Teleworking and Teletrade in India

Combining Diverse Perspectives and Visions

The rapid spread of information technology combined with the deregulation and upgrading of telecommunications in virtually all countries has given considerable impetus to outsourcing or delocalisation of work. This is happening within and across national boundaries and has been described as teleworking, taking different forms. The development of teleworking represents a convergence between a number of different trends, many of which have major implications for environmental, social and economic policy. How industry, the governments, the policy-makers respond to these changes will seriously impact on the future of the economy, on the employment possibilities as well as the quality of work-life of people.

Swasti Mitter

The Authors of this collection are part of a globally distributed team. Over a period of 28 months (July l997 – September l999) the team has explored the potential employment opportunities which telework could create for traditionally disadvantaged groups, such as women, and for poorer countries, such as India. The research focused on three cities of India: Mumbai, Bangalore and Calcutta.[1]

As part of the research exercise, at the hill station of Lonavala, near Mumbai, on June 17-18, l996, potential research partners from different sections of Mumbai's civil society [Sasikumar and Ramani l996] debated and reflected on the priorities of the project and the need to take into consideration the questions of equity and efficiency. It will be difficult, researchers agreed, to introduce and to encourage 'teleworking' until and unless it is proven commercially profitable. Yet, at the same time, there were concerns that the criterion of profitability alone would not necessarily improve the quality of the working lives of the majority of people. This tension between commercial profitability and social equity permeates the writings of the authors of this volume. At Lonavala in l996, Veena Poonacha and Parvati Rajan voiced some of the concerns that crucially conditioned the research questions for the project [Poonacha and Rajan l996]:

> ...due to the prevailing notions that home-based work is essentially women's work, it is likely that companies adopting telework systems would prefer women. Part of the reason for this preference could be notions that women are more docile and less likely to unionise or demand better wages.
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> Women too might be tempted to opt for telework as it enables them to manage their multiple roles effectively. While the system provides women with the possibility of managing their homes and earning a living, there is a danger that their contribution to society will remain invisible. It would not challenge the existing gender inequity in the home; or the prevailing stereotypes that domestic work is essentially women's work.

Sujata Gothoskar similarly observed [Gothoskar l996]:

> Collective action plays important functions. When your work affects your health, when inflation eats into your wage, you can and do raise these issues collectively. If, on the other hand, you are working alone in a far-off distant suburb of the city or town, how do you get your concerns through to people who make the decisions about your work-life?
>
> Another aspect of collectives is the growth of your personality through sharing of experiences, information and knowledge. What are the possibilities for us? What sort of training is available? How can one access such training?
>
> In the current climate of what Swasti calls 'privatisation, deregulation and adulation of the market economy', when the emphasis is on the individual devoid of collective identity, isolation of women is all the more scary as the basic vulnerability of women as women and as workers has in no way changed for the better.

Women's perceptions of telework, in general, were less optimistic than those of Ramani, who believed that telework could ease the pressure of unplanned urbanisation and create new niches for poorer countries in the global market for software. In the light of the experience of Mumbai – a city of nearly 10 million commuters, where it takes on average two to three hours to travel to the commercial centres, and where rental costs of property are as high as in Tokyo or New York, he asked pertinently:

> An important question that arises, therefore, is: "Does teleworking have the potential to alter the current pattern of urbanisation in a country like India?". Cost of real estate, problems of housing faced by the staff, the strain on the city's infrastructure,

The contribution of Swasti Mitter and Sujata Gothoskar in collating this collection of papers is gratefully acknowledged. *–Ed*

> have already made India's software industry turn its back on cities like Mumbai and go to Bangalore. It is not, however, clear that Bangalore's own infrastructure can absorb much more of this [Ramani 1996].

It is in the light of the conflicting interests and complex concerns of the stakeholders in Mumbai, as well as those of Bangalore and Calcutta, that I subsequently formulated the research questions and agendas for the project. My role was to synthesise the visions, aspirations and findings of the researchers that I had the privilege to work with. This essay reflects this role.

I
What is Telework?

'Tele' means distance. The term 'telework', strictly speaking, thus, means 'distant working'. In practice, however, it refers to a specific mode of distant working, whereby employees or freelancers offer their services, using telematics, on a site which is geographically separated from the main office. 'Telematics' refers to a combination of information and technologies which connect the computers of employees or freelancers to the computer of the main employing organisation. In the language of the emerging information society, teleworking involves working from distant premises on-line.

In Europe and in the US teleworking initially implied working from home. The term 'teleworker' then gradually came to include mobile workers, such as sales people, or those who work on multiple sites, such as maintenance workers. Freelancers, such as journalists, who make use of 'business centres' or 'shared facility centres' to connect to the premises of their customers also came to be described as 'teleworkers' [see various essays in Jackson and van der Wielen l998]. The common characteristic of all these different modes of working is that they increase the flexibility in the location of work and reduce workers' commuting time. The term 'teleworking' is thus often used interchangeably with 'telecommuting'. As it opens up the possibility of moving the sites of work away from high rent city centres, this form of work is often assessed from the point of view of the corporate sector, urban planners and employees. Again, teleworking or telecommuting, at least potentially, offers women and men an opportunity to combine family with career.

The spread of 'telecommuting', even in the west, has fallen short of the wild predictions made in the 1980s and 1990s. Even with the falling price of computers and telephone connectivity, employing organisations still primarily rely on on-site workers. Senior executives, working from home, say in the evening, with a lap-top and modem, will not see themselves as 'teleworking'. Again, in the corporate sector, managerial exigencies often run counter to technological possibilities. Personal interaction and direct supervision are still considered of vital importance. Employees too, and particularly women employees, do not accept the notion of working from home without worries. There is thus a resistance to the externalisation of work, both from the employer and from the employee, with the help of telematics. This resistance is visible in the west, but is even stronger in India, where the management culture is still oriented towards direct supervision and strict monitoring [Rajan, this volume].

Even in Europe and in the US, telematics-assisted externalising of work is more relevant to geographically dispersed offices than to home-based employees. It is becoming customary to decentralise or delocalise back-office functions of a company to a different site. Call centres, likewise, are becoming major institutions for providing customer services to companies; these centres, again, are located away from the company's main premises but are networked to it by telematics. It has been predicted that in some advanced countries, as in the UK, by 2001, one in 30 people will be working from call centres ('End of the line: call centres, Britain's new sweatshops', *The Independent* (news paper) magazine, January 2, l999). The trend is visible in Malaysia. In India, too, call centres are appearing in cities like Mumbai or New Delhi. It is, likewise, becoming common for companies to outsource a section of work to a vendor company which is connected to it by telematics. Internet kiosks are also becoming a site for delivering services, by minuscule entrepreneurs, at a distance from the customers. 'Tele-networking' among firms, rather than 'telecommuting', is becoming a more common mode of externalising work by companies.

Externalisation and delocalisation of work, using information and communication technologies, is not confined to national boundaries. Digitalisation of information makes it possible for a number of service activities to be relocated across national boundaries, where property prices and/or salaries are low. This international telework involves, in essence, trade in information services. We refer to it as teletrade.

The relatively low salaries of quality programmers in Bangalore, for example, is one of the major factors contributing to its success in attracting outsourced work in the field of software services from Europe and the US. These programmes are, in effect, composed of 'distant' workers of subcontracting companies abroad. Indeed, the study of three cities – Mumbai, Bangalore and Calcutta – shows that, in India, the concept of telework is more commonly understood in the context of internationally outsourced work in software services or remote processing than in the context of telecommuting. Yet, as the sectoral studies in Mumbai indicate, the picture may radically change in the near future.

