The Corporation and the Panchayat. Negotiations of knowledge in an Indian Technology Park

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South East of Bangalore, Karnataka, India. This is the location of the technological and industrial district known as Indian Silicon Valley, identifying the area around Electronics City. A new suburb of Bangalore, E-City has been dramatically developing in the last twenty years, experiencing an expansion so fast and intense to call for a redefinition of the legal and administrative competences required by its management. E-City has been chosen by the majority of international corporations as a location of their Indian branches. E-City is also the location of the Research & Development Department of the US based corporation where I developed my fieldwork. The paper describes the reasons, both scientific and economic ones, that led the corporation to delocalize its R&D in India, and the long-term effects that such decision is bearing on the entire territorial, human and urban development. E-City administration, shared among the traditional institution of Panchayat and the association of industry managers, has entered into a conflicting phase with the City Council of Bangalore, about crucial matters like primary resources management and distribution. The paper stresses how the processes of knowledge production, management and transfer cannot be understood within predefined disciplinary bounds, being strongly affected by local socio-economic constraints that make them useful, effective or im/possible.

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Introduction

My research moves from the need of focusing on the contexts that allow, enforce and make possible the challenges of scientific and technologic development, taking into account not only scientific skills and

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technical competences, but also investigating external and contingent factors, like social environment, economic constraints and cultural biases, that actually make scientific research useful, other than possible. This is the reason why I have been developing my recent fieldwork in the Research & Development Department of an international corporation, one of the ten largest corporate enterprises worldwide.

The corporation is a multilayered and multifunctional subject, with multiple areas of action and a strong capability of shaping the contexts where it establishes its activities. Large corporations have been traditionally developing the applied research they need within their own facilities: researchers with a basic academic education in Science or Technology are selected and hired with the perspective to be the trained internally, in order to adapt their research profiles to the required corporate needs and directions. The presence of Research & Development Department (R&D) within the corporate environment isn't therefore a new contingence. Despite this, the study of the corporate R&D contains a few peculiarities that I will discuss later in the paper.

In the last twenty years though, a brand new element has arisen in the research policies of the largest world corporations: the delocalization of the R&D in the so called 'emerging countries'. While the delocalization of industrial plants and production processes can be rather easily explained in the framework of the best-cost policies, that is to say the lowering of production costs and salary control, the delocalization of the R&Ds is a more recent, more delicate, and non immediate process to explain.

My research has followed the process of delocalization of the R&D in India, enacted by the corporation under my focus since 2000. The corporation (that I will call Oil&Techno in the following) has significantly invested in the start of several R&Ds worldwide, the most prominent of which is located in Bangalore. The Bangalore R&D is now fully working, and it represents the most effective research facility of the corporation outside the US. What has made such success possible? What have been the specific reasons that transformed the Indian R&D in a lively and productive reality?

Which differences can be spotted with respect to other R&Ds, opened by the corporation with the same goal, and still resulted as much less efficient and productive? I want to discuss whether there is anything like a context depending reason of success, and whether such dependence can be significant even for a standardized and global subject like the corporation.

During my fieldwork, started in 2009, I had the occasion of following my colleagues and informants, researchers and employees from the

corporation, outside the corporation buildings and laboratories. Despite my research specifically focused on the research process taking place in the corporation's labs, I could not avoid including in my observations also personal trajectories and life histories, and expanding the gaze from mere research processes to a wider consideration on people and research networks. What has progressively emerged is the presence of a strong and wide network connecting the large community of IT workers employed by different companies, a powerful network structured over working topics but still based on informal relations.

IT workers and their networks are a main emerging social feature in present Bangalore scenario. Outside the Research & Development Department of the Oil&Techno there is actually an entire developing world of IT informal research, people and activity. Therefore, the physical location of the R&D has turned to be a key element of my fieldwork, that needs being treated thoroughly. This is the turning point where the concept of the Technology Park enters into my interests. Indeed, a well-defined area of the southern periphery of Bangalore has been renamed in the last decades as Electronics City. Technological infrastructures and office facilities have been created from scratch with the clear purpose to attract industries and companies from India and from abroad to open their branches in this new favourable environment. Numerous companies have accepted the challenge, and the increase in working opportunities have created the conditions for the convergence of many IT young professionals, chasing in Electronics City the best opportunities for their careers.

