



ITU-D

STUDY GROUP I

4th STUDY PERIOD (2006-2010)

QUESTION 21/1:

*Impact of telecommunication
development on the creation
of employment*



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QUESTION 21-1/1

1 Study domain – Question definition and workplan

Liberalization and privatization of the past years in the telecommunications sectors have generated huge investments everywhere in the world. These investments led to take up of services, which in turn led to further investment as demand outstripped supply. Today in most of the countries, the telecommunication industry generates substantial economic benefits, in terms of its contribution to GDP, generation of government revenues through payment of various taxes and generation of employment.

Indeed, a decisive effect of the above mentioned policy reforms is noticeable on the structure and level of direct employment in the telecommunications sector. While jobs were lost in some areas, in particular, among traditional telecommunications services operators, the overall dynamism they have generated has led to job creation in other areas to an extent that sometimes more than offsets the losses. A substantial number of jobs has been created by new network operators and telecommunications services providers, since markets were opened to competition, and also by manufacturers to face the challenge.

The Sector also generates substantive indirect employment. Suppliers to the operators have seen growth in the past few years. Outsourcing certain telecommunication activities due to liberalization has to be taken into consideration. IT-enabled services is also an important source of employment creation through work migration across national frontiers in areas like Call centers, Medical transcription, database processing, Back office operations, Data processing, Human resources, Web site services, Revenue accounting. In many developing countries, the grey market employment created new jobs through activities like resale, equipment maintenance, spare parts selling, etc.

This report focuses on a qualitative and quantitative evaluation of direct and indirect jobs created by telecommunication development in national labour markets after privatization and liberalization, in particular in three subsectors:

1. Fixed telephone;
2. Mobile telephone; and
3. Internet

First, recent trends in the telecommunications sector in terms of regulation, services and investment are described as well as their effect on the economy as a whole in terms of new employment generated. Secondly, the focus is made on the impact on direct employment specifically within the telecom industry. Strategic approaches adopted by countries and organisations in relation to employment are then explored. An assessment of indirect, induced and grey market jobs is then presented.

This study is based on a literature review, and on countries' contributions on their policies and experiences.

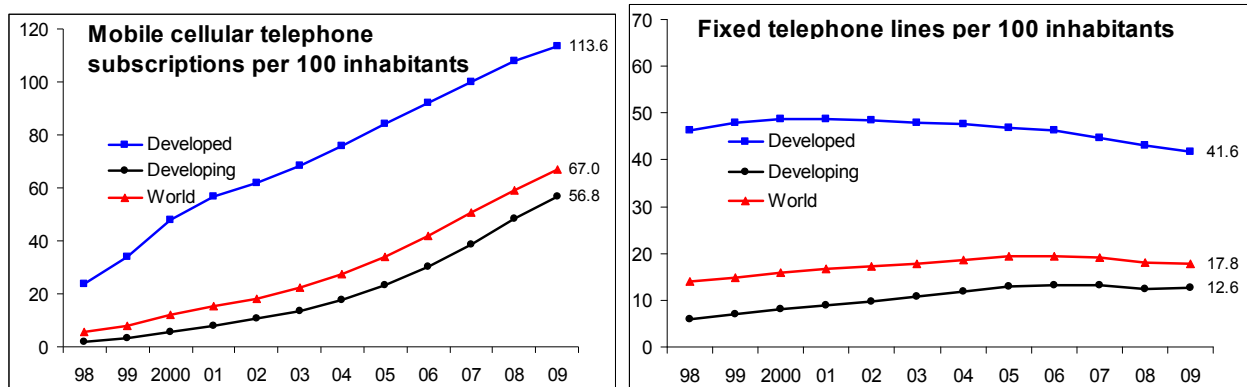
2 International trends in telecommunications services: liberalization of telecom markets, new products and services

2.1 Liberalization of telecom markets

Today, telecommunication services are characterized by rapid technological developments; deregulation and privatization; mergers and acquisitions among established and new service providers; the proliferation of new high-value services; and a trend towards an integrated information and communications industry – “convergence”. Profound structural changes have occurred in telecommunications services, as well as significant developments in the regulatory framework at the national, regional and world levels. These have in turn reinforced a trend for yet more restructuring changes. The traditional monopoly operators have lost an increasing share of activities to new competitors but the industry has experienced continuous growth as well as rapid change and progress in policy and technology development, as a result of an increasingly competitive and networked world. It is true and encouraging that overall, the digital divide has been reduced. ITU statistics show phenomenal growth rates in the mobile sector, where penetration rates have surpassed

those of fixed lines in 2002, reaching an estimated 67 subscriptions per 100 inhabitants or 4.6 billion subscriptions globally at the end of 2009 (Figure 1). Between 2008 and 2009, mobile cellular penetration in developing countries surpassed the 50 per cent mark to reach an estimated 57 per 100 inhabitants by the end of 2009. Fixed line penetration, on the other hand, has started to decline in the developed world in 2006, and in the developing world in 2008, reaching by the end of 2009 a penetration of 42 and 13 per 100 inhabitants, respectively.

Figure 1: The Mobile Miracle*



* Data for 2009 are estimates.

Source: ITU World Telecommunication/ICT Indicators Database¹.

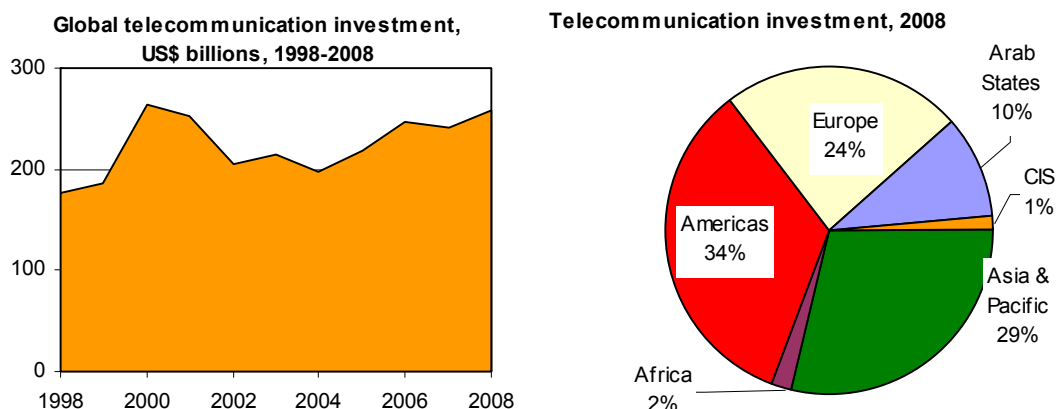
Global telecommunication investment, which includes expenditure on initial telecommunication installations and additions to existing installations, peaked at over US\$ 250 billion in 2001, before falling until 2004. Since then, it has increased again and in 2008 surpassed the 2001 value, reaching US\$ 259 billion (Figure 2). Investment figures must also be seen in light of technological innovations and competition in the wholesale market, which have significantly reduced prices and allowed operators to “buy more for less”.