The research team decided to investigate the trend and prevalence of national telework within the confines of Mumbai. Still a new concept, the team felt that teleworking as a practice was most likely to take root in Mumbai, which has the best telecommunications infrastructure in India and a vibrant global business environment. In order to assess the trend in India's share in international telework or teletrade in software and related services, the team decided to make Bangalore and Calcutta the focus of investigation. The well-publicised success of Bangalore – which we call the 'Bangalore phenomenon' – made it an ideal city to study the opportunities and challenges that cities in India face in attracting and retaining new service sector jobs. Calcutta, in contrast, represented a case where its abundance of knowledge workers did not guarantee a success.

Types of Telework: National and Transnational

Terms such as telework or teletrade are still fairly unfamiliar in India, even in megacities. In our project, the researchers needed to explain the meaning and the implications of the terms to interviewees in each of the surveys. In many quarters, interviewees had never heard of the term. Types of teleworking, as understood in Europe or in the US, had to be the starting point of our investigation. The categories were modified in the light of the surveys in order to reflect the specific developments in India. The following types of national teleworking were found significant: (1) Individualised teleworking: home-

based employee or homebased freelance; (2) Institutional teleworking: satellite offices, customer care service centres, or call centres.

For transnational teleworking or teletrade, software services and remote processing work were the main focus of our study. The types of links between the foreign and Indian companies that provided the context of our analysis were as follows: (1) Indian subsidiaries of foreign companies: offshore operation; (2) Joint ventures between foreign and Indian companies; offshore operation; (3) Large and small Indian companies; outsourced network operation; (4) Small- and medium-scale Indian companies; outsourced or networked operation.

We found that the growth of teleworking and or tele-networking of various types in India can be explained as much by technological as by market considerations. These involve: advanced hardware and software; ascendancy of e-business and e-commerce; and increase in outsourcing and delocalisation.

The internet lies at the heart of geographically distributed work. It is a versatile tool because, unlike fax or telex, it allows interactive communication. It is also far cheaper to use than communication tools such as telephones. Teleworking is the vehicle of business-to-business transaction in digital information carried through the internet, a major component of e-commerce. There is now a consensus that the volume of business on-line globally will soon dwarf purchase of products on-line.

> In the US the current $114 bn business-to-business sales of digital information, for example, will expand to $1.5 trillion by the year 2003. In contrast, the e-retailing or on-line shopping will grow much more slowly, from $12 bn this year to $41 bn in the year 2002: a fraction of the forecasts for e-business.

(Electronic Business: Financial Times Survey; *Financial Times*, Wednesday, October 20, l999).

Teleworking reflects the increased flow of such digitalised business information, through the internet and intranet, among the 'core' and networked companies.

The growth of telecom networks and advanced switches has made teleworking and e-business in information processing simple and often cheap. The technological possibilities, particularly of the internet, have given a boost to 'downsizing' and 'lean management'. The trend is to delocalise or outsource work as much as possible in order to keep the size of the 'core' company small.

The advantage of establishing networks with outsourcing companies, through teleworking, are weighed against the advantages of sending out work to satellite offices and home-based employees. Management is often concerned with the loss of control over quality, as well over the timing of the delivery while outsourcing. Interviews with senior managers and human resources development professionals identified the optimism of corporate management, and its concern regarding various forms of teleworking.

We have also drawn attention to the tensions between technological possibilities and the regulatory framework in the structuring of the telecom market and in the adoption of telework. The case studies in the finance and in the media sector, as documented by the Bombay First Initiative, focus on this concern. Ramani, likewise, in his paper stresses the limits that the regulatory framework poses for exploiting technological possibilities. The growth of e-business in digital information – both within and across India – could for example, be greatly enhanced with the use of 'Voice over the Internet Protocol', a major development in the field. In a still highly regulated telecom market, the adoption of such technology is often delayed by the state-owned telecom companies.

The researchers in the project were deliberately recruited from a variety of backgrounds in order to lend a multi-dimensional nature to the enquiry. There were researchers from academic institutions, from trade unions and women's networks, and from civil society groups representing town planners and business communities. The background and the perspectives of the researchers were reflected in the modes of enquiry and, thus, in the findings. This paper synthesises the experience and viewpoints of this diverse group of researchers, in order to reach a balanced evaluation of teleworking.

II
Prevalence of Telework in Mumbai: Who Benefits?

It is still unusual to study the spread and significance of telework in developing countries. Without a model to follow, it was not easy to gather in Mumbai what is called base-line information on teleworking. At the initial stage of the survey, in September l998, companies in India, even in Mumbai, had not heard of telework. In the midst of, and in spite of, this unfamiliarity with the term itself, the prevalence survey quantified the direction of change in Mumbai's industries that contributed to a conducive environment for teleworking. These are: organisational innovations, with increased trends in outsourcing and delocalisation of work; technological innovations, with enhanced use of computers, web technology and telecommunication links; and changing industrial structure, with a faster rate of growth in new, computer-related sectors, than in the traditional ones.

In spite of this environment:

> ...in the sample, only 10 out of 1000 employees were home-based workers, seven out of 1000 were mobile workers and 11 out of 1000 were back-office workers. These figures are for Greater Mumbai, which is India's financial capital. This is the city that one would expect to begin to innovate in terms of a teleworking culture. The prevalence of teleworking in India, generally, therefore, would be much lower that that in Mumbai and in many regions even negligible (Irani, Gothoskar and Sharma, this collection).

The low figure for 'teleworking' registered in the prevalence survey, may reflect lack of familiarity with the concept of 'teleworking'. It is not a term frequently used in India, even in Mumbai. The term often needed to be explained to the senior managers of the companies interviewed. This low prevalence of home-based work is somewhat startling as the sample of the survey was deliberately biased towards big establishments, and towards emerging sectors, such as software, that are likely to adopt teleworking.

The qualitative case studies in three selected sectors, likewise, explored the trend and prevalence of telecommuting in Mumbai. The sectors chosen were media, software and finance. Again, the sectors were chosen as they are most likely to adopt teleworking. The insights gained from interviews with the senior managers confirmed the findings of the prevalence survey. Home-based teleworking is very small in Mumbai. The concerns of the managers centre on possible inefficiencies that may arise out of: lack of supervision; lack of personal contact; and lack of secrecy of sensitive information.

The qualitative case studies, based primarily on interviews with the senior management of the companies interviewed, complemented and often confirmed the

findings of the prevalence survey. In spite of some general trends, it transpired that in the media sector: home-based teleworking is negligible, but there is a potential for its spread if the infrastructure could be improved; employees and freelancers most frequently use, for 'distant work', cybercafes, telecentres, telecottages or computer centres; teleworkers primarily use the internet and intranet, for key functions such as submitting news reports and for co-ordinating TV programmes; and web technology and web sites are commonly used to advertise for, and to improve, communication, with the 'distant' clients.

> As Nalini Vaz record (in this collection): Not many reporters use teleworking currently. Those who have computers at home key in their stories at home and send them across through e-mail. One can work from home, make the necessary telephone calls, meet people and get the information. In this way a lot of time is saved going to the office. Then there are those who do not have a computer at home. A reporter said that a colleague of hers who stays at Vikhroli (a suburb of Mumbai) went home after covering a function, went to a computer centre and sent in her story from there. In this way a lot of commuting time was saved which would have been spent travelling all the way from Vikhroli to Prabhadevi.