The development of Electronics City doesn't reproduce the standard patterns characterizing the setup of a Technology Park: typically these are results of organized and structured process, as can be observed in many contexts in the west and non-western scenarios (cfr. Doha and Hong Kong examples). The lacking of a real urban planning, the more or less spontaneous circulation of people and information, and the underlying competition among the companies sharing the spaces of Electronics City don't contribute to shape the classic profile of the cooperative environment in a Science and Technology Park. Nevertheless, the occurrence of a sequence of unrelated events has created the conditions for the emerging of a scenario where the relevance of the individual company is progressively resized with respect to the importance of the overall background context.

The large majority of IT workers gathering in E-City for job-related reasons consider themselves more as citizens of such newly created city

environment than as employees of a specific Indian, or even less so, foreigner company. The physical proximity of many productive plants, as well as that of laboratories and IT firms, creates the premise for the emergence of a strong informal network that actually escapes company planning and organizational patterns. The increasing density of people commuting daily to E-City generates new needs and requests of services, connected both to daily life, such as food, sport, entertainment and health, and to technology light topics, such as phone services and wi-fi external coverage, that have triggered the development of newer E-City features.

The Technology Park arises therefore as un unplanned outcome from these scenarios, a sort of side-effect induced by a series of unrelated investments, events, trajectories, people's requirements, and follow-ups.

Let's therefore analyse this developing scenario in some more detail.

Research in the corporation

What does it mean to develop scientific research in the context of a corporation? What are the main structural and relational features that distinguish an academic laboratory from one embedded in a corporate environment? Is it possible to identify specific procedures, workflows and knowledge transfer patterns characterizing one or the other possible research endeavour? Let's briefly summarize a few evident issues at stake in the context of corporate research, pointing out the relevant discrepancies with traditional academic research laboratories; then I'll try to evaluate the potential effects that these discrepancies can have on research outcomes.

As a first theme, it's necessary to specify that the research performed in corporate environment is always applied research. Applied research requires a close vicinity and a strict interlink of the entire research process, from its very early stages, with its material output, meant as a deliverable, an object, a finite device. Applied research is aimed at answering concrete questions, rather than investigating theoretical matters, and in this sense it can be thought as a converging form of intellectual enterprise. Applied research doesn't have to speculate on the basics foundations of knowledge, and it's not supposed to produce new science; rather, it has to confidently rely on existing science paradigms and existing semi-finite technological procedures, in order to be able to complete them and therefore achieve its material results. Applied research is a transformative process from a not-so theoretical stage of knowledge to stage that is even less so. The overall task

at stake in corporate applied research is the transformation of existing devices into customized, optimized ones.

The very concept of applied and customized research calls into the game the role of the customer, the hypothetical external user that one day will benefit from the effort of the research challenge (in change of money, as the results of applied research are market products). The role of the

external customer is indeed not so hypothetical, since its presence is quite strongly materialized in the labs' common imaginaries by the occurrence of strict deadlines. The customers' requirements are the pretext used by the corporation for is the imposes severe and frequent

The picture appears quite different from what observed in academic or independent research contexts, where deadlines arise and fall, depending only on links with other academic structures and their research time constraints. The main difference with the academic environment consists on the fact that the corporate labs' deadlines are pushed by market agreements, by demands from the customers and by fluctuations of money value. The corporation plans its selling strategies on the basis of detailed schedule agreements with its customers, so that the timing of all processes isn't a matter that can be any longer negotiated at the level of laboratory life.

Corporation's customers are both public subjects, as governments and states, and private ones, as other corporations: they very pay their maximum attention to the best social and economic contingencies that can be achieved when they sign a contract with a deadline agreement (Wilkins, 2005). This means that not all deliverables are suitable to be sold or bought at every time. Deadlines emerge eventually as the result of thorough cross considerations of external constraints that don't bear any real connection with the research contents and contexts.

All these issues contribute to shape a very stressful working environment. The competition among similar labs dedicated to the same productions turns to be very pronounced, and consistent economic incentives are given to those showing the best productive rates. Moreover, awards and public (though internal) recognitions are granted to the employees with the aim of trying to balance and compensate the impact of such demanding working environment. A main consequence of the stressful

working conditions in the corporations is the rate of abandoning and volunteer job quitting, that is rather high in Electronic City. On the other hand, the large job offer ad the rather easy conditions under which a new

qualified job can be found make the circulation of employees and researchers very lively and fluent, creating a real problem of data protection and research security among the companies in open regime of competition.

