the middle class movement" in the city (Jain Housing no date).

Despite all this real estate hype and activity, property on or close to the Corridor had lost its sheen with home buyers by 2014. Apart from the general subdued economic climate after 2008, which slowed down investment in IT (ChennaiRealty.biz blog. 2013), over-pricing had dampened demand. In 2009 reasonable property prices made the IT Corridor a desire-able destination, but price rises of 60–80% between 2010-2014, especially along the first two sections of the Corridor, had made

property unaffordable for the average home buyer. Here too, physical and social infrastructure had fallen below middle class expectations of such housing prices. No major infrastructure project had been initiated over the previous five years, putting immense pressure on existing infrastructure - sewerage facilities, storm water drains and good roads were still lacking, and connectivity, including by rail was poor (ChennaiRealty.biz blog. 2013, Adlakha 2015). Affordability had shifted south towards the peripheral stretches of the Corridor, a good 35-40 km from Adyar, where, despite social infrastructure being inadequate, home buyers had begun to invest (Sivaramakrishnan 2014, Adlakha (2015).

The IT Corridor and the Monsoon

Roumeau et al.'s 2015 working paper *Water Governance and Climate Change Issues in Chennai* is one of the only discussions of the IT Corridor in relation to the monsoonal ecology it transforms (Roumeau et al.'s 2015).[25] This was undertaken within a wider discussion of Chennai's "contradictory" (:6) relationship with water i.e. that it suffers from both heavy monsoon rains and droughts that authorities have to prepare for year after year.[26] How different urban configurations are "positioned in relation to these material realities," the paper argues (:6), shapes discourses and institutional arrangements.

The IT Corridor is built on fragile coastal wetlands and water bodies, including marshland, erys and water tanks, extending from the Pallikanarai Marsh in the north to the Muttukadu Laguna in the south. Due to encroachment on these wetlands and the destruction of interconnected water bodies, heavy rainfall during the monsoon season frequently results in flooding, as was witnessed most recently in 2015. In addition, its situation close to the Bay of Bengal makes the Corridor vulnerable to sea level rise, storm surges, tsunamis, saline intrusion into water tables and ground water depletion. Roumeau et al. (2015) express the view that ground water depletion and saline intrusion present the greatest water threat to the IT Corridor. Rampant development, overexploitation of ground water and rising sea levels[27] have accelerated the depletion of the aquifer and the intrusion of seawater. To regulate this, the CMA Ground Water Regulation Act (1987) was enacted and further amended in 2003, but has not been effectively implemented. Extraction still takes place along the IT corridor. The State proposes a comprehensive ground water regulatory authority to impose strict controls on the use of ground water, through clarifying property rights, and imposing extraction charges and limitations and water conservation measures.

Until 2015, flooding on the IT Corridor tended to be naturalised - it was a "flood prone area," as a result of being "naturally low-lying" (Roumeau et al. 2015:24,9, Reuters in Chennai 2015). Though this might be true, it ignores what happens when the natural hydrological topography of an area is almost completely urbanised through erasure to synchronize with a much touted infrastructural mega-project and its associated private sector development (Roumeau et al. 2015). This is now

[25] This was also published as part of the Chance2Sustain research programme (2010-2014).
[26] For instance, in 2003 the north east monsoon failed and the city experienced its worst drought for 54 years, followed in 2005 by acute flooding. The same looks likely in the 2015/16 monsoon cycle, though in reverse.
[27] Sea level in this part of the Bay of Bengal is rising an average of 1.3 mm (about 1 meter in the past 70 years) (Roumeau et al. 2015).