We found that the use of telemediated distant work takes a different trajectory in the finance sector. The emphasis is not so much on connecting individual 'distant' employees to the core office, as on establishing connectivity among employees and/or traders of the same company, operating from decentralised sites. The qualitative survey of the finance sector highlights organisational innovations that are becoming prominent in initiating such connectivity. These are: service centres, in which customer care services and back office functions get decentralised, minimising commuting time for the customers and for employees; and networking organisation, in which satellite offices of the registered traders get connected to the 'core' office with the help of cost effective ICT technologies such as very small aperture terminals (VSAT), as in the case of the National Stock Exchange.

The qualitative survey, thus, points towards the spread of 'tele-networking' rather than 'teleworking' in the finance sector. The reasons, perhaps, lie in the nature of the business. The need to ensure the secrecy of sensitive information in the financial sector makes the companies cautious about relying on individual 'externalised' workers.

We learnt from the qualitative case studies that the forms which teleworking assumes depend much on the nature of the services provided, as well as on the size and ownership of the companies studied. In the software sector, Datamatics, for example, has some 600 home-based workers, of which 98 per cent are women. The company which began with ten home-based teleworkers in 1990 has expanded both internally and externally. Datamatics consciously recruit women in order to 'use the latent pool' of skilled women. The major activities that these women undertake are not in the field of software services but in the areas of electronic publishing and back office processing. These activities are less complex and need comparatively little monitoring.

The permanent staff in their 'core' office engage in high value added operations such as data warehousing. The case studies in the software and data entry sector, thus, indicate that home-based telework is feasible, but mainly for tasks that need little monitoring.

Limits to Home-Based Work

In summary, home-based teleworking is still viewed with circumspection by companies in Mumbai on the following grounds: it makes it difficult for the company to ensure the quality of the services and the delivery time; it erodes the advantages of face-to-face interaction, which generate competence on the one hand and company loyalty on the other; and it makes the task of evaluating the performance of the employees difficult within the accepted and current pattern of management traditions.

The surveys, nonetheless, indicate a burgeoning trend in promoting home-based work, which allow companies to use certain categories of employees effectively and profitably. These are: working mothers; media reporters or salespeople; employees who have to work unsocial hours; and researchers who need to avoid distractions. Although not yet widely prevalent, there is, according to management, a scope and need for tele-based homeworking in Mumbai, which could have potential beneficial aspects, especially for women.

The perception of telework was not, interestingly, uniform. As the senior management of companies interviewed point out, women do not always prefer to be home-based workers. It is not only young middle class women, working in the glamorous media sectors, who like to go out to work. Mothers with young children, and disabled people too, often express their need to go out to work in order to avoid loneliness and alienation. For employers, the question of secrecy and the protection of sensitive data also acts as a deterrent to hiring home-based teleworkers.

The surveys have highlighted in detail the significance of an efficient infrastructure. They have also documented the cultural, psychological and social factors that condition employers' attitudes towards home-based telework. Parvati Rajan's report and essay complement the above surveys and shed light on the importance of organisational changes and training in making home-based telework a success:

> The idea of teleworking would take some time to get used to in India and therefore would require a slow, gradual and well-planned transition. It can be applied to certain types of jobs, after taking into account their characteristics...Suitable systems of control for ensuring employee productivity, assessing overtime payments and managing employee accountability would be needed. Training programmes would have to be planned to equip the employees with skills necessary for teleworking. Special emphasis would be needed with regard to computer-related skills. Organisations would need developmental programmes to bring employees together and motivate them, provide interaction so that the employees have a sense of belonging to the organisation and are able to identify themselves with the organisation (Rajan, this collection).

On the basis of her interviews with human resources development professionals, with professional trainers and with the students of IT and management in Mumbai, Rajan identified occupations where, with adequate support and preparation, home-based teleworking could become a feasible mode of work. The education and training in formal institutions of learning, as she points out, need to be geared to producing employees with time management skills, the ability to work in isolation, and to handle assignments independently.

These skills are expensive to acquire and beyond the means of the majority. Nonetheless, they will contribute to corporate efficiency and to the quality of working lives of a certain section of the community. The acquisition of these skills is, however, unlikely to contribute directly to democratising the benefits of ICTs to disadvantaged groups. The initiatives, to give competence in requisite skills to elite

workers, at the formal institutions of learning, could nonetheless also be the basis for formulating relevant courses to enable non-elite employees to take part in teleworking. S Ramani dwells on the possibility of a partnership between SNDT Women's University and NCST: two prominent institutes of technical and business training in Mumbai [see Swasti Mitter, l999, Telework, Teletrade and Sustainable Development: The Synthesis].

III
Can Bangalore Phenomenon be Replicated in Calcutta or Elsewhere?

Teletrade in software services features prominently in discussions on international outsourcing to developing countries. Bangalore has been particularly successful in gaining a sizeable share of such internationally outsourced software services work. For the poorer regions of the world, the Bangalore phenomenon has become a symbol of optimism. It is now viewed by technocities in India, and in the neighbouring countries, as a model to emulate in their search for a niche in the globalised information economy.

Against this background, we evaluated the prospects of two Indian cities, Bangalore and Calcutta, in the market for export-oriented on-line work, especially in software. Jane Millar assesses the factors that would ensure a sustainable growth in exports from Bangalore which is, at the moment, recognised as the IT capital of India (Millar, this volume). Calcutta, on the other hand, is a newcomer, and has yet to make an impact. The case study of Calcutta (Swasti Mitter and Asish Sen) to explore the possibilities of replicating the Bangalore phenomenon on the strength of its abundance of cheap 'knowledge workers'.

Despite the success of software firms in Bangalore, the future of the city in teletrade, as our research indicates, is far from assured. The lingering lack of trust in the quality of services, as well as the inadequacy of infrastructure, still limit the scope of offshore outsourcing to Bangalore from the US and Europe. The major portion of outsourced work requires the on-site presence of Indian consultants, and contributes comparatively little to capacity building in India. The ratio of offshore to on-site work for companies in Bangalore is changing, particularly in response to technological changes that make transnational communication cheap and reliable. Yet, with the current ratio of 40 per cent or more of services being delivered on-site, most Indian companies have a long way to go to move up the value chain.

The message from the case studies documented by Jane Millar (this collection) is clear:

> The market for software services is dynamic and unpredictable, so that firms, in order to survive, need to be agile, flexible and responsive to client demands. To this end, firms have to forge close alliances with client firms, develop the capabilities to learn from these relationships, and feed the lessons learned back into production.

The sustainable success of Bangalore depends also on its ability to withstand competition from the newcomer cities in India. In this respect, the image of the city counts. Bangalore is often selected over other cities for three main reasons: it provides a 'Silicon Valley' style of competitive environment that is centred on technology, as opposed to Pune's business-oriented culture; the high quality skills that are available in Bangalore; and the location is attractive; this factor assists in quality recruitment. Yet, there are grounds for concern as well. Overcrowding, soaring property prices, environmental pollution and a rise in the salary of programmers have recently signalled worries about Bangalore's further growth (Millar, this collection).

Calcutta lags behind not only Bangalore, the first mover, but also behind newcomer cities, such as Hyderabad, the capital of Andhra Pradesh, in enticing investment from foreign companies or from large Indian software houses. Small and medium scale enterprises (SMEs) are numerically dominant in the science and technology park of Calcutta. The 'brain drain' of engineering graduates from West Bengal to other States in India and to the US also contributes to a scarcity of requisite skills.

