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3 Soft Skills

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1. The Software Industry and the Soft Skills

The knowledge society is based on a new generation of ICT jobs which merge from the industrial productive system (Hardware and Software production) and the services providers system (Third Sector). Being a device of the human communication the ICTs forge a new paradigm in the labour market analysis. Between the demand and the supply a new analytical cluster should be studied: the population of ICT users. This type of population neither offers nor consumes products, but through consumption it generates new product, as it happens in the ICT open source system. The multiplier effect is greater than ever since the consumer is an actor of the productive system itself. The development of Internet pushes a new economic demand based on a new type of good transaction where the process, free of the price, feeds new needs ranging from the entertainment and private life up to new form of reciprocity and solidarity (Alcohol Association, Anorexia, Eating disorder chats, etc).

Still, the ICT sector covers social needs (ageing population, disability, health problems, environmental threats, etc.) with an added impact on social professions.

The knowledge society embraces all these new forms of human interaction and human support which are not classified in economic terms but they do act in economic terms.

Since the technical knowledge required by the new ICT actor is not demanding due to the "user friendly" ICT facilities, it is worth denoting as "soft skills" those skills used in all jobs of the knowledge society using the computer.

These soft skills are different from "hard skills" required by the ICT or Computer industry (which are traditionally divided into hardware and software skills), in that they facilitate tditional professions or invent new jobs, as in the environment or entertainment sectors.

This above mentioned strand converges into the communication process in two directions.

The first direction refers to the gender divide in the "knowledge society" which caused the distribution of boys and girls into two different educational paths, namely the scientific profession for boys and humanistic professions for girls.

Even if the current situation seems to be changed (female enrolment rate in mathematics and science has increased) the previous cohorts of female and male population brought to the current labour market formed by scientific professions absorbed by man and humanistic professions covered by women.

Thanks to the ICT soft skills, women can play a different role both for their professional career and for their role in the knowledge society at large.

The second direction refers to the Soft skills pertaining to the intercommunication process. While the first direction is covered by the survey, the second one will be briefly deepened in this report.

2. The Balance Between the Education Supply and the ICT Economic Demand

The development of economic productive system and the new social services pushed by ICT facilities grew faster than the education system in Europe and in other countries with a consequent unbalance between demand and supply of the ICT skills.

Several studies were conducted at Member State level so as to understand the right education policy to be implemented.

A study carried out in Northern Ireland during the period of the gathering of the Lisbon European Council, pointed out the severe shortage of "soft" ICT skills. The Report *"A Study of the Northern Ireland Labour Market for IT Skills"*, was completed by the Priority Skills Unit at the Northern Ireland Economic Research Centre (NIERC). It indicated that significant progress has been made in balancing the skills supply and demand of the local Software Industry at entry level but it added that while there was a continuing difficulty in finding all of the experienced people required for the industry.

Two main considerations emerged from the remarks of the Minister for Higher and Further Education, Training and Employment regarding the research:

- the need to balance ICT shortage towards the "demand side",
- the need to provide ICT education to cover the skill shortage.

A range of scenarios was examined, each with different assumptions about the growth in employment and the output of educational institutions.

Social Partners welcomed the report underlining its relevance in understanding the dynamics of the ICT sectors. However the shortage of ICT skills was confirmed given the rapid growth of the ICT sector, a problem experienced to an even greater extent in other regions.

Five years later, the ICT sector seemed to have changed in the nature and in learning styles but the same question remains on the relationship between ICT demand and supply even if the two spheres are less rooted into the ICT industry and more positioned into new sector such as entertainment, heath and assistive technology.

The gender dimension added another factor for change. In 2000s, the ICT labour market was anchored into a masculine paradigm where boys covered the better paid positions and the ICT core skills and women's enrolment rate in computer sciences was sensibly low.

3. The Epistemology Discussion on Soft Skills

Another way of seeing ICT soft skills refers to the traditional separation of professions between agriculture, industry and services. As said before, the ICTs introduce a new paradigm in analysing the labour market. Following this approach, the ICTs, being focused on the communication process, multiply the relevance of soft skills as a new scenario for the European development.