widely acknowledged (Lavanyal 2012, Janardhanan 2015, Jayaraman 2015, Murarka 2016, Narasimhan et al. 2016 et al.). Development has interfered with the hydrological performance of the two large water bodies in the area - the Pallikanarai Marsh and the Muttukadu Laguna - and their interconnected water bodies (Srivatathsan and Lakshmi 2011), which, along with the Buckingham Canal, serve as the area's main flood defences (Kennedy et al. 2014). These hydrological systems control inundation and safeguard against storms by holding excess flood water during periods of intense rain and discharging it into the sea. They also serve as percolation systems to recharge the aquifer, and their wetland vegetation manages soil erosion, stabilizes shore lines and acts as a sink for eutrophic nutrients such as nitrogen and phosphorous (Vinodhini and Sundaram 2015). As consequence of the IT Corridor and associated developments, these performativities have been substantially altered. Firstly, the extent of the Pallikanarai Marsh has been dramatically reduced in size from 1339 ha in 2002 to 605 ha in 2013 by encroachments. Secondly, its use as a dumpsite at Perungudi increased fourfold, from an area of 20 ha in 1995, to 78 ha in 2013 (Seifelislam 2013). In addition, it received untreated sewage and treated sludge discharged by Metrowater. These encroachments affected its ecological performance, including the contamination of groundwater (Parameswari et al. 2012, Seifelislam 2013). A reason given for this disregard for the wetland systems was its classification from the British colonial era onwards until recently as 'wasteland.' This vindicated rampant encroachments, without clear responsibilities within the metropolitan governance system as to how to deal with them (Vencatesan 2006). The SMP recommended the refurbishing of urban water tanks, but gave the responsibility to the Public Works Department whose mandate is drainage and water provision, not the interconnected causes of flooding (Jameson 2014). These processes were not uncontested and in 2007, as a result of campaigns by the Save the Pallikanarai Marshland Forum, the southern part of the marshland was declared Reserved Land under the Forest (Conservation) Act of 1980 and brought under the jurisdiction of the District Forest Officer (Seifelislam 2013). This made the Tamil Nadu Forest Department responsible for the marshland and its potential upgrade into a highly protected area (Roumeau et al 2015).

These complex relations with water are potentially compounded by climate change. However, Roumeau et al. (2015) found a lack of awareness amongst residents and city planners alike about its possible impacts. Only two small paragraphs in the SMP (CMDA 2008) in the chapter on the environment make reference to it:

> It is now recognised that climate change due to global warming is going to be an important threat to safety of millions of people not only living near the coastline but also in the interior because of its impact on changing rainfall patterns and cyclones. Chennai is a flat coastal city subject to regular cyclonic storms and extensive inundation during the northeast monsoon period. Hence it is necessary to take into account ways and means of tacking the effects of climate change in a planned manner. Knowledge on this subject is only gaining ground in recent times. We need to absorb latest information and technology in this discipline not only to cut down greenhouse gas emissions from urban activities but also anticipate the effects of climate change on the economy and life of people to take timely remedial measures (CMDA 2008:105-106).

In other words, climate change was an abstract concept without any real significance. In 2011, a Cities and Climate Change conference in Chennai was organised by the Madras Chamber of

Commerce and Industry in collaboration with Citizens Alliance for Sustainable Living (SUSTAIN). This launched the Sustainable Chennai Forum and the inclusion of climate change in debates about the future of the city.

Conclusion

It is clear from the foregoing that the IT Corridor in Chennai is the product of a powerful discursive apparatus – policies, politics, legislation, plans, imaginaries, institutions, procedures - and resulting material practices – land acquisitions, planning applications, tenders, construction etc. brought to bear on a stretch of what was seen to be vacant land-in-the-waiting (what Jason Moore (2015) calls a "cheap"), to be transformed into an engine of economic growth for Tamil Nadu. Through these measures, space, place, governance, Chennai's idea of itself and socio-political relations were dramatically restructured into abstract units of value in global circuits of capital (see e.g. Dowall and Monkkonen 2007). However, if new materialism is to be believed, all of the entities participating in this assemblage – space, place, plans, institutions, humans, consciousness, non human entities etc. are also radically withdrawn from them and lead other lives, both actual and virtual, that have the potential to disrupt the global circuits they are caught up in. Here Doreen Massey's definition of space as a "product of interrelations and embedded practices, a sphere of multiple possibilities, a ground of chance and undecidability, and as such always becoming, always open to the future" (2005 in Philippopoulos-Mihalopoulos 2015:33) is extremely useful. In this respect, the monsoon floods of 2015 served as critique of the assemblage of discursive and material relations through which the IT corridor stretch of south Chennai had been transformed. They exposed it to also be a vast receptacle for monsoon rain whose hydrological capacities had been so compromised by development that they were no longer able to be exercised. The monsoon rains of 2015 exceeded their assigned places and passages in the urban system, where these had been designated; they reclaimed spaces they had once held, now filled in or built over, but recalled in place names ending in -eri, -ery or -akkam; they moved moved independently of property lines, though they affected different properties differently, sometimes, though not always in ways aligned with class and caste; they asserted their rights to space and time in the urban system. I would argue that it is through the development of the idea of the right of monsoon rain to its place in the city through a broadened concept of spatial justice, that the future of south Chennai be reviewed and reassessed.