Material factors count as well. Yet, as Mitter and Sen (this volume) postulate, the question of image is also relevant. The negative image of a polluted city, with a history of trade union militancy, counteracts the positive features such as political stability and the friendliness of local people. Calcutta – mockingly described, by non-Bengalis in India, as the capital of the Soviet Republic of West Bengal – receives inadequate mention in IT policies and colloquia even in India. Calcutta, consequently, fails to acquire visibility in the global market for software.

To counteract the consequences of a stereotyped image, the report by Mitter and Sen advocates the marketing of Calcutta as a propitious site for the location of large Indian or multinational companies. These companies could revitalise the base of the industry in which SMEs could start and thrive.

The difficulties of obtaining start-up capital for SMEs of Calcutta stand in sharp contrast to the ease with which bigger established companies in Bangalore, such as Infosys or Wipro, can raise capital on the stock market (Ramani, 'IT-enabled Services', this collection). The functioning of the capital market poses a challenge to SMEs. The research suggests ways of circumventing this factor, and recommends the launching of government-supported venture capital funds for assisting small and medium-sized companies (Mitter and Sen, this collection).

It is in the context of concerns for the small- and medium-scale enterprises that the role of the non-resident Indians (NRIs) becomes significant. In Calcutta, the NRIs are the major source of capital when they return home from a long stay in the US or Europe (Mitter and Sen, this collection). In Bangalore, too, it is the expertise and capital of expatriate and 'returned' Indians that have often led to the successful launching of software companies (Millar, this collection). The concept of 'brain drain', thus, requires some fresh assessment. The global movement of labour, with few cognitive skills, from poorer countries to richer ones, evokes the fear of an erosion of the skills base. But there are beneficial aspects of this mobility as well. These are particularly prominent as the companies increasingly seek expertise on the line-of-business (LOB) as much as those on the line-of-technology (LOT). The combination is viewed as essential for structuring their strategies and organisation for a greater share of the global trade in software services. The NRIs provide strategic links between Indian vendors and their out sourcing companies and, as our research shows, thus play a significant role in forming a globally distributed network of companies.

Software or Remote Processing?

It is necessary to take into account the historical and cultural specificities of the host cities studied in order to understand the nature and direction of transnational telework. What is desir-

able or feasible in Bangalore is not so in Calcutta. The exploration indicates that for a city like Calcutta, which has a high rate of educated unemployed, a better strategy for the policy-makers would be to encourage business in remote processing. With a predicted total value of US$1.9 billion of internationally outsourced remote work coming to India by the year 2007, Calcutta could fare better in this field (Table 1).

These areas will create greater employment per unit of capital and open up opportunities for women and men who are not as globally mobile as software programmers. Calcutta, in the form of educated unemployed, has a surplus of 'knowledge workers' who could be absorbed in these other forms of IT-enabled services. Yet, as the fieldwork on Calcutta shows, the city also needs a healthy and growing software sector in order to ensure generic skills that the software sector alone could create.

The question of education and training becomes important in the context of teletrade, both in software services and in remote processing. Since IT-enabled services cover a wide range of processes and products, it is difficult to generalise about training requirements. The fieldwork at the company level gave some insight into the types of skills that the software companies require and train for in order to cater to the needs of the global market (Table 2).

In the case of remote processing work, the requirements of training are not as demanding as in the case of software. The skills required depend on the nature of services that the vendors provide. Our research has focused mainly on medical transcription for US doctors and data processing work for airline companies. A familiarity with cosmopolitan culture and American accents are considered as important as numeracy and literacy, including computer literacy (Ramani, this volume).

The possibility of generating employment through transnational networking thus depends on education and training to create the requisite skills. However, the skills include not only technical ones but a familiarity with the scope and culture of the market. Policy-makers in Maharashtra, Karnataka and West Bengal will need to assess to what extent the private sector and on-the-job training could be relied upon for an adequate supply of requisite skills.

IV
Teleworking: Windows of Opportunity for Women?

Home-based teleworking, is still not a common phenomenon in Mumbai, except that in certain companies, highly skilled architects, lawyers, IT personnel, or top executives opt to work from home, either for a number of days a week, or in the evenings on-line. There is also some evidence of the emergence of 'virtual offices' where the employees come to the office only for meetings, but work primarily from home with a computer, modem and cellular phones. This is a world of relative privilege, in which employees do have an option.

A comparatively larger number of employees, however, incline to home-based teleworking as a solution to conflicting demands in their lives. They have less choice. Understandably, women's approach to telework is more complex and personal than that of men. The social pressures of having to balance the demands of family and career, often bring them to take up home-based teleworking. In the process, their employment status, in many cases, changes from that of full-time employee to freelance consultant. The freelancer faces the problem of insecurity of work and gets excluded from benefits and pensions. Yet there are compensations, in terms of flexibility in time, and the opportunity to be with the children:

Sarita, also a freelance researcher, has been teleworking for 6 years now. She is mar-

Table 1: Remote Processing in India

IT Enabled Services	1998-99		2008 (Projections)	
	Employed	US $ millions	Can be Employed	US $ millions
Back office operations/Revenue accounting/ Data entry/Data conversion	9,700	97	2,60,000	4,370
Remote maintenance and support	1,600	15	1,80,000	3,105
Medical transcription/Insurance claim processing	3,800	32	1,60,000	2,530
Call centres	1,400	9	1,00,000	1,380
Database services	1,000	10	1,00,000	1,495
Content development	5,500	62	3,00,000	5,750
Total	23,000	225	11,00,000	18,630

Source: NASSCOM, India, 1999.

Table 2: Training for Skills

Course Provision	Content
Technical programming	Cobol, RPG400, C++, OOP, C, Web Programming, Java, Visual Basic, Power Builder, Windows/GUI Basic, GALAXY, Ms Visual C++, DB2, ORACLE, IDMS, SYBASE, RDBMS, CICS, Informix, MVS, JCL. OS400, UNIX, X-WIN/MOTIF.
Software professional	Database Tuning, Oracle Tuning, Networking Principles, Computer Hardware and System Software Concepts, BSD Socket Programming, Client Server Concepts, Basic N/W Concepts.
Software development process -related	System Development Methodology, Data Modelling, Project Management, Testing, Object Oriented Design, Process Modelling, MS Project, Configuration Management, Object Oriented Development Process, Integrated Requirements Management.
Business-related	Manufacturing Systems, Distribution and Logistics Systems, Order/ Shipping/Billing Systems; Financial Services Systems, Insurance Systems, Retail Systems.
Inter-personal skill development	Managing Customer Satisfaction, Facilitating Innovation, Leadership Skills, Team Building Skills, Negotiation Skills, Appraisal Skills, Recruitment Interviewing Skills, Oral Communication, Written Communication, Presenting Skills.
General	Time Management, French, and Japanese.

Source: Jane Millar, interviews in Bangalore, l998.

Table 3: Appraisal for Skills

Skills reviewed	Details
Technical	Quality, Planning and Practice, Estimation Skills, Analysis, Architecture, Design, Programming, Testing, Technical Knowledge, Technical Documentation, Application Knowledge, Project Planning
Personality	Oral Communication, Written Communication, Team Work, Leadership, Decision Making, Initiative and Innovativeness, Bottom-line responsibility, Tolerance for Ambiguity, Complexity and Uncertainty, Learning and Analytical Ability, Organising and Planning Ability, Adherence to Targets, Positive Attitude, Values, Attention to Details, Performance Reviews.