A regional comparison of ICT investment highlights that in 2008, the Americas region was home to the highest share of telecommunication investment (34%), followed by Asia and the Pacific (29%) and Europe (24%), the Arab States (10%), Africa (2%) and the CIS region (1%).

¹ ITU publications, 2009, World Telecommunication/ICT Indicators Database 2009 (13th Edition) <http://www.itu.int/ITU-D/ict/publications/world/world.html>

Figure 2: Global telecommunication investment

Global telecommunication investment, in US\$ billions, from 1998-2008 (left) and share of telecommunication investment by region, 2008 (right).



Source: ITU World Telecommunication/ICT Indicators Database.

Note: According to the ITU, telecommunication investment is defined as: "...the expenditure associated with acquiring the ownership of property (including intellectual and non-tangible property such as computer software) and plant. These include expenditure on initial installations and on additions to existing installations where the usage is expected to be over an extended period of time. Note that this applies to telecom services which are available to the public, and excludes investment in telecom software or equipment for private use." It should be noted that some national telecommunication authorities, from which ITU collects data, fail to compile and include telecommunication investments made by foreign companies and investors that operate within a country.

2.2 New products and services and new ways of working in the telecom industry

The telecommunication sector expanded steadily following the process of its liberalization. It has been transformed by the explosive growth of Internet usage, multimedia and mobile phones, and the great increase in data flow (packet switched) in comparison with voice traffic (circuit switched). There has been a shift towards fibre-optic networks and greater bandwidth for multimedia needs. Competition between carriers is fiercer, in the context of deregulation, "unbundling the local loop", and having to handle different technologies from multiple vendor devices in order to provide services to an ever-greater client base.

The expansion has been particularly remarkable for the mobile telephony. mobile networks can achieve good coverage of the population at a relatively low cost per user. GSM (Global System for Mobile Communications) and other wireless technologies have spread rapidly in recent years, and there is an increasing trend to bring the availability of high-speed data to almost the entire population through services such as GPRS (General Packet Radio Service), I-Mode, UMTS (Universal Mobile Telecommunications System) and W-CDMA (Wideband Code Division Multiple Access) that go towards third generation (3G) technology. All these developments have contributed to massive growth in traffic, and great opportunities to create new services and revenue streams. New examples include the possibility of using the Global Positioning System technology of mobile phones to call up location-specific items, like maps, traffic news and entertainment/shopping information, or to receive advertising and information on the locality.

Rapid changes in the competitive environment coupled with the development of new technologies, have also led to the modernisation of work organisation. New technologies, global competition and the increasing speed and volume of information, generate flexible and adaptable working relationships and organisation. Telework constitutes a form of work organisation whose increasing use is a clear sign of a trend towards a more flexible and more mobile workplace. Some people work from home, while others, occasionally utilize mobile telecommunications technology to work from coffee shops or myriad other locations. In April 2007

there were 12 million U.S. employees working from home². Long distance telework is facilitated by such tools as [virtual private networks](#), [videoconferencing](#), and [Voice over IP](#). It can be efficient and useful for companies as it allows staff and workers to communicate over a large distance, saving significant amounts of travel time and cost. As [broadband Internet](#) connections become more commonplace, more and more workers have enough bandwidth at home to use these tools to link their home office to their corporate intranet and internal phone networks. Telework is particularly important for telecommunications companies, for whose products and services provide an important field of application.

3 Quantitative and Qualitative analysis of the impact of telecom development on employment in the telecom industry

Privatization and deregulation meant significant transformations in the corporate environment. These reforms facilitated the incorporation of the rapid technological changes that had occurred in the world market and the development of new abilities, which resulted in a considerable increase in productivity.

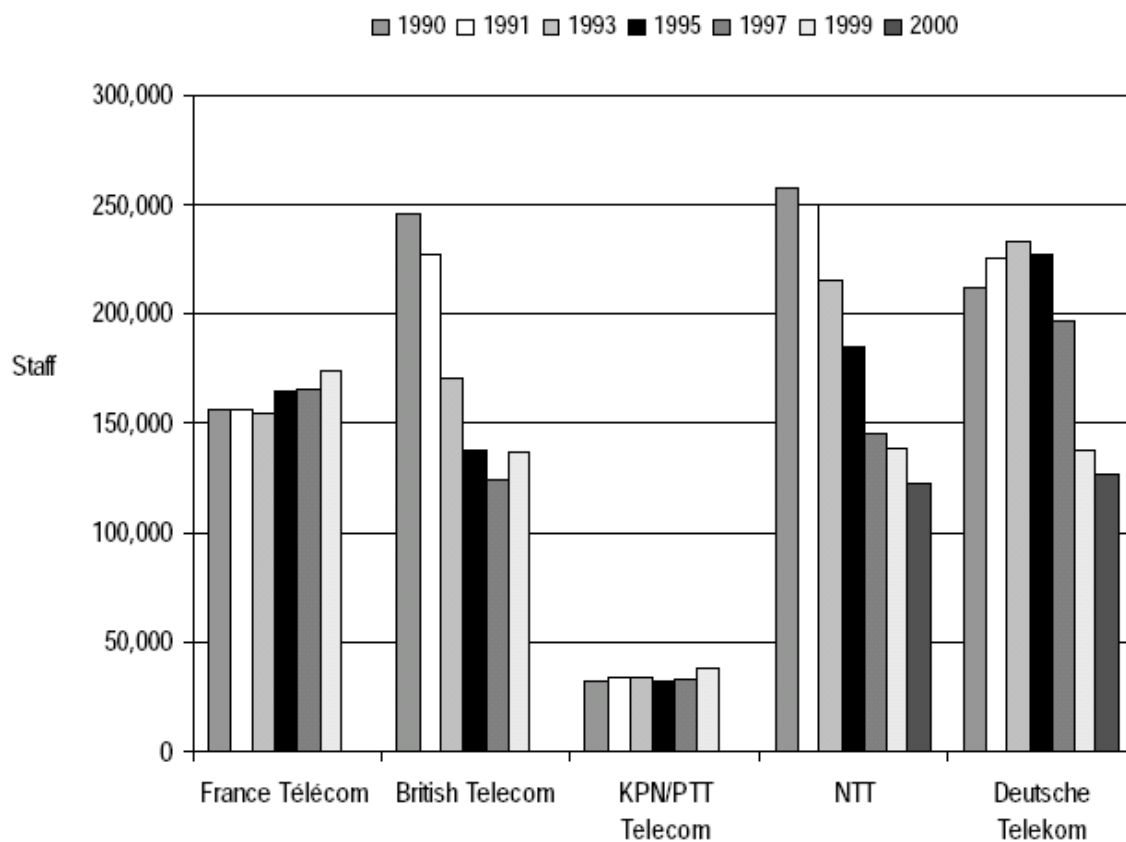
Moreover, they have generated in most cases substantial economic benefits, in terms of contribution to GDP, generation of government revenues through payment of various taxes and of course generation of employment