I would say that this is the most prominent feature of Electronics City as a would-be Technology Park: the community of ideas and perspectives arises exactly from the element of little company loyalty performed by the employees. Often quitting and changing their positions, they materially create the conditions for an exchange and an unplanned transfer of knowledge and competences, that eventually results as an enriching feature for all the players involved in the process. In fact, as a specific company may suffer the loss of a set of protected information, it may also gain unexpected advantage from the implicit extra competencies brought in by new employees coming from previous working experiences.

On the economic side, the most effective strategy enacted by the corporations to try to prevent the frequent job quits is to pursue a policy of high salary, increasing the salary offer when the risks of abandoning results more severe. So, being not so strongly tied with the job ends up being a favourable conditions, allowing the employees to receive more incentives to remain (Bougleux, 2012a).

One more interesting outcome of the unplanned circulation of knowledge and competences is the frequent birth of spin-offs and new small IT enterprises, set up by entirely Indian teams, made of people that benefitted of intense training in IT sector and international perspective acquired during their jobs for international corporations. If such unplanned circulation among the companies operating in E-City could at a first sight be considered as bearing a negative backlash on companies production, the increasing number of international productive realities that still keep the initiative to settle in E-City speaks indeed of an opposite scenario. The working, economic and social condition characterizing E-City are still considered highly favourable. So let’s describe them in some more detail.

Beginning and Short History of Electronic City

Karnataka State Electronics Development Corporation Limited (Keonics) is a publicly owned company born in 1976 with the objective of promoting electronics industries in Karnataka. Its profile shows both private and public features, holding a relevant role in the public policy and largely accessing to public funds, as well as being oriented to create attractive working

conditions and guarantee a good cooperation environment for private partners.

According to its own historical narration Keonics 'promoted the development of electronic industry in the State [of Karanataka] and to create infrastructure for the rapid growth of electronic industries […]. It was envisaged to function both as manufacturer and as a facilitator as well as catalyst for the development of electronic industries and accordingly classified as development enterprise'(Keonics website).

The first land spot of less than 1,5 km^2 was acquired by Keonics not far from the city limits of Bangalore at the time, and something in between a village and a small suburb dedicated to host technology infrastructures was firstly founded. An independent urban reality called Electronics City started existing slowly and progressively, from what was initially only a series of technologically well-equipped new buildings. In the last twenty years though, Bangalore city expansion has dramatically changed the landscape of surrounding areas. Closer suburbs were included in the city borders one after the other, allowing Bangalore to reach the present population of over eight million citizens. At the same time, as E-City was gaining more and more relevance as a technology hub, a number of innovative Indian laws started promoting the role of local institutions as the new subjects in charge of fostering local development. E-City found itself in the proper and opportune conditions to acquire a legal and formal status. It increased in relevance, population and especially in average income, and these factors created the conditions for the start of an institutional dialogue with the city of Bangalore. The dialogue hasn't always been simple, touching crucial topics such as the regulations on land exploitation, and the administration of basic resources, as water and electricity.

The development of E-City in terms of technical structure can be shortly summarized in three steps. A first step of the city development has been characterized by the arrival of IT companies, both Indian like Wipro and Infosys, and foreigners like HP and Siemens, that during the Eighties were hosted by Keonics and shared or hired its IT infrastructures.

A second step, started approximately in the early the Nineties, can be identified with the first start of direct manufacturing of IT components by Keonics. E-City made technological products were mainly destined to the communication sector, like phones and wireless devices. For ten more years, thanks to agreements with international partners engaged in highly developed IT manufacturing (including the Italian Marconi), E-City started

developing components for its own customized communication network. A fast web network was launched in the late Nineties, trying to solve one of the worse Indian technology problem, the poor speed of the web connections. The second step developed simultaneously to the implementation of the first one, i.e. the quite lively activity aimed at attracting new companies with always new and dedicated infrastructures. Indeed an increasing number of world large companies set up to open their Indian branches in E-City, including the corporation where I developed my fieldwork.

A third step has been characterized by the beginning of the large scale commercialization of IT products labelled Keonics & E-City, starting a process of transfer of the 'Karnataka model' to other bordering Indian States, such as Kerala and Andra Pradesh. The Karnataka model is a short way to call a comprehensive process of going digital, involving production, education and institutions. The Karnataka model is strongly relying on the much smaller E-City model, as an example to trigger the development of an entire city through experiences of digitalization such as e-learning and e-government. The effectiveness of these attempts is still to be validated and analysed.