Source: Jane Millar, interviews in Bangalore, 1998.

ried and has two young children. She has consciously chosen to telework which saves the time she has to spend not only travelling, but also in routine work which is essential in an office setting. 'There are problems as well. You may not get work for a couple of weeks and then get three assignments at the same time. You do not have the heart to refuse as you have just spent 4 anxious weeks waiting for work and anyway, your choices have precluded any pension benefits coming your way. So you not only have to be able to live on your earnings, but also make provisions for the times when you may not be able to for some reason or the other. Then you tend to spend up to 18 hours or more a day working. Often this leads to your losing the precarious balance you have attempted to achieve in your work and private life [Gothoskar, this collection].

In India, in terms of numbers of employed, the role of women in the digital economy has become more marked in on-line export-oriented information processing work than in telecommuting. In contrast to developed countries, it is teletrade or transnational telework that gets greater coverage in business magazines and newspapers than home-based telework. Of the three cities that we have studied in the project, neither home-based telework nor collective forms, such as call centres, have been widely prevalent. The use of telematics for externalising work to satellite or subsidiary offices has been adopted in sectors such as the media and the finance sector, but the extent of the adoption is yet rather limited. In contrast, large, medium or small companies have emerged around cities like Mumbai, Bangalore and Calcutta in work such as medical transcriptions or data entry. There are subsidiaries of multinational companies, particularly of airline companies, that undertake back office functions for core companies in the US and Europe, in the Santa Cruz Export Processing Zone in Mumbai. The wage differential between India, the US and Europe, and the difference in time zones between the US and India, make the relocation of work to Indian cities inevitable. India and the medical transcribers in it work when the doctors go to sleep in the US. The average wage of a medical transcriber in India is $1200 per annum compared with that of $25,000 in the US.

Internationally outsourced jobs, such as medical transcription work or software services, do make a considerable difference to the lives and career paths of women.

In software, as the surveys in the project reveal, women enjoy preferences on a scale that they never experienced in any other field of engineering and science. In India, women occupy 19 per cent of professional jobs in the software industry. In Calcutta and Bangalore, the figure is higher than the average for India. In both of these cities the proportion of women varies from company to company, and it is not unusual to find women occupying 20 to 25 per cent of professional jobs. Neither in Bangalore nor in Calcutta did the researchers find any evidence of discrimination, either at the point of recruitment or in career progression. In some cases, companies preferred to recruit women as the attrition rate among women is lower than that among men.

Women receive a very large proportion of remote processing jobs. In Mumbai, in large subsidiaries of multinational airline companies, for example, 60 per cent or more of the employees are women. The salaries, at Rs 5,000 (US $ 100 approximately) per month for a trainee, are good by Indian standards. The work is repetitive but clean. These jobs give fresh opportunities and freedom to a new generation of urban women. The potential is particularly welcome in a city like Calcutta, where the rate of unemployment is dauntingly high among the educated youth. It is difficult to estimate precisely the number of women recruits in remote processing work. But, on the basis of the micro case studies in cities like Mumbai or Calcutta, one can safely assume that it is growing at a rapid rate. NASSCOM predicts the total employment in this sector is going to be far above one million by the year 2007 (Table 1), with women forming the majority.

A number of factors have contributed to the position of women in the IT-enabled services and information processing sector. A worldwide shortage of requisite cognitive skills is one of them. Expanding internet usage and electronic commerce are leading to increased demand for 'core' IT workers such as computer scientists, engineers, programmers and system analysts in OECD countries. The emergence of e-commerce and the e-economy are generating new IT occupations with their own specific skills requirements. The report on '*The Emerging Digital Economy*' by the department of commerce of the United States, 1999, comments that there is now a marked imbalance in the demand and supply of IT workers at all levels of skills, widening the wage gap between IT workers and all other workers. Recruiting IT workers from developing countries alleviates only part of the shortfall. Relocation of work on-line, to countries like India, if the infrastructure does not pose challenges, offers another solution. The demographic trend of a negative or zero rate of growth in Europe adds to the process of relocation to countries such as India, where there is an abundance of youthful workers and where some of the requisite skills are twenty times cheaper than in the US or in Germany. The companies in high wage countries themselves, as a recent IDS study predicts, are proactively involved in the relocation process.

It is difficult to generalise about skills requirements, as there are so many varieties of internationally outsourced telework. One can, however, postulate that the skills needed in software, on average, are higher than those in remote processing work. Even in this fairly high value added sector, women experience relative ease of entry, particularly as the skills shortage forces companies to recruit non-engineering graduates who have qualifications in science subjects. Engineering graduates are usually males. Companies take steps in providing creche and other facilities to retain women. Some software houses in Bangalore have introduced 'telecommuting' to make it easier for women with children to be in the profession.

> As more women have become eligible for recruitment, the gender balance of the workforce has changed. In Bangalore, firms keen to retain their investment in female staff have adapted their human resource strategies in order to provide appropriate support for them. For instance at Infosys, women employees who have children can take advantage of a company run creche. Some firms, Novell Software and Wipro for instance, are experimenting with telecommuting in order to maintain the skill-levels of female workers with young children. The culture of the corporate sector is changing [Millar, this collection].

The skills required in remote processing work, although not as high as in software, are considerable. In medical transcription work, the employees are expected to be familiar with American accents and to have the background to understand and interpret medical terminology. In Calcutta, such employees generally have a degree in pharmacy.

In remote processing work as in software, it is the young women – between the ages of 21 and 24 – who find it easy to enter the profession. They are, to quote a 22-year old programmer in Calcutta, "too young and career-oriented to think of maternity leave and childcare". The recruitment procedure in remote processing work,

of the subsidiaries of foreign airlines, as Gothoskar's report indicates, favours young women and men with proficiency in English. They come from 'well off and double income families'. The age of the employees and their background makes it possible for the company not to address questions such as that of childcare.

Age and stage of life are key factors in moulding women's choice for the type of telework. In Mumbai, while young women work in the offices of foreign airline companies in the export processing zones, older women, with young children, opt for and receive home-based telework. Companies such as Datamatics receive assignments from their international clients. In turn, they pass these to women teleworkers who work from their homes, mostly online, and with their own computers. These home-based teleworkers comprise a wide range of women: housewives, doctors, lawyers, chartered accountants. All that they have in common is that they had to give up regular employment some time ago for the sake of their families. Teleworking gives them a welcome and much needed opportunity to be in touch with the world of work. Yet it is difficult to ensure that these women can progress, with adequate access to training and childcare, to high value added jobs.

Given the age and class bias, it is easy to understand why the NGOs and trade unions in Mumbai and Calcutta are sceptical about the democratic aspects of telework, and worry about 'increasing polarisation within society and within the workforce" (Gothoskar, this collection). These new types of jobs can be accessible only to the fairly well off and educated sections of society. Even jobs that are at the lowest rung of the telework hierarchy may not be available to the poorer sections. (Mitter and Sen, this collection).

V
Telecentres or Telekiosks? Democratising Benefits of ICT

The question of gender equity is closely linked with that of social equity in Mumbai. As in other metropolises of the developing world, women in Mumbai, even among the poor, have a more vulnerable position than men in the employment market. This is because, in all strata of society, women's position in the family gives them less access to economic resources and formal training. Women are highly visible in the precarious informal sector of Mumbai and, as Sujata Gothoskar's report so vividly describes, contribute to the swelling numbers in that sector (Gothoskar, this collection). This happens as the traditional manufacturing industries, such as textiles, that previously employed women, gradually disappear. In their place, the city receives new, often IT-related, industries where women get a good proportion of jobs. Yet the women who get jobs in these new industries are not the same ones as those who lose jobs in the traditional sectors.