3.1 The impact in fixed telephone companies

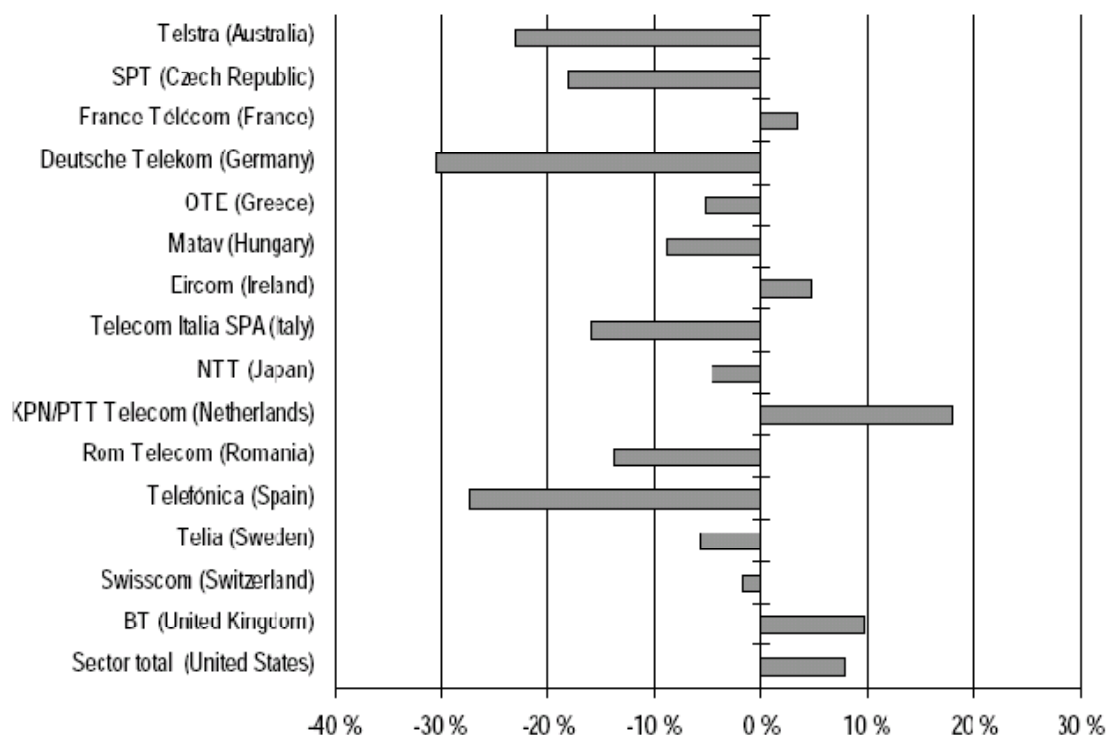
In general, employment has fallen and continues to fall among the main traditional operators in mature markets (this is the case in most developed countries). In Deutsche Telekom, for example, employment fell from 233,000 in 1993 to 167,000 in 2000 through early retirements and redundancy packages (but the group's workforce as a whole stood at around 227,000 in 2000, through global business expansion). In British Telecom, the labour force was cut from 241,124 at privatization in 1984 to 136,800 in 1999. At NTT, employment was 313,600 in 1985 at privatization, and 122,400 in 2000, a reduction which was accompanied by the consolidation of branch offices, outsourcing and restructuring.

² Rosenberg Matt, September 26, 2007, Slow but steady "telework revolution" eyed, Cascadia Prospectus <http://www.discovery.org/scripts/viewDB/index.php?command=view&program=DI%20Main%20Page%20-%20News&id=4235>

Figure 3³: Employment trends in British, Dutch, French, German and Japanese telecommunications enterprises, 1990-2000



³ International Labour Organization, 13-17 May 2002, Report for discussion at the Tripartite Meeting on Employment, Employability and Equal Opportunities in the Postal and Telecommunications Services, Geneva.



On the opposite, this situation is generally not true for operators (whether privatized or not) in emerging countries who are continuing to construct and/or modernize their network. In Mexico, the privatization of Telmex did not in itself result in job cuts – following an agreement with the trade unions there were no layoffs, and the workforce increased (on paper at least) by 30 per cent in the period 1997-99. Data contained in the OECD Telecommunications Database 2001 indicates slight changes in the workforce in most countries, with increases notably in Mexico and Poland.

In Africa, the situation is balanced. Average teledensity is very low, with most lines concentrated in urban areas, the lack of technical staff and expertise means that ICT-trained employees may well move to richer countries. Thus the principal employment preoccupation may be how to retain skilled staff and how to attract new ones, rather than a need to cut employment numbers, despite budgetary constraints. The general trend is however upwards, especially in countries where there is continuing investment. In Cameroon⁴, as from the end of 2007, after a long period of stagnation, both subscriber and staff numbers of the state-owned incumbent began to grow steadily. This is explained by the massive investment in fixed CDMA technology and the recruitment of fresh staff. However, this growing employment trend is not a systematic pattern⁵ in the continent as mentioned above. For example, Telkom South Africa's workforce declined heavily throughout the years (more than 15 per cent in the period 1995-99).