The latest regional government initiative to implement E-City dynamics has been the sponsoring of training and education activities, trying to promote the local development of careers and specialized professional profiles. The lack of strong education institutions is maybe the feature that so far has mostly prevented E-City from being considered a Science and Technology Park under every respect. The federal government initiative to promote the opening of schools and colleges in the district is aimed at filling such existing real gap.

Presently, the education offered in E-City high schools is basically technical: main topics available are programming languages, hardware and networking administration, data management for different work environments, including medical and public administration.

A strong emphasis is laid on the quality of the educational paths offered in E-City. Schooling is offered from early years, from pre-school and primary school institutions aimed at attracting young employees to move to E-City with their families, and possibly settle down there. The school system is designed according to Asian and European higher standards, promoting South Korean mathematics teaching methods, as well as Montessori approaches for pre-school younger classes. But higher education profiles offered in E-City can't really compete with those provided by academy or

traditional scientific institutions in the larger Indian Higher Education scenario, like the Indian Institute of Technology and the University of Madras. Both these institutions represent high standards of superior education of contemporary India, and at the same time they embody the legacy with history, being founded during the colonial times by the British administration. Let's therefore investigate the relevance of tradition and legacy from the past, describing one more important traditional institution, and its relevance for our discourse and across Indian history.

Panchayat, the (former) Council of Five

Panchayats are traditional form of local government, that had historically both executive and judicial functions. Land was distributed to the peasants by the Panchayat, that was also responsible for taxes' collection on behalf of the government. The Panchayat could then keep a share of the collected taxes for itself and the village (Nehru, 1964).

History of Panchayats is ancient as India: they existed before the arrival of the Mughal Empire, they were considered highly important and endowed with a variety of tasks, spanning from justice administration and controversies solving, to providing free education. The relevance of the Panchayats emerge if we take into consideration the numerous political phases and transitions that characterize Indian history: local forms of government and organizational structures had more chances to survive to the political changes, to new rulers and new sets of laws, being directly interfaced with the needs and requirements of the population, and preserving their fundamental complicity with it.

In the late XVI century the Mughal Empire introduced the role of the tax collector as someone who didn't belong to the community, subtracting this relevant function to local control. During the XVIII century the East India Company worsened the separation between the community and the administration of its own resources, eroding some more the role of Panchayats with the introduction of an authority in charge of keeping the local population registers, therefore the tracks of how much each family and village owed to the state in terms of produced wealth.

After the Mutiny (1857) the British Rule started to invert the process of Panchayats' relevance suppression, limiting their powers but still leaving them to be established and develop when local communities required it. In Gandhi's vision, Panchayat had the function to maintain, spread and also

teach democracy at a local level, instilling the sense of representation and control over the rulers that had been frustrated in the decades of the British Empire. Gandhi faced many opponents in this respect, who supported the idea that rural institutions were a legacy from the traditional past, that new independent India had to get rid of. The existence of Panchayats was eventually inserted in the Constitution of independent India only in the section dedicated to the general principles, without any reference to its functions nor to its position in the context of the federal asset of the republic (Metcalf and Metcalf, 2004).

Since the Seventies, several laws and resolutions have been approved by the Indian Parliament in the direction of re-attributing some core functions to the Panchayats, until their final reintroduction as possible local government organizations. In the context of contemporary India, centralized decisions taken in favour of structures aimed at de-centralizing political decisions represent a surprising and unprecedented event.

The new organisms, Gram Panchayats, are elected in proportion to the number of inhabitants of the village, after an authorization to their formation released by the local closest federal authority. The Panchayat keeps its historical name but its members may be more than five, and at least one third of them must be women. At least in principle Panchayat elections are independent from political lists, and as it happens for general elections, all castes and tribes must be fairly represented. They remain in charge for five years and their responsibilities and duties are to be negotiated with the federal authority. According to local requirements and needs, they are organized in structures of increasing size and responsibility, eventually interfacing directly with the regional government. In 1992 a government resolution empowered Panchayat with the extra relevant role of ‘local development promoters’, endowed with a list of precise tasks including industrial promotion (Metcalf and Metcalf, 2004).

Due to the federal structure of Indian republic, the relevance and tasks and density of Gram Panchayat varies significantly according to the regions. In Karnataka the relevance of the Panchayat is particularly high, being almost six thousands spread on several administrative levels.

In 1997, Keonics passed the control of the IT infrastructure over to an elected assembly representing active industries, Electronic City Industry Assembly, which was configured as a village Panchayat, i.e. corresponding to the smallest village-level local organization.

Electronic City is one of the 240.000 Gram Panchayats in present India.