With gradual changes in the structure of industries, Mumbai has become predominantly a service sector city. Even within the service sector, one can discern a growing polarisation in the conditions of employment between new, hi-tech, and traditional, rudimentary, service industries. This does not bode well for the social and political stability of the city. Hence, in this project, for sustainable development, we have explored the potential of telematics to offer new opportunities to relatively underprivileged groups.

In Mumbai, a substantial proportion of the workers in the informal sector, men and women, are robust, self-employed, small and minuscule entrepreneurs providing various services to the city's population. These entrepreneurs include plumbers, vendors, roadside restaurant owners or garment makers. Access to internet facilities, on a communal basis, is likely to improve the business and marketing skills of these groups by giving them: access to information on market and bureaucratic procedures; and opportunities to publicise their services to a wider clientele, who have access to internet facilities on a private or communal basis;

Communal access to the internet is useful even for self-employed professionals such as journalists or accountants. These, unlike the small and minuscule entrepreneurs of the informal sector, will have the requisite literacy skills but may not have the finance to purchase equipment and technical support, to communicate telematically with distant clients. There is thus a niche market for communal provision of internet facilities that could promote teleworking among those who are not employees of established companies. The city planners, likewise, will have an interest in it, as communal internet facilities reduce the need to commute to work. These facilities thus have the potential, as with formal telework employment, to lower traffic congestion, energy use and air pollution. Communal access to the internet could thus meet a mix of market and community demands.

In the western world, extending a teleworking infrastructure on a communal basis takes such forms as shared facility centres. In this form, a building, an office or a work centre is equipped with various information technology facilities, both for on-site work and for communicating to clients at a distance. These facilities are shared by a number of users who may be employees of different companies, independent freelance professionals or small businesses unable to afford such facilities on their own. In Mumbai, with the growing importance of the hi-tech service sector, it is likely that such work centres will soon emerge, predominantly in response to the demands of the commercial sector. In order to make them feasible and viable, the city planners need to ensure uninterrupted supplies of the high bandwidth connectivity that most professionals will need.

The users of shared facility centres are elite workers. When the infrastructure is adequate, the market alone will cater to their needs. In contrast, the institutional innovations that are required to extend the facilities of distance and dispersed work to the underprivileged, need greater involvement by donor and public agencies. The role of city planners and external agencies in democratising the use of telematics is not unique to poorer countries. In the western world there has been a strong presence of the state and other public sector agencies in these initiatives. In Europe and the US, multipurpose, multicustomer telework centres, generally known as telecentres, have attempted to meet a number of social and market-oriented objectives in high density residential areas. These are: to enhance the hands-on skills in the use of telematics by poor residents of the inner cities; to enable employers to utilise from a distance, with the help of telemediated links, low cost labour in the inner cities; and to increase possibilities for self-employment by giving access to market information to residents in the inner cities.

The spirit behind the establishment of telecentres has been holistic, as embodied in the experiments with 'Electronic Village Halls' in Scandinavia and with the telecentre in Manchester, UK [Aicholzer 1998]. In most of these experiments, there has been an understandable tension between the social and commercial objectives. In order to be commercially successful and self-financing, telecentres needed to market the facilities to entice professional or viable businesses to come and

use them. Yet, for catering to the needs of vulnerable community groups, such as immigrants and women's networks, telecentres could not rely on the market and needed continual subsidies from public bodies and external agencies.

UNDP-supported pilot electronic community centres in Egypt resemble, to a certain extent, the models followed in Europe and the US. Described as technology access community centres (TACC), the first three centres in Egypt aim to serve as the training ground for civil society groups, the private sector, and low income groups, to familiarise them with information technologies. The telecentres give the target groups opportunities to use ICT for their social empowerment, as in the field of distance education and telemedicine. These also give the target groups access to knowledge of the markets for effective participation in e-commerce (Source: http://www.undp.org:80/info21/pilot/TACC.html).

Telecentres, as a mode of offering skills and facilities for telework, have not taken root in the planning of IT in India. India's

Internet Kiosks

S RAMANI

Among the new forces shaping the world economy today is the emergence of the service sector as the leading sector providing for sustainable growth. This sector is the major hope of most developing countries. Growth in jobs reduces the number of people excluded from a share in the benefits of development. Some aspects of information technology (IT) give us reason to believe that growth and improvements in the quality of life can be made possible using relatively little capital, relatively little consumption of irreplaceable resources, and relatively little damage to the environment. If this is the case, we can go ahead to invite billions of people to share in the economic warmth that is being created by human ingenuity. In this, IT may not be the sole player, but it is likely to be an important one.

There is an IT revolution on in India. Part of this revolution has been the creation of what are called STD booths: small street-side shops, offering access to public phones meant for long distance calls. These booths are created with a capital investment equivalent to about US $ 2,500 each. This includes an investment of about $ 1,000 by the telephone company on the phone line and about $ 1,500 that the booth entrepreneur would invest in furnishing the place with a table, a few chairs, a fan, and the microprocessor controlled call-monitoring and bill-printing machine. The shop is often the partitioned front room of the owner's home. Some booths in cities sport a fax machine too; some also have a xerox machine to offer photocopying services.

Each booth employs about two to three people on an average, depending upon the number of phones and other equipment. The estimated number of these booths is 3,00,000, and the estimate for the number of persons employed is 6,00,000. Their creation involved two important steps: (a) Need for recognising the different situation in countries like India: The recognition that telecom development in India cannot be a blind copy of telecom development elsewhere. What matters here is not how many phones there are per thousand of population, but how many people live within walking distance of a public phone. (b) Need for innovative privatisation: The small entrepreneurs running the STD booths work from 5 a.m. till midnight, seven days a week, but their spouses laugh all the way to the bank, as they carry the day's collection.

It took a great deal of courage for the government controlled telecom monopoly (now liberalised) to let small-time entrepreneurs share in the work and profits. In return, the telephone companies are also making a pretty penny now, as the telephones in the booths have a very high utilisation factor. Any telecom company in the world would turn green with envy on seeing these 3,00,000 phones, each logging several hours of active use per day, all of it on long distance dialling. The jobs created are low-level jobs, paying as little as 500 dollars per year. However, they are being created at a cost of about 1,250 dollars per job. It is difficult to visualise any other way of generating jobs at such a low cost.

A recent development is the creation of internet kiosks similar in many ways to the STD booths. In a population with an average per capita annual income of less than $ 500, the number of people who can have a telephone and computer at home is very small. It makes good sense to have kiosks down the street, where users can walk in and use networked PCs for a couple of dollars an hour. The telephone line used here does not do long distance dialling, but only makes local calls to connect to the nearest point of presence of an internet service provider (ISP). Frequently, the line used is an integrated services digital network (ISDN) line, offering high capacities for speedy downloading of data. One such line is connected to a router connected to some capacity-sharing device such as a 'hub'. This enables the sharing of the capacity of the telephone line between 5 to 15 PCs. Each PC can 'surf the net', send and receive email. There has been a rapid growth in these internet kiosks, particularly in the southern states of India, where English literacy is relatively high. Like the STD booths, the internet kiosks also create low cost employment. The cost of creating four jobs can be estimated from the equipment cost (about $ 10,000) and the telecom service provider's investment on the telephone line, which is about a thousand dollars. The PCs in these kiosks enjoy very high usage hours, and offer students and others low cost access to the internet.