In general, the decline in telecommunications employment is largely concentrated in activities like construction, installation, repair, and maintenance of central office switching equipment, and cable and line jobs. Female employment was particularly affected by technological change, because many women were telephone operators and clerical workers. However, employment increases occurred in areas related to marketing, the extension and upgrading of infrastructures. In the United States in the 1990s, the largest increases in employment opportunities have been in network planning and management, marketing and

⁴ Cameroon's Contribution of at the Study Group 1 meeting , 7-11 September 2009, Document 1/290, Case of Cameroon, <http://www.itu.int/md/D06-SG01-C-0237/en>

⁵ See footnote 2.

customer services. There was also major job growth in non-traditional or “non-core” activities, such as those associated with computer, networking and data processing services. All these areas include skills and qualifications which were not traditionally seen as central to telecommunications services in the past.

3.2 The impact in mobile telephone companies

The trends here are generally upward. In new mobile market the increase can be very important each year due to the level of investment. The mobile phone sector registered a 106 per cent increase in mobile employees in the period 1995-99 in the OECD area (173,166 to 356,827 employees), 208 per cent growth in the European Union (38,080 to 117,375), and a 57 per cent rise in the United States (102,500 to 161,400).

A Study⁶ done in December 2005 by the GSM Association on six countries: Brazil, Chile, Columbia, Mexico, Peru and Venezuela, presents those results:

<i>Employment from mobile services in the six study countries (000)</i>	<i>Direct</i>
Dealers	109
Wireless carriers	38
Support services suppliers	0
Wireline carriers	69
Other capex suppliers	103
Terminal suppliers	4
Terminal component suppliers	0
Network equipment suppliers	3
Network equipment component suppliers	0
Total	326

It shows that 326,000 jobs were generated by direct employment in the industry of which 38,000 are employed directly by the mobile operators.

Mobile operators often have flexible structures made up of young, interdisciplinary teams working in unstable markets, and employee recruitment is generally based on criteria concerning their human relations and teamwork capacities, versatility, willingness to accept horizontal mobility and interest in continuous training.

Although the mobile operators themselves only create limited employment, jobs they do create are highly paid and sought after, and there is a major knock-on effect in retail (through the sale of airtime, handsets, and SIM cards). Indeed, the GSM industry has given rise to several pre-paid card kiosks business hence employment. In Pakistan⁷, the total number of franchisees stood at 1,522 with an estimated staff of 10,650 employees.

⁶ Lewin David, Sweet Susan, December 2005, The economic impact of mobile services in Latin America, A report for the GSMA, GSM Latin America and AHCIEET, http://www.gsmlaa.org/files/content/0/93/GSM%20LA%20Study_The%20Economic%20Impact_English.pdf

⁷ Pakistan Mobile company contribution from presented at the Q21 Rapporteur’s Group meeting in Cairo (March 2009), Document RGQ 21/1/016, <http://www.itu.int/md/D06-RGQ21.1-C-0016/en>

In Egypt⁸, Mcel has four major distributors and approximately 10,000 retail outlets selling pre-paid airtime cards and Vodacom uses twelve super dealers who manage an extensive network of resellers across the country.

GSM resale has become a viable employment opportunity in other ways. In Nigeria⁹, the increased teledensity has led to jobs creation with the advent of the GSM "umbrella people" who, in many towns across the country, resell GSM wireless services, most notably phone calls or airtime. With an umbrella to mark their stand, a Subscriber's Identification Module (SIM) card and handset, they are ready for business.

However, as the market reaches saturation, the growing trend tends to reverse. An Operator like Vodafone have experienced huge growth – the firm employed around 57,000 workers worldwide in 2001, up from only 9,640 in 1997, following a series of takeovers and worldwide expansion. In October 2001 it cut approximately 650 jobs from its 10,000 United Kingdom workforce¹⁰.

In 2007 the GSM Association published a report which estimated the number of jobs created by the mobile telecommunications industry in Tanzania in 2006¹¹. It calculated that the mobile telecommunications industry supported over 125,000 jobs, along with another 25,000 created through the economic multiplier.

Table 1: Estimate of the employment created by the mobile industry in Tanzania

	Source	Number of jobs
1	Mobile operators	1,285
2	Fixed network operators	341
3	Network equipment suppliers	783
4	Handset designers and dealers	7,045
5	Other suppliers of capital items	244
6	Suppliers of support services	14,725
7	Airtime commission, payphone commission	101,141
	TOTAL	125,564

3.3 The impact of internet

Internet development impact on jobs since telecommunications liberalization has been uneven between developed and developing countries. This is due to the fact that while the number of estimated Internet users worldwide continues to grow rapidly, penetration levels in the developing world remain low and Africa features among the lowest (with values of 0.82 to 2.03) in the ITU Development Index because less than 5 per cent of the population use the Internet, compared to less than 15 percent in Asia, and 43 and 44 percent in Europe and the Americas respectively. Internet service providers and, more generally, the providers of online information services, are among companies that have witnessed relatively rapid development at in particular in more advanced economies and have generated significant employment. Liberalisation has also

⁸ Ubaru Moses, Draft report of the Joint ECA -ITU-Issues Paper on the impact of ICTs on Employment and Poverty Alleviation in Africa (Opportunities and challenges), http://www.uneca.org/.../Issues_Paper_Impact_ICTs_Employment_Poverty_Alleviation_Africa-Ubaru-EN.ppt

⁹ ITU publications, 2003, Trends in Telecommunication Reform 2003: Promoting Universal Access to ICTs – Practical Tools for Regulators, Chapter 3, p.55.

¹⁰ See footnote 7.

¹¹ Tanzania's Contribution of at the Study Group 1 Meeting, Geneva, 7-11 September 2009, Document 1/284-E, The impact of Mobile communications on Economic Development: The Case of Tanzania, <http://www.itu.int/md/D06-SG01-C-0284/en>

favoured strong competition in the helpdesk market, which offered new outlets for computer scientists or freshly trained or retrained technicians.