At this stage of the events, the development of the City Bangalore starts overlapping with that of E-City. In the last decades, Bangalore has experienced a huge growth in terms of population, extension, services and job offers especially in the IT-related sectors of the job market. The city limits have progressively expanded in the direction of E-City until today's situation, when it is virtually impossible to distinguish Bangalore from its former suburb. As a consequence of its expansion, the city of Bangalore has acquired the status of Large Metropolitan Area, newly named Greater Bangalore, according to Indian rules applying to metropolis with over one million citizens. In 2012 the Council of Greater Bangalore has voted the inclusion of Electronic City in its metropolitan area, and here we place the start the next step of our discussion.

Intersections

Electronic City Gram Panchayat has immediately opposed its refusal, still holding, to the inclusion in Greater Bangalore metropolitan area. The ultimate decision on the legal status of E-City will be eventually taken by federal authorities, but as the controversy develops we can observe a few topics acquiring general relevance in our perspective.

The opposition of E-City creates the premises for an unprecedented kind of alliance between a traditional rural institution and an association of rampant industry IT managers. How was this possible? Bangalore has been building its modern image over the idea that technologic development has the power to drag along the citizen's emancipation. A widely diffused rhetoric connects the high average income of the Bangalore residents to the overtaking of the traditional forms of production characterizing the entire metropolitan area, now devoted to services and tertiary economic sectors. Bangalore is the effective capital of the Indian Silicon Valley, and E-City is perceived as just its engine. The inclusion of E-City into Bangalore metropolitan area is a fact that is already taken for granted, not a topic to be put under question by the vast majority of people living in the metropolitan area, and also in the rest of India.

The opposition to the inclusion posed by E-City Panchayat opens a space for discussing the general role of institutions in fostering processes of technological development. On one side, local forms of government are still perceived as a legacy from the tradition, keeping their relevance only in those issues where a close vicinity with the population may result in a more

specific capability of interpreting needs and understanding specific local features. On the other, technological development is the main factual and rhetoric topic used by all political sides for launching India into modernity, bridging the gaps between rural and metropolitan areas, connecting IT Indian professionals with the rest of the world: therefore, technological development is typically perceived as a non-local issue. Finally, recent laws have involved local and small administrative structures like the Panchayat in the non-local issues of development. Clearly, something more has to be unravelled about the relation between modernity and locality.

The official reason for the oppositions claimed by the Gram Panchayat are indeed clearly stated, and can be traced both in the deposited and public documents: the taxes collected in favour of the Grater Bangalore Council would be higher than those owed to the local Panchayat. In change of the higher costs, the metropolitan area would guarantee to E-City an efficient water distribution, preventing office buildings and facilities to run out of water, not just in the dry season, as it happens on almost regular basis. It would also guarantee an adequate electricity supply. E-City electricity consumes are higher than city averages, for obvious reasons: on the other hand there is an on-going polemics in E-City about the waste of pubic power performed by Bangalore public administration for non-relevant reasons, such as monuments and public buildings nightly illumination.

The construction of main roads and related infrastructures connecting the two cities has been founded so far by Bangalore City Council, showing the existence of good background relations; but a most recent episode in the political clashes was the refusal opposed by Bangalore City Council to the request of planning a new airport construction closer to E-City, being the existing one located north-east of Bangalore, distant over two hours drive. On the whole, the administration of resources results to be a crucial controversial ground, reproducing a well-known dynamics between local and centralized institutions.

Conclusions

Finally, I want to pose a more relevant consideration on the circumstances that might foster the enhancement of science and technology. The question at stake here is whether a Science and Technology Park is the most suitable infrastructure for pushing forward such development, and whether programmed cooperation and interaction among different institutions turn up to be scientifically productive in the

long term. In my observation of the Indian context, I have noticed a rather different, though effective, process. As previously underlined, the interchanges and cross communications in E-City take mainly place in a spontaneous and unorganized way; the evolution of such a picture is possibly realizable only in specific social contexts, like the Indian contemporary one, and cannot be considered properly as models. All networks and informal relations in E-City are made possible by a certain lack of central efficiency (and lack of trust in them) and, at the same time, by a very fast growth in population, opportunities and money. This rapidly changing scenario can be better understood with a nonlinear and maybe complex explanatory pattern, fitting perfectly an unplanned development process. In this effective, though simplified picture, the Panchayat and the association of corporate managers seems to play the same game in opposing the slow gigantic bureaucratic administration in India, including that of a would-be Technology Park.

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