List of References

ABC Techno Labs. (2015). Environmental Impact Assessment for the Proposed Expansion of IT Park "SP Infocity" at Perungudi Village, Sholinganallur Taluk, Kanchipuram District, Tamil Nadu. MoEFCC File No. 21-495/2006-IA.III http://environmentclearance.nic.in/writereaddata/EIA/24062015V6XNMFROEIAREPORT-FAERYESTATE.pdf

Adlakha, N. (2015). The next big residential hubs in Chennai. *The Hindu*, 20 Nov http://www.thehindu.com/features/homes-and-gardens/the-next-big-residential-hubs-in-chennai/article7899681.ece

Admin. (2015). OMR Highway the New Developing Phase of Chennai Metro City. *Vienna Times*, 21 July http://www.viennatimes.com/world-news/omr-highway-the-new-developing-phase-of-chennai-metro-city/

Arabindoo,P. (2005). Examining the peri-urban interface as a constructed primordialism. In V. Dupont (ed.) *Peri-urban dynamics: Population, habitat and environment on the peripheries of large Indian metropolises*, pp. 39-74. New Delhi: CSH Occasional Paper No. 14, publication of the French Research Institutes in India.

(2009). Falling Apart at the Margins? Neighbourhood Transformations in Peri-Urban Chennai. *Development and Change* 40(5):879-901.

Aranya, R. (2008). Location theory in reverse? Location for global production in the IT industry of Bangalore. *Environment and Planning A* 40:446-463.

Arora, A. and Gambardella, A. (2005). *From underdogs to tigers: the rise and growth of the software industry in Brazil, China, India, Ireland and Israel*. Oxford: Oxford University Press.

Asian Development Bank. (2007). *Benchmarking and Data Book of Water Utilities in India*. http://www.adb.org/publications/2007-benchmarking-and-data-book-waterutilities-india

Bajwa, G. S. (2003). ICT Policy in India in the era of liberalisation: its impact and consequences. *Global Built Environment Review* 3(2):49-61.

Banerjee-Guha, S. (2009).Neoliberalising the 'Urban': New Geographies of Power and Injustice in Indian Cities. *Economic and Political Weekly* 44(22):95-107.

Brenner, N. (1998). Global Cities, Glocal States: Global City Formation and State Territorial Restructuring in Contemporary Europe. *Review of International Political Economy* 5(1):1-37.

Castells, M, Hall, P. and Hall, P. G. (1994). *Technopoles of the World: The Making of Twenty-first-century Industrial Complexes*. New York: Routledge.

CDP. (2009). *Chennai revised Comprehensive Development Plan. V1 Main Report; V 5 Institutions and Governance*. Chennai: GHK consultants with Taxila, SUSTAIN, HABICO.

Chance2Sustain. (no date). http://www.chance2sustain.eu/7.0.html

Chandrasekaran, S. (2014). What is in a name? *The Hindu*, 20 Dec http://www.thehindu.com/features/downtown/what-is-in-a-name/article6710917.ece

Chennai Patrol. (no date). http://www.chennaipatrol.com/

ChennaiRealty.biz blog. (2013). Growth of OMR. 15 May. http://www.chennairealty.biz/blogs/residential-apartments-flats-and-plots-for-sale-near-omr-IT-corridor-chennai.html#sthash.UvZncJ8J.dpbs

CMDA. (2003). *Action Plan for Thirupporur IT Corridor - a preliminary report*. Chennai: CMDA.

CMDA. (2008). Second *Master Plan for Chennai Metropolitan Area 2026.* Chennai: CMDA.

Coelho, K., and Vijayabaskar, M. (2014): On the Charts, Off the Tracks. *Economic & Political Weekly* 49(22):101–10.

Coelho, K., Venkat, T. and Chandrika, R. (2012). The Spatial Reproduction of Urban Poverty. *Economic & Political Weekly* 47(48):55-63.

Coello, K. and Raman, N.Y. (2010). Salvaging and Scapegoating: Slum Evictions on Chennai's Waterways. *Economic and Political Weekly* 45(21):19-23.