By spreading internet usage skills at low cost, internet kiosks are creating the base for teleworking. Once one is comfortable with email, she/he can go on to offer services to others via email. She/he can even afford the luxury of acquiring a PC and telephone line for use at home. We need to note that the major barrier to teleworking over the internet is not the availability of capital, but is often the lack of knowledge and skills. This is where the internet kiosks come in. This transition from kiosk user to teleworker has not yet occurred in India, but it soon will, as the number of internet users has already climbed to an estimated 2.5 million. EPW

past successful experiments in giving communal access to telephone facilities are shaping up its recent initiative to democratise the benefits of the internet. In India, institutional innovation for extending telework to underprivileged groups is taking a distinct route, in the form of 'internet kiosks'. These essentially cater to market needs, unlike the telecentres of Africa or Europe. The roles of public or donor agencies in their implementation and operation are nil. The policy interventions are needed only in the areas of technical and management training, in order to make these sustainable in the long term.

These 'internet kiosks' are a technological upgrading of the STD booths which are a common phenomenon in India. These are small street shops, offering access to public phones meant for long distance calls. These have created 3,00,000 booths all over India and more than 6,00,000 jobs. In a similar fashion, internet kiosks can serve the needs of teleworkers who cannot afford to own their own equipment. With reasonable low-cost training for entrepreneurs and users, the current STD booths, with some capital investment, can become internet kiosks. As with telephone booths, the internet kiosks, in an enabling environment, could demonstrate that:

> Telecom development in India cannot be a blind copy of telecom development elsewhere. What matters here is not how many phones or internet connections we have per thousand of population, but how many people live within walking distance of a long distance phone or internet connection (see box).

Internet kiosks no doubt offer opportunities to acquire hands-on skills. Yet some amount of computer literacy and familiarity with the hardware are essential preconditions for starting such kiosks. In the city of Mumbai, academic centres of technical training, such as SNDT Women's University and the NCST, have taken some initiatives to run formal courses in order:

> to train 300 persons per year in operating computers, in handling e-mail and browsing in order to manage a kiosk. The programme aims to seek out women and persons from rural areas. It will, likewise, place considerable emphasis on email transmission in Indian languages. It will try out key-boarded email as well as scanned attachments to see which type of interface serves the user best (Ramani and SNDT Women's University, 'Training in the Running of a Telekiosk: A Plan', l998, quoted in Mitter l999).

For the city planners in Mumbai and other cities in India, it will be important to assess the relative merits of telekiosks, in comparison with telecentres, to promote beneficial telework among the underprivileged. Internet kiosks open up possibilities for successful entrepreneurship among those who have less access to finance and other resources. Even in this small-scale entrepreneurship, however, women encounter much greater barriers than men. As Gothoskar observes:

> ...most of the telekiosks and cybercafes that seem to have been set up in Mumbai and especially in Pune have been set up by young men who have access to family space. Often, family space is not available to girls as much as to boys, as boys are supposed to remain part of the natal family and fend for it, while women are supposed to remain in the natal home only temporarily. While such attitudes need to be challenged and are indeed being challenged, we also need to provide girls and women with soft loans and credit facilities for renting space and procuring equipment for such telekiosks (Gothoskar, this collection).

VI
Teleworking and Unions

Certain categories of teleworking, particularly when the employee works on his or her own, raise important labour issues regarding employment contracts and career progression. We felt that trade unions, in their present form, are unable to address these.

Traditional trade unionism is primarily geared to give a collective voice to the employees, who come to work at a defined site. Unions, thus, are primarily a product of an industrial age, when large numbers of people worked in close proximity to each other and when collective interests and the need for solidarity were easy to perceive. Such institutions, understandably, are not effective in protecting or demanding rights for dispersed teleworkers.

The prevalence survey in Mumbai does not indicate, as yet, a widespread use by the employers of individual forms of telework. The incidence of home-based telework was sparse also in the qualitative survey of the three selected sectors. Yet, the qualitative case studies on the software sector in Mumbai reveal that there is also an inclination among some of those who do not have many alternative employment opportunities to opt for telework. Such teleworkers do require the support of collective and co-operative actions. It is particularly important, for example, for women, who often decide to opt for teleworking in the absence of adequate childcare provisions. The mode of organising in order to form a collective

Table 4: Taxonomy of Cyberlaws

Policy/legal Issue	Description of concern	Country addressing the issue
Intellectual property rights	• managing and acquiring rights in the digital environment	Malaysia
	• preventing piracy of copyrighted works	Malaysia
	• extending current copyright regime to include digital works	Malaysia
Electronic commerce	• identifying, certifying and authenticating buyers and sellers	Malaysia
	• securing legal status of digital signatures and digital certificates	Malaysia
	• applicability of contract law (rights and responsibilities and liabilities of parties) and dispute resolution mechanisms	None
	• fraud and crime, law enforcement in electronic commerce	Malaysia, Thailand
	• money flow and taxation in electronic commerce	None
Security and encryption	• protecting against breaches of security in computer systems and networks	Malaysia, Philippines
	• preventing crime in the digital environment	Malaysia
	• formulating rules on the use of encryption technology	Malaysia
Privacy and data protection	• protecting against intrusion into individual's private information	Malaysia, Philippines
	• controlling use of personal information	
	• facilitating transborder data flow	
Content regulation	• blocking objectionable materials on the net	China, Vietnam, Singapore
	• protecting national interests against undesirable materials	"
	• reconciling conflicting cultural values in information content	"
Access and service provision	• managing technical standards in a networked environment	Malaysia, Philippines Thailand
	• ensuring interconnection and interoperability of computer systems and networks	Malaysia, Philippines Thailand
	• regulating pricing and service quality of information services	None
	• delineating responsibilities and liabilities of access and service providers	Malaysia, Philippines, Thailand, China, Vietnam, Singapore

Source: IT Policy and Legal Framework, http://www.ncb.gov.sg/nii/plf.html/.

needs to be innovative, broadening its mandate beyond wage demands. These should include health and safety regulations (relating to repetitive strain injury in particular), access to training, and the absence of barriers against going back to previous office jobs.

Article 4 of the ILO Convention on Homework specifies some parity of rights between home-based and office-based employees. The convention, although ratified by the member states, has yet to be translated into legislation, except in Finland. The freelance teleworkers are not covered by this convention. Against this background, Gothoskar's essay draws our attention to certain possibilities of organising freelance employees into some form of collective, using the internet as a means of organisation.

In the context of India, including that of Mumbai, as our surveys show, on-line teleworking predominates in satellite offices, call centres (often described as service centres) or offices that undertake basic office functions of the multinational companies. In contrast to the west, home-based telework is still relatively unimportant in Mumbai.

When a company externalises work to satellite offices or call centres, it leads to shifts in the location of employment, but not necessarily in the conditions and modes of work. A satellite office, in common with its main office, is regulated, in most situations, by the legal framework of India. In some cases, as in the call centres or service centres, the diversity in tasks gets diminished, leading to stressful and repetitive work, such as uninterrupted answering of customers' telephone calls. The stress affects the physical and mental health of employees adversely. These are new concerns, but could, with some adaptation, be dealt with by traditional trade union procedures.

Such satellite or subsidiary offices do not necessarily require a fresh approach to organising. Against the background of offshore development projects in remote processing work there is a need for some accepted guidelines. Thus, for instance, to quote Sujata Gothoskar:

> ....In chemical technology, the accepted guidelines of the ILO say that in case of transfer of technology, the companies should follow the same/similar stringent standards as they follow in a developed country. The same principle should apply to transfer of or sub-contracting of computer-related work. The occupational health and safety standards of radiation, furniture like chairs, eye check-ups, regular breaks etc, should be implemented in India.