Application of ICTs can be found in most domains, from heath care (telemedicine, e-therapy, VR therapy, etc) to learning and training (e-learning, etc), from entertainment (multi-user on line gaming, etc) to business and commerce (e-commerce etc). Moreover, the birth of multi-user multi-agent 3D worlds, simulated graphic worlds where real people interact and communicate with other people over distance with autonomous agents (3D characters also called *alvatar*) combine immersiveness and multimodal input output VR technology with possibilities of mediated social interaction, leading to an increase and modification of the experience of the physical and social world. This new human interaction and communication is defined as "Experiential Technology", a technology able to provide a compelling "illusion and non-mediation" to the user who finds herself or him self actively immersed in a world of experience. The new interpersonal communication and the sense of being in the world with other people spring off the birth of new epistemological issues relating:

a. role of women in the knowledge society
b. ICT software's ethical design (CMC, chats, blogs, on line relationships, etc)
c. ICT technological solutions (characteristics able to elicit a sense of being there and interacting with someone).

The above mentioned realms entail different dimensions.

Women are at risk of exclusion either in the ICT private use and in the professional domain for historical reasons (gender division of society and relating educational enrolments). At the same time, women playing a key role in the family due to the gender division of labour market, are not able anymore to face the youth problems and able to communicate with the new youth ICT language. In this respect, ICTs alter and modify the way communication within the family is experienced.

ICTs contrast the role of the body (physical presence) in the communication process and turn human relationships into a sort of "soft"-ware relations. The meaning of context is altered by the ICTs which introduce three shifts.

The first one refers to an independent vision of the relationship between "text" and "context". The second one limits the social context to the spatial-temporal characteristics rather than the face to face emotional dimension. The last one shift is talked through the meaning of context as the result of a choice made (chat access) rather being conceived as a collection of explicit and tacit conditions.

The ICT world employs cohorts of labour market (youth and adults) generation in providing and using ICT products which are means and ends at the same time. A business world of "hard" and "soft" skills" which exchange information focused on the immediate need satisfaction and not to a sustainable perspective.

Within the above mentioned "context" the need of "soft skills" able to "control" the information process towards a more sustainable society, arises.

4. Hard and Soft Skills

The old way of doing business through power, hierarchy and individualism has been displaced by a workplace that values partnership, relationship and organizational learning. As a result, soft skill development has become an essential part of the corporate training and development tool kit. In a recent study of 1400 corporate chief information officers, 97% agreed that soft skills in the workplace are increasingly important.

Active listening, interpersonal skills, and providing effective feedback are a few of the skills that come to mind when we think about soft skills. There are others which incorporate these skills but are less familiar to us. Creating and maintaining openness, using dialogue effectively, and checking for understanding are likely to become the new generation of soft skills basics because of their power to facilitate group and organizational learning.

While soft skills as a concept seem basic, the fundamentals of these group soft skills cover a large range of "social dimensions": openness, dialogue and understanding.

5. Redefinition of ICT Skills

As part of the overall labour market economy, the ICT jobs resented from the above mentioned discussion on "soft skills".

Nature of ICT Skills

As the utility of ICT is discovered across different economic sectors, so these sectors will increasingly incorporate ICT applications and services and will require an ICT-skilled workforce. This situation leads to rapid changes in, and blurring of, sectoral boundaries, and also of occupational categories.

The enlargement of ICT sector implied a multiplication of jobs in term of number of work force and in term on its quality.

Education of ICT employees

The qualifications profile of ICT workers is particularly illuminating since it reveals the internal shape of the industry. The high number of workers with intermediate ICT skills is reflective of an ICT economy that has limited expertise in R&D and technological development. This corroborates the current picture of for example the South African ICT sector as being more involved in ICT services and application of systems, rather than in the development of new products or utilities.

Gender Representation of the ICT Workers

The South African case offers another example on the gender issue and in the ICT supply as well. In terms of equity, blacks (