ColourLibraryBlogspot. (no date). Photographs of largest IT campus in India, TCS Siruseri, Chennai - An architectural Marvel. http://colorlibrary.blogspot.co.uk/2012/08/photographs-of-largest-corporate-it.html

Department of Civil Engineering, IIT Madras (2012). Real-time Traffic Information System (RTIS). http://rtis.iitm.ac.in/

Dossani, R. (2005). Origins and growth of the software industry in India. *Working Paper, Stanford University Asia Pacific Research Centre*. http://iis-db.standford.edu/pubs/20973/Dossani_India_IT_2005.pdf

Dowall, D. E. and Paavo, M. (2007). Chennai Urban Land Market Assessment. *IURD Working Paper Series*. https://escholarship.org/uc/item/7f45v6d8

Easterling, K. (2014). *Extrastatecraft: The Power of infrastructure space*. London: Verso.

Flyvbjerg, B. (2014). What You Should Know about Megaprojects and Why: An Overview. *Project Management Journal* 45(2):6-19. DOI:10/1002/pmj.21409.

Flyvbjerg, B., Bruzelius, N. and Rothengatter, W. (2003). *Megaprojects and risk: An Anatomy of Ambition.* Cambridge: Cambridge University Press.

Forsyth, A. (2014). Alterative forms of the high-technology district: corridors, clumps, cores, campuses, subdivisions and sites. *Environment and Planning C* 32:809-823.

Forsyth, A. and Crewe, K. (2010). Suburban technopoles as places: the international campus-garden-suburb style. *Urban Design International* 15:165-182.

Jain Housing. (no date). Ten reasons for buying a property in OMR, Chennai. http://www.jainhousing.com/omr.pdf Accessed 13 November, 2016.

Jameson, S. (2014). 'Flood management Does Not Exist': Assembling Flood Governance through Knowledge management in Chennai. Amsterdam: University of Amsterdam.

Janardhanan, A. (2015). Why is Chennai underwater? *The Indian Express*, 04 December http://indianexpress.com/article/explained/why-is-chennai-under-water/

Jayaraman, N. (2015). Chennai floods are not a natural disaster – they've been created by unrestrained construction. *Scroll.in* 09 December http://scroll.in/article/769928/chennai-floods-are-not-a-natural-disaster-theyve-been-created-by-unrestrained-construction

Jessop, B. (2002). Liberalism, Neoliberalism, and Urban Governance: A State-Theoretical Perspective. *Antipode* 34(3):452-472.

JNNURM. (2005). *Overview. Jawaharlal Nehru National Urban Renewal Mission*. Government of India: Ministry of Urban Employment and Poverty Alleviation and Ministry of Urban Development. http://jnnurm.nic.in/wp-content/uploads/2011/01/UIGOverview.pdf. (2011). http://jnnurm.nic.in/

Kennedy, L. (2015). Multi-scalar dynamics driving India's urban megaprojects. Speculative urbanism and the IT Corridor in Chennai, India. Paper presented at RC21 International Conference, Urbino (Italy) 27-29 August.

Kennedy, L. Varrel, A., Denis, E., Dupont, V., Dhanalakshmi, et al. (2014). Engaging with Sustainability Issues in Metropolitan Chennai. *City Report Series (Chance2Sustain).* https://halshs.archives-ouvertes.fr/hals-01061314

Kennedy, L. and Sood, A. (2016). Greenfield Development as Tabula Rasa. Rescaling, Speculation and Governance on India's Urban Frontier. *Special Issue of EPW, Review of Urban Affairs* 51(17):41-49.

Kumar and Sashi, R. (2008). SEZ's in India: Concepts, Objectives and Strategies. National Seminar on Special Economic Zones, Karnataka.

Kumari, S. M. (2013). How traffic stops life on Old Mahabalipuram Road. *Times of India*, 19 Nov, http://timesofindia.indiatimes.com/city/chennai/How-traffic-stops-life-on-Old-Mahabalipuram-Road/articleshow/26015388.cms

Kuppuswamy, S. (2014). Manifestation of information technology industry in Chennai Metropolitan area. http://shodhganga.inflibnet.ac.in/handle/10603/27365

Lavanyal, K. (2012). Urban Flood Management - A Case of Chennai City. *Architecture Research* 2(6):115-121. DOI:10.5923/j.arch.20120206.01

Malmarugan, K. and Narayan, S. (eds.).(2006). *Evolution of and Integrated Facility. The IT Corridor*

Story, Chennai.