Employment creation was however tempered in the developed world by the fact that several communication companies, burdened with unredeemable debts from their expansion projects, had to sell their assets for cash or filed for [bankruptcy](#) in the aftermath of the telecommunications industry bubble (1995-2001). Despite this downturn period, the sector has kept strong positions as far as employment is concerned. In the USA for example, there were¹² 383,000 wage and salary jobs in Internet service providers, Web search portals, and data processing services in 2006. Data processing, hosting, and related services accounted for about 68 percent of the jobs, with the other 32 percent in ISPs and Web search portals. Due to the relatively low capital costs of equipment for data hosting services, and to the geographic distribution of ISPs, about 94 percent of establishments have fewer than 50 workers, and about 65 percent have fewer than 5 workers. Professional and related occupations (Computer specialists like software engineers, systems analysts, programmers...) were the largest group and accounted for approximately 41 percent of wage and salary employment. The second largest group, office and administrative support occupations, made up about 32 percent of jobs. An additional 17 percent of workers were in management, business, and financial occupations.

In Pakistan¹³, the liberalisation of internet provision in 1995 started a new era. 150 ISP licenses were issued, out of which about 70 started their businesses providing dial up service, but limited demand (due to lack of knowledge, limited and expensive PC population) and low ARPUs (Average Revenue Per User) due to fierce competition resulted in closing down of almost all the ISPs except five, which are now focused more on broadband service. The total number of number of employees with the ISPs was estimated at about 3500 in 2008.

Some initiatives were launched by several organizations to foster economic growth and social development through ICTs. Thus ITU has initiated with UNECA (United Nations Economic Commission for Africa) the creation of training centres to favour capacity building for young graduates¹⁴.

4 Strategic approaches in relation with direct employment

Job structure for the personnel of a telecommunications company has changed in the past according generally to the technological features of the new equipment installed. Though, the introduction of electronic switching equipment does away with the monitoring and verification tasks carried out by telephone operators and administrative staff. According to a report published by Rada (1989)¹⁵, electromechanical systems required a staffing level of around 15-20 employees per 1,000 lines, whilst digital systems only require between four and five employees, i.e., four times fewer personnel. In Argentina, the number of officials, technicians and supervisors increased from 21.5 per cent of total staff in 1976 to 30 per cent in 1988, whilst the number of telephone operators fell from 26 per cent to 20 per cent over the same period. The percentage of manual workers and overseers remained unchanged (approximately 36 per cent), as did that of administrative staff (13 per cent).

Today, liberalization, privatization and global competition have added up to rapid technological change and have generated significant changes in the occupational mix of telecommunications jobs¹⁶. France Télécom reported in 2000 that 31 per cent of its employees had changed to new jobs in marketing and sales, wireless or information system over the preceding three years. Energis (United Kingdom) reported that no fewer than 50 per cent of their employees are in sales and marketing.

¹² United States Bureau of Labor Statistics website (<http://www.bls.gov/>)

¹³ See footnote 4.

¹⁴ ITU Regional Office for Africa, Presentation of the at the Study Group 1 meeting , 7-11 September 2009, Document 1/290, Aperçu sur le projet pilote e-emploi au Congo Brazzaville, <http://www.itu.int/md/D06-SG01-C-0284/en>

¹⁵ International Labour Office, 2002, Confronting the Social and Labour Challenges of Privatisation in Argentina: Multinational Enterprises in Telecommunications in the 1990s, Working Paper No. 90, Geneva.

¹⁶ OECD, 2001, Communications Outlook 2001 (Paris), p. 238.

Elaborating forecasts at a country or at an organization level is essential to identify and anticipate those future changes. For example, in the United States, the Bureau of Labour Statistics (BLS) conducts such studies regularly and the results are available online (www.bls.gov). One of the studies presented below (see Table 2), predicted an overall increase of 23% of the workforce between 1998 and 2008. The study predicted a lowering of age profile – largely due to the redundancies that occurred and the influx of younger employees. A substantial reduction in the average age, that historically was typically high for public companies, was predicted. The BLS study also forecast a 31 per cent fall in the number of directory assistance operators (from 23,000 in 1998), a 34 per cent fall among station installers and repairers (24,000 in 1998), and a 23 per cent fall in the General Office clerks category (28,000 in 1998). By contrast, a 61 per cent growth was predicted over this period in the number of computer systems personnel and technicians, and 37 per cent increase in marketing and sales personnel.

Similar studies were also conducted on a regular basis by the European Union. For example The European study for the EU project Analysis of the obstacles to the development of the full potential of employment in the telecommunications sector¹⁷ conducted in 2000 explored the skills needs and training implications for highly qualified specialists in the telecoms sector (Table 3). It summarised its findings in tabular form. The study identified a common trend towards an increase in formal educational qualifications. In management and technical jobs, there was a trend towards professionalization of the personnel. The professions most in demand were engineering in general and economics (Degrees in Economics, Personnel Management or Accountancy).

Table 2: Employment change in the US

Occupational category	Employment 1998	Forecast change, 1998-2008 (per cent)
Administrative and clerical support	354 000	7.9
Precision production, craft and repair	261 000	23.0
Executive, administrative and managerial	165 000	37.3
Marketing and sales	109 000	37.6
Professional speciality (computer systems personnel and electrical/electronics engineers)	95 000	46.7
Technicians and related	47 000	13.6
Other	9 000	20.4
Total	1 042 000	23.4

Source: US Bureau of Labor Statistics: *Monthly Labor Review* (Washington, DC), Nov. 1999, pp. 60 and 74 (figures revised May 2000); and US Bureau of Labor Statistics, quoted in OECD: *Communications Outlook 2001*.

¹⁷ Latniak Erich and Schmidt Dilcher Jürgen, 2000, Employment and skills in growing business areas of the telecommunication service sector, <http://www.unionnetwork.org/unitelecom.nsf/7bc3a7f8037b9be5c12568f90032d10f/a7bcfdb71bf0bc29c125692100536529?OpenDocument>

Table 3: Present and future employment skills- study of the European Union¹⁸.