In the context of labour issues related to internationally outsourced information processing work, concerned academics and researchers in India expect the WTO to play a role. Here, one would hope that there could be points of convergence of opinions and interests between the developed and developing world. Top US trade officials have recently urged the WTO to be more sensitive to labour and environmental issues before its next ministerial meeting in November this year ('WTO must be Sensitive to Labour Issues', *Financial Times*, September 30, 1999) and have urged the WTO to intensify its existing cooperation with the International Labour Organisation. In a similar vein, the EU's new trade commissioner insists that respect for labour standards must precede the next round of trade liberalisation (Lamy Wary 'Labour issues and the WTO', *Financial Times*, October 7, 1999). Developing countries, including trade unions in them, generally oppose the incorporation of formal labour and environmental rules in WTO procedures; they see in such social clauses seeds of protectionism by developed countries against developing ones. In the context of transnational telework, however, there is a demand, among researchers such as Gothoskar, who work with unions, for an international regulatory framework relating to conditions of employment in the subsidiaries of multinationals.

VII
Regulatory Framework

Given the constraint of time and resources, the project did not explore, in sufficient detail, the significance of a regulatory framework for the quantity and the quality of telework, national or international. The project, nonetheless, addressed the importance of this problem, and gave the question prominence in the final workshop [see Irani 2000].

Clearly defined rules regarding intellectual property rights, security, data protection and content regulations are going to be crucial for facilitating teletrade between India and its trading partners. These rules will have an important bearing also on promoting telework within India. In order to promote teletrade in information processing – a major component of e-commerce – it is not sufficient to have globally or locally distributed sites of work, or access to tools and techniques of the internet. It is equally important to have the assurance of 'trust services' (R Mansell et al Virtual Communities, Intelligent Agents and Trust Service Provision for E-Commerce, SPRU, UK, 1998) for authenticating the identities of transacting parties; reducing the risk that one or the other party can repudiate their participation; maintaining data integrity; and ensuring that the privacy of the parties is upheld.

Some countries in the region, such as Malaysia, Thailand and the Philippines, have already started addressing these issues, but discussions in India have been limited in these areas of concern (Table 4).

In addition to trust services, for telework or teletrade, the importance of a well defined regulatory framework lies in ensuring that service providers guarantee technical standards in a networked environment and promote interoperability of computer systems.

The findings of our research also make it clear that there is a role for the voice of the traditionally disadvantaged groups, such as women or the physically disabled, in the formulation of telecommunications policies in India. In the context of our project, the concept of 'targeted access' to infrastructure, skills, capital and the knowledge of the market is just as important as the concept of 'universal access' promoted by the International Telecommunications Union. Here there is a space for negotiation and consultation between women's groups, groups representing disabled people, the corporate sector and the policy-makers.

This is particularly so as the traditionally disadvantaged groups generally get excluded from the knowledge that the UN agencies and policy-makers provide for promoting business and e-commerce across national boundaries. UNCTAD's Global Trade Point Network is one such example. The network uses advanced networking and multimedia communication technologies to provide all required services for trade transactions at a reasonable cost. But it is only the elites of India who are even aware of such facilities, although it aims to serve the interests of the poor.

VIII
Areas of Policy Intervention

Despite the differences in perspective, all the surveys in the project confirmed that the extent and nature of teleworking are determined as much by cultural factors as by technological ones. The negligible spread of homebased telework in Mumbai

was explained by the high cost and poor access to infrastructure. The limited prevalence of this form of telework was ascribed also to women's preference to 'go out to work', but to sites that are not too far from their homes. Again it is the prevailing management culture, as much as material conditions, that make the companies cautious about putting out work to homebased individual teleworkers. Researchers documented material conditions and attitudes, both of employers and of employees, that define the actual or perceived challenges, barriers, opportunities and strengths of telework. These give an insight into the evolution of different institutional forms of teleworking and tele-networking in India. The research in the project made it clear that teleworking institutions assume distinct connotations in different countries and contexts. Thus, telecentres may mean an institution that delivers both facilities and training, or may simply mean shared facility centres.

In this project, researchers from different disciplines and interest groups explored the potential for telework and teletrade to improve competitive efficiency, and social equity in the megacities of India. We expect that the experience and insights gained from the project will benefit other cities in Asia and in Africa.

The researchers, in the course of their analysis, assiduously stressed where interventions by policy-makers or lobbying by stakeholders would be prudent in order to make the new modes of working, and doing business, commercially viable and socially desirable. To this end, researchers, in both the quantitative and qualitative explorations, highlighted the significance of factors that condition the appropriateness and sustainability of national and transnational teleworking. These related to:

– An infrastructure that assures efficient functioning of web technology, as in the internet and intranet;
– Marketing and communication skills that assist entrepreneurs in the developing world to have a foothold in e-business;
– Technological skills that are required in business-to-business transactions in digital information;
– A regulatory framework that promotes low-cost supply of connectivity;
– Cyber laws that protect intellectual property rights and confidentiality of sensitive data.

The research in the project likewise points towards the measures that will democratise the benefits of telework and teletrade by giving targeted access to disadvantaged groups in the areas of:

– Vocational and computer-related education and training for employment and self-employment;
– Low cost finance for initiating small and minuscule enterprises, as in telekiosks;
– Information on market, laws and the regulatory framework related to e-commerce.

The researchers likewise delineated, on the basis of their fieldwork, the current and potential roles of various stakeholders in planning and implementing teleworking for efficiency and equity. The researchers uniformly recommended a consensual approach. They also emphasised distinct responsibilities for each interest group. The research points towards:

– The role of the government in creating an enabling environment with respect to infrastructure;
– The role of the private sector, and particularly of its professional associations (such as NASSCOM) in establishing rewarding partnerships with companies abroad;
– The role of members of civil society, such as the NGOs and trade unions, in protecting employment rights and career opportunities in the emerging techno-economic environment;
– The role of international policy-making bodies in ensuring that codes of conduct relating to trade and employment rights are applied to national and international teleworking.

The fieldwork stressed the need to be clear about the ownership and support system of key institutions such as telecentres and telekiosks, particularly if these are to be used as vehicles for democratising the benefits of e-commerce to groups that rely on communal telelinks, out of necessity or of social preference.

In summary, the project concluded that national and international teleworking could contribute to sustainable development only when the economic, social and cultural contexts of the people concerned are sensitively taken into account. EPW

Note

1 The vision of the project started in a totally different part of the world, in Cartagena, Colombia, where I first met S Ramani, the director of NCST, Mumbai, at a workshop convened by United Nations Commission on Science and Technology (UNCSTD) in early February, l996. There I had the privilege of discussing with him the possibility of a future collaborative research project between UNU/INTECH and NCST on the use of ICT for improving the quality of lives in the megacities of India. Our special focus on telework received sympathetic response from International Development Research Centre (IDRC), Canada, that funded first the pre-project planning activities and finally the research project. This innovative exploration was made possible by the generous financial and intellectual support of IDRC. Rohinton Medhora of IDRC interacted with the team at all stages of the project. The project benefited from contributions from researchers working inside and outside academic institutions. The latter group included diverse stakeholders, ranging from business executives and professional consultants to women activists and trade unionists. The project was supported by F C Kohli, the chairman of TCS, and eminent members of the Bombay First Initiative, the think tank of the Bombay Chamber of Commerce. Research support also come from the relevant quarters of the governments of Maharashtra, Karnataka and West Bengal.

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