Manaikandan, R., Lakshmi, S. and Bakiya, P. (2016). Women Passengers in Share Autos - A Case Study of Chennai. *International Journal for Innovative Research in Science and Technology* 3(1):322-328.

Mariappani, J. (2015). Two years on, no progress on plan for mega planning authority for Chennai. *Times of India*, 02 Jan. http://timesofindia.indiatimes.com/city/chennai/Two-years-on-no-progress-on-plan-for-mega-planning-authority-for-Chennai/articleshow/45723544.cms Accessed 13 Nov 2016.

Massey, D. (2005). *For Space*. London: Sage.

McKinsey Global Institute. (2010). *India's urban Awakening: Building inclusive cities, sustaining economic growth.* http://www.mckinsey.com/global-themes/urbanization/urban-awakening-in-india

Mehta and Pathak. (1999). Economic Development, Globalisation and Urban Governance in India. *India the Challenge of Urban Governance*. O. P. Marthur (ed.). New Delhi: National Institute of Public Finance and Policy.

MMDA. (1995). *Master Plan for Madras Metropolitan Area 2011*. Chennai: MMDA.

Moore, J. (2015). *Capitalism in the Web of Life. Ecology and the Accumulation of Capital*. London: Verso.

Murarka, H. (2016). Tampering with Nature: Faulty Town Planning Caused Chennai Floods. *the quint*, 18 August https://www.thequint.com/india/2016/08/18/tampering-with-nature-faulty-town-planning-caused-chennai-floods

Narasimhan, B., Bhallamudi, S. M., Mondal, A., Ghosh, S., and Mujumdar, P. (2016). *Chennai Floods 2015. A Rapid Assessment.* Bangalore: Interdisciplinary Centre for Water Research, Indian Institute of Science.

Nasscom-McKinsey. (2002). *Vision for the Indian IT Services and IT-enabled services industry.* http://www.nasscom.in/Nasscom/templates/NormalPage.aspx?id=2601

OMR Rider (2014). The 'Old' behind Old Mahabalipuram Road. *OMR Rider*. 29 March http://omrrider.blogspot.co.uk/2014/03/the-old-behind-old-mahabalipuram-road.html

Pangariya and Arvind. (2004). *India in the 1980's and 1990's: A Triumph of Reforms*. International Trade 0403005, EconWPA.

Parameswari K., Mudgal, B. V. and Nelliyat, P. (2012). Evaluation of groundwater contamination and its impact: an interdisciplinary approach. *Environment, Development and Sustainability* 14(5):725-744.

Planning Commission. (2002). *Tenth Five Year Plan (2002-2007).* New Delhi: Government of India. (2008). *Eleventh Five Year Plan (2007-2012). V3. Agriculture, Rural Development, Industry, Services and Physical Infrastructure*. Oxford: Oxford University Press.

Philippopoulos-Mihalopoulos, A. (2015). *Spatial Justice: Body, Lawscape, Atmosphere*. London: Routledge.

Rakesh, K. S. and Mohamed, A. R. (2010). The Urban Pedestrian Environment - Role of Qualitative Evaluation: Analysis of an institutional Area I Chennai, India." *Indian Journal of Transport Management*, Jan-Mar:27-44.

Ramakrishnan, D. H. (2014). Land acquisition for next phase of OMR nearly done. *The Hindu,* 09 Feb. http://www.thehindu.com/news/cities/chennai/land-acquisition-for-next-phase-of-omr-nearly-done/article5668509.ece

Ramakrishnan, D. H. (2015). OMR project moves ahead. *The Hindu*, 06 Jan http://www.thehindu.com/news/cities/chennai/omr-project-moves-ahead/article6757971.ece

Raman, N. (2011). The Boar and the Bank: Changing Policies towards Slums in Chennai. *Economic and Political Weekly*, July 30, 46(31):74-80.

Reuters in Chennai (2015). Southern India hit by floods after heaviest rainfall in more than a century. *The Guardian* 02 December http://www.theguardian.com/world/2015/dec/02/southern-india-hit-by-floods-after-heaviest-rainfall-in-more-than-a-century

Roumeau, S., Seifelislam, A., Jameson, S. and Kennedy, L. (2015). Water Governance and Climate Change Issues in Chennai. USR 3330 "Savoirs et Mondes Indiens" *Working Papers Series no. 8.* hal-01144122

Roy, A. (2002). *City requiem. Calcutta: gender and the politics of poverty*. Minneapolis, University of Minnesota Press.