	Required skills	Tasks to be performed	Organizational and vocational training implications	Estimation on changing demands
Highly qualified specialists	for technical staff: <ul style="list-style-type: none"> - broad scope of technical knowledge - business knowledge - design competencies - knowledge on legal background (regulations) - communication and interaction competencies (esp. launching process) - "experience" 	<ul style="list-style-type: none"> - product development, including technical specification, prototyping, "launching" (introduction to the market) - re-engineering of products 	<ul style="list-style-type: none"> - close cooperation with different professions - support and opportunity to update competencies 	<ul style="list-style-type: none"> - low numbers (development groups are small groups but they are essential) - ongoing need for highly skilled staff/high performance staff - faster "induction" processes for graduates to become productive - danger of "burn out"
	for marketing research staff: <ul style="list-style-type: none"> - good technical understanding - good analytic skills in market research and marketing - communication and interaction competencies (esp. launching process) 	<ul style="list-style-type: none"> - market monitoring - research on customer behaviour - definition of product features, prices, potential customers 	<ul style="list-style-type: none"> - close cooperation with different professions - support and opportunity to update competencies 	<ul style="list-style-type: none"> - there seems to be a scarceness in finding experienced marketing people; but less dramatic than in the technical professions - danger of "burn out"
	for management: <ul style="list-style-type: none"> - project management - social networking - communication and interaction competencies (esp. launching process) - financial and time control - use of IT-based project - management tools 	<ul style="list-style-type: none"> - central task: organization of productive teams on scarce resources - communication/ interaction (different type of leadership) 	<ul style="list-style-type: none"> - not only single persons and individual skills are relevant but there is a need for productive team work - different style of management needed: open access, - communication, cooperative leadership - accepting mistakes as chances to learn - knowledge management 	<ul style="list-style-type: none"> - management of these units during periods of staff turnover - danger of "burn out" - recruitment by internal management development procedures, partly from external companies

Source: Latniak and Schmidt Dilcher, 2000.

Such studies are essential for elaborating accurate public policy choices which must focus on increasing and adapting skills, to develop a workforce that is high skilled and responsive to the needs of the economy. Different initiative can be taken like in the European Union¹⁹:

- Fostering the mobility of knowledge workers across borders and sectors and thus help match demand and supply at the high skill level; The European Commission has launched a Job Mobility

¹⁸ See footnote 16.

¹⁹ Commission of the European Communities, December 2008, New Skills for New Jobs, Anticipating and matching labour market and skills needs, <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0868:FIN:EN:PDF>

Action Plan²⁰ (2007-2010) which aims to improve existing legislation and administrative practices regarding worker mobility, ensure policy support for mobility from authorities at all levels, reinforce EURES (European Employment Services) as the one-stop instrument to facilitate mobility of workers and their families, foster awareness of the possibilities and advantages of mobility among the wider public

- Providing better lifelong learning opportunities at all levels to anticipate the rapid changes in employment needs through education, professional training programmes etc.,
- Defining a strategic framework for cooperation in education and training The strategic document²¹ adopted by the European Union identifies four long term strategic objectives:
 1. Making lifelong learning and mobility a reality;
 2. Improving the quality and efficiency of education and training;
 3. Promoting equity, social cohesion and active citizenship;
 4. Enhancing creativity and innovation, including entrepreneurship, at all levels of education and training.
- Adopting fiscal and tax incentives. For example, IT companies which create jobs can be given tax exemptions in direct correlation to the number or to the categories of newly created jobs.
- Employment strategies can also be associated with social policy towards minorities. For example, In order to create more jobs for vulnerable groups (disabled, aged and low income people), governments can issue a series of laws and regulations, which aim at encouraging various entities providing specific job opportunities to meet the demand which will be less expensive than taking care directly of this category of population. Those qualified companies can get preferential policies in the area of taxation, bank loans, land, and foreign exchange etc. In China²², some Software Company and many information service providers have committed to create employment among vulnerable groups to take advantage of those measures. Some initiatives to employ this category of people were also taken sometimes directly by some operators. This was the case in Gabon²³ where the operator Moov has launched an initiative to employ handicapped people by providing them with small vehicle equipped with mobile phone booths.

For a company also, to remain competitive there is a need to have such a forward-looking approach in analysing the future requirements and needed resources in order to prepare the future competencies. Orange Group has launched a program in 2005 in order to provide visibility up to 2008 regarding the outlook for jobs, required competencies and geographical competencies of the group's activities. Following that approach, it was found (see figure 4 below) that the number of employees with direct links with outside customers would increase sharply²⁴. Management is also changing as competition and privatization bring new challenges. There has been, and continues to be, strong growth in executive and managerial occupations within telecommunications. Major competencies are also required in project management for the deployment of increasing complex projects.

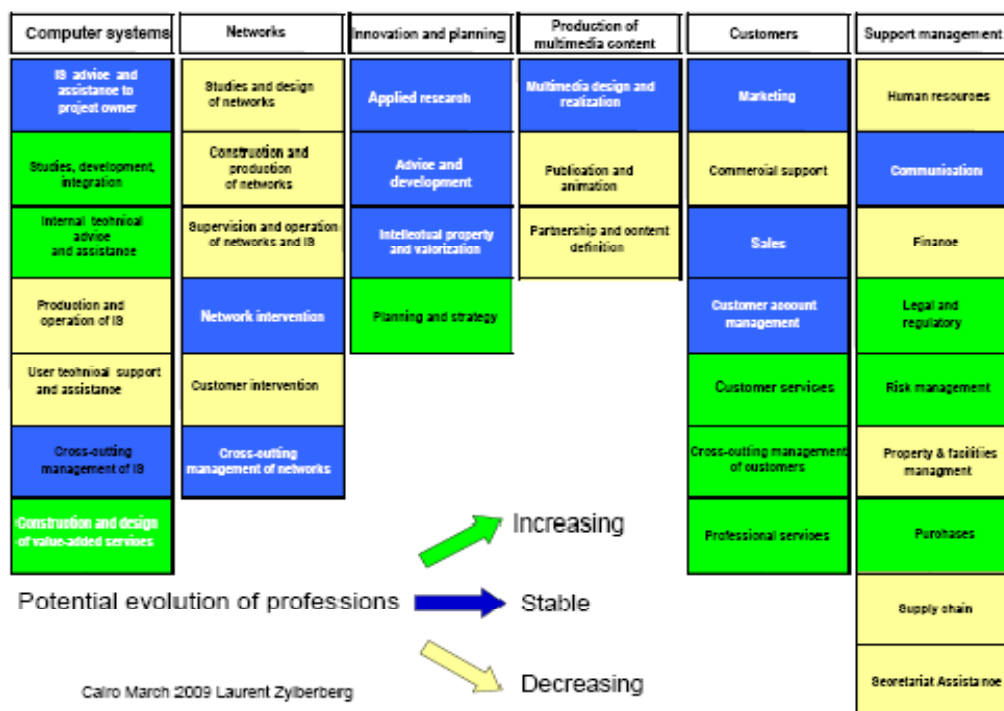
²⁰ European Commission, 2006, Job Mobility Action Plan of the European Commission 2007-2010, available on <http://ec.europa.eu/social/main.jsp?catId=540>