Sassen, S. (1991). *The Global City: New York, London, Tokyo.* New York: Princeton University Press.
(2005). The Global City: Introducing a Concept. *Brown Journal of World Affairs* 11(2):2

Seifelislam, A. (2013). A rapid assessment of the impact of wetland degradation on groundwater resources in the fast growing city Chennai. *Unpublished report prepared in the framework of the Chance2Sustain programme*.

Simhan, T. E. (2010). Site identified for Chennai Sports City. *The Hindu Business Line*, 07 Sept http://www.thehindubusinessline.com/todays-paper/tp-economy/site-identified-for-chennai-sports-city/article1003484.ece

Sivaramakrishnan, A.S. (2014). Chennai's OMR not desire-able anymore? *Magicbricks.com*, 11 June http://content.magicbricks.com/industry-news/chennai-real-estate-news/chennais-omr-not-desirable-anymore/70473.html

Sivaramakrishnan, K. C. (2011*). Re-Visioning Indian Cities: The Urban Renewal Mission*. New Delhi: Sage.

Sivaprakash, G. (2015). Analysing Delay with Los at the Major Intersections of OMR Stretch (Chennai). *International Journal for Scientific Research & Development* 2(12):158-160.

Software Technology Parks of India. (2016). https://www.stpi.in/

Sood, A. (2015). Industrial Townships and the Policy Facilitation of Corporate Urbanism in India. *Urban Studies* 52(8):1359-1378.

Special Economic Zones in India (2009). http://sezindia.gov.in/index.asp

Srivatathsan, A. and Lakshmi, K. (2011). Chennai's vanishing water bodies. *The Hindu*, 13 June http://www.thehindu.com/todays-paper/tp-national/tp-tamilnadu/chennais-vanishing-waterbodies/article2099972.ece Accessed 01 October 2016.

Swyngedouw, E. (1996). Reconstructing Citizenship, the Re-Scaling of the State and the New Authoritarianism: Closing the Belgian Mines. *Urban Studies* 33(8):1499-1521.

Tamil Nadu. (1996). G.O. Ms. No. 169 of Industries (MIE), 12.09.1996.
(1997*). IT Industry Policy of Tamil Nadu*. G.O. Ms. No. 300, IND (MIE), 03.11.1997. Industries Department of Government of Tamil Nadu.
(2002). G.O. Ms. No. 13, 16.08.2002. Information Technologies Department of Tamil Nadu.
(2005). *ITES Policy of Tamil Nadu*. G.O. Ms. No.11, 25.10.2005. Department of Information Technology of Government of Tamil Nadu.
(2008). *Information Communication Technology (ICT) Policy of Tamil Nadu*. http://www.elcot.in/ITC_Policy.php.

UNCHS. (2001). *Cities in a Globalising World. Global Report on Human Settlements*. London: Earth Scan Publications.

Varrel, A. (2011). The "IT" mantra in mega-projects in India: the case of the IT Highway in Chennai. Locating implications and contradictions for metropolitan development. *Rethinking Development in an Age of Scarcity and Uncertainty*. 19-22 Sept. 2011. University of York.

Vencatesan, J. (2006). *Wastelands: Is It Time to Rethink?* Bangalore: Current Science Association.

Vijayabaskar, M (2010): Saving Agricultural Labour from Agriculture: SEZs and Politics of Silence in Tamil Nadu. *Economic & Political Weekly* 45(6): 36-43.

Vijayabaskar, M. and Babu, M. S. (2016). The Politics of Urban Mega-projects in India. *Economic & Political Weekly* 51 (17) http://www.epw.in/journal/2016/17/review-urban-affairs/politics-urban-mega-projects-india.html

Vinodhini, O. and Sundaram, A. M. (2015). Issues in Indian Cities Due to Increasing Coverage of Highways: A Case Study of the Sriperumpudud – Poonamalle Stretch in NH4. *Creative Space* 2(2) January:197-212.

Wikipedia (2016a). Dashrath Patel. https://en.wikipedia.org/wiki/Dashrath_Patel

Wikipedia. (2016b). Old Mahabalipuram Road. https://en.wikipedia.org/wiki/Old_Mahabalipuram_Road

World Bank. (2009). *World Development Report 2009. Reshaping Economic Geography*. Washington DC: The World Bank.