²¹ European Commission, May 2009, Strategic framework for European cooperation in education and training ("ET 2020") adopted by the Council, http://ec.europa.eu/education/lifelong-learning-policy/doc28_en.htm

²² China Contribution during the Study Group 1 Meeting, Geneva, 7-11 September 2009, Document 1/278, ICT industry Development accelerates transformation of social employment in China, <http://www.itu.int/md/D06-SG01-C-0278/en>

²³ Gabon's Contribution at the Study Group 1 Meeting, Geneva, 7-11 September 2009, Document 1/262, <http://www.itu.int/md/D06-SG01-C-0262/en>

²⁴ France Telecom's Contribution presented at the Q21 Rapporteur's Group meeting in Cairo, March 2009, Document WT109-07/021, NTICs: Tools for the creation, destruction or transformation of jobs for telecom operators, <http://www.itu.int/md/D06-DAP2B.1.3.7-C-0021/en>

Figure 4: occupational domains in France Telecom; trends and outlook for evolution²⁵

To capitalize on these forecasts, strategies to create employment, internal mobility and capacity-building were identified as essential. The policy was then to provide every employee with the means to realize a career objective in line with the Group's strategy and to involve all management in the Group's transformation. ICTs were recognized as an important mean to develop employee's careers, and at the same time for employers to advertise job opportunities, as well as required competencies.

Another example that can be cited is British Telecom. The company and the Communication Workers Union (CWU) agreed in 2000 a formal *Learning and Development* statement which places obligations on the company to foster the lifelong learning and development of its staff, including the provision of high quality retraining and reskilling assistance. Most BT employees have access to the intranet (the 'central nervous system' of the organisation, in the words of the company's HR Director), and are able to find out for themselves what training resources and opportunities are available, without this process necessarily having to be mediated through their line manager. The 'BT Academy' distinguishes between work-related e-learning and personal development learning.

In Turkey, Türk Telekom Academy Training Portal provides significant contribution to Human Resources training. At the first stage, 15.000 Türk Telekom employees and 15.000 employees from associated companies and dealers could use e-learning trainings.

In summary, Innovation, liberalization, privatization and global competition have increased the demand for high-skilled technical workers (e.g. computer scientists, engineers). Given the market-oriented nature of the industry today, jobs related to sales and marketing as well as management are, as a result, areas of huge growth. Human resource policies or strategies become central to employers, workers and their representatives. Indeed, countries and organizations must adapt to emerging techniques and new demands in a fast changing environment through permanent training and skill updating. Strategies need to be directly related to the current and forecast future skills needs of telecommunications companies. Companies should

²⁵ See footnote 23.

design accurate plans to facilitate internal mobility. Every employee should be aware of the outlook, the competencies and the requirements for future jobs. Lifelong learning opportunities are essential tools that can be used for that purpose.

5 Employment trends in indirect, grey market, and induced areas

Indirect jobs include jobs generated through purchases. In Gabon, Gabon Telecom and Libertis, respectively, make 70% and 60% of their purchases from local suppliers. 55% of Onatel's purchases in Burkina Faso are made from them while Mauritel devotes 35% of its procurement; Telecom firms commonly hire third-party outside plant subcontractors for the physical installation of network. Many third-party outside plant subcontractors are small to medium-sized enterprises that specialise in installing physical infrastructure, such as the road and pavement work needed to install fibre conduits and cables. They mainly employ civil engineers and technicians, networks planning and design specialists, maintenance technicians.

To get a good picture of the indirect employment generated, there is also a need to take into account jobs which depend either directly or indirectly on the telecommunications industry generate expenditure in the economy which, in turn, create other jobs. Employees of operators spend money on restaurants, holidays, food etc and generate additional jobs in establishments such as restaurants and retail stores as a result. There are various estimates of this multiplier effect which induces further employment. For example, after a review of the literature, the Employment Policy Institute in the US assumed a multiplier of 1.5 when estimating these effects²⁶. The Brookings Institution confirms the presence of the network effect multiplier for broadband development. Brookings found that for every 1 percentage point increase achieved in broadband penetration, general employment rises from 0.2 to 0.3 percent²⁷.

In less advanced economies, the level of employment generation in the informal sector is enormous. In Africa, many people work now into the sale and repair of Computers, GSM and their accessories², while others have set up telephone call centres as their major source of income. The Otigba market in Lagos (Nigeria) for example is considered to be the largest informal ICT market in sub Saharan Africa. Various others are scattered all over the country. Telecom development also holds out the promise of increased incomes for the self-employed in the informal economy particularly in respect of providing an increased source of information on domestic and global markets.

The rapid development of telecommunications infrastructure worldwide was also an important inducer of job creation. Indeed, the areas of subcontracting for example have witnessed many changes. As per the findings of a global survey conducted in 2002²⁸, the telecom industry was found to be one of the most volatile industries. Changing customer demands, ever-changing industry standards, legacy systems' inability to keep up with the growing volumes, interworking challenges between diverse nodes were pointed as just some of the hurdles that mar the telecom industry. These challenges are ongoing, unpredictable, and often unmanageable, making the overall telecom climate volatile and the need for adaptability paramount. Outsourcing, which is the practice of hiring an external organization to perform some business functions in a country other than the one where the **products** or **services** are actually developed or manufactured, has the potential of overcoming cost-pressures, reducing operational cost, gaining access to specialized resources, optimizing existing investments and establishing a sound, flexible strategy. The outsourcing market is generally divided into four main categories²⁹:

- research and development (R&D) which include Chip design, product design and engineering, product development and design services, product lifecycle management services,
- IT services: Application development and reengineering, application maintenance, infrastructure services, packaged application services, system integration, enterprise-quality services,

²⁶ Bevens J., August 2003, Working paper on updated employment multipliers for the US economy.

²⁷ Van Gaasbeck Kristin, Perez Stephen, and Sharp Ryan, November 2007, "Economic Effects of Increased Broadband Use in California," (Sacramento, California: Sacramento Regional Research Institute), http://www.srri.net/AboutUs/EconEffectsBB_Research.pdf

²⁸ Aricent, 2006, Outsourcing, A Must for the Telecom Industry (White Paper), <http://www.aricent.com/index.aspx>

²⁹ Lightreading, 2006, Outsourcing to India, report, http://www.lightreading.com/document.asp?doc_id=99502

- business processing outsourcing services (BPO): Finance and accounting, human resources, knowledge services, order management, procurement, inbound (customer services), outbound (sales and marketing),
- consulting services.

Many companies specialize in subcategories within those four. Outsourcing can also be associated to **off shoring**, in which the functions are performed in a foreign country by a foreign subsidiary. In India for example, stable pro-IT policies which include special incentives associated to the creation of industrial parks and special zones have been helpful in improving infrastructure as well as means of communications. The government had demonstrated a strong support for software firms by further providing all the basic facilities required for an outsourcing company to flourish thus playing a major role in contributing to the success and the well being of IT outsourcing to India. Some of the Indian government policies include:

- Tax Incentives on Infrastructure: A 10 years tax holiday to ventures engaged in developing and/or maintaining and operating an infrastructure facility.
- Tax Incentives on Power: 10 years tax holiday to undertakings, which generate and /or distribute power.
- Tax incentives on Telecom: Five years tax holiday for companies providing telecom services including Internet services and broadband services. Also 30 per cent deduction from profits for the next 5 years in any 10 continuous years out of first 10 years is also offered.
- Tax incentive on Industrial Parks and Special Economic Zones: Ten year tax holiday is applicable to ventures that develop and/or operate or maintain in notified IT parks and special economic zones.
- Tax Incentives for Exports: Tax is deducted on exporters' profits.
- Other Incentives: Tax concessions are allowed and a weighted deduction of 150 per cent for scientific research and development expenditure has been offered. Ten year tax holiday is available for R&D companies engaged in scientific and industrial research.

One of the most rapidly developing forms of off shoring is the call centre. International call centres constitute indeed today an important proportion of the jobs generated. African countries have started to position themselves to take advantage of the huge market. The outsourcing potential is generally based on different parameters: low wages, multi-linguality, favourable time zone, large pool of graduates, and improved ICT infrastructure, amongst others. Thus, it has enabled Senegal³⁰ for example to count today 12 operators of call centers and to trade teleservice. These companies represent 1245 work stations for nearly 2200 employees. The most famous among them, PCCI, has the appearance of a mastodon with its 800 declared stations for 1.200 employees. A record, even in comparison with what is done in the developed countries. In 2008, Maroc Telecom³¹ has announced that in its Burkina Faso subsidiary, approximately 27,000 indirect jobs were associated with the 13,647 telecentres created, 600 in the 150 cyber-café, and 700 with the 120 distributors and wholesalers. Egypt capitalizes on its macro labour characteristics with an educated and multilingual labour pool of over 300,000 yearly university graduates and wages that are lower than in the US or Europe. Moreover, Egypt is centrally located between the US, Europe and Asia with several transatlantic cables passing through Egypt. Call centres are also charged special rates for international telecommunications in order to foster the industry.

In general, Call centres support customers across all sectors of industry offering a wide range of services as diverse as assistance with use of products, credit card activation and medical information. They concentrate a group of functionally specialised workers on a remote location (within countries or between them) with a telecommunications link to customers. Competition to attract international call centres (serving a customer base beyond national boundaries) is fierce³². In addition to such factors as telecommunications infrastructure and labour costs, time zone and the language skills of the workforce play an important role. The growth in outsourcing and virtual call centres generation further complicates the geographical picture.

³⁰ Senegal's contribution presented at the Q21 Rapporteur's Group meeting in Cairo (March 2009) Document RGQ21/1/023-F, <http://www.itu.int/md/D06-RGQ21.1-C-0023/en>

³¹ Vivendi website <http://www.vivendi.com/vivendi/Contributions-of-Maroc-Telecom>

³² Huws U, Jagger N, O'Regan S, July 1999, Teleworking and globalisation, 358, Institute for Employment Studies.

6 Conclusion

Telecommunication development is associated with new patterns of job creation and job loss.

As far as direct employment is concerned, the sector has seen traditional skills (construction, installation, repair, and maintenance of central office switching equipment, and cable and line jobs...) diminish in importance, and new skills (including "hybrid" skills) (computer, networking and data processing services) and job areas like management, marketing and sales increase in demand. In the internet area, jobs in data processing, hosting, and related services are among the most developed. Related companies such as those which specialise in installing physical infrastructure employ mainly civil engineers and technicians, network planning and design specialists, maintenance technicians. Resale has become a viable employment opportunity for services like mobile telephony.

For developing countries to ensure a good transition in the wave of these new employment trends, there are necessary pre-requisites. These include good skills demand forecasts, and accurate human capacity approaches. This encompasses education adjustment towards the professionalization of the personnel in new areas of demand. Initiatives to encourage internal mobility, mobility of knowledge workers across borders and sectors... to fill the future gaps are absolutely necessary. Continuous staff training is also critical to meet citizen expectations, adapt skills for future organizational needs, improve individual job satisfaction, redeploy staff, enhance career and employment prospects and take advantage of technological progress. Governments and corporations should ensure through accurate strategies that employees are adequately trained for life-long employability and can for example be assisted substantially through the use of new, ICT-based, learning technologies.

Regarding indirect and induced jobs, Outsourcing market has seen an upsurge. Among the new and innovative ways explored in boosting economies and create jobs, Business Process Outsourcing (BPO) has proved to be successful for many developing countries. The off shoring market is a huge business opportunity for job creation for the developing or low-income countries. Like the example of India has shown, a strong support for software firms by offering tax incentives and further providing all the basic facilities required for an outsourcing company to flourish plays a major role in contributing to the success and the well being of IT outsourcing. Different parameters: low wages, multi-linguality, favourable time zone, large pool of graduates, improved ICT infrastructure can also help to build a strong base for the outsourcing market in general. The example of Senegal was presented among the most attractive countries in the call centre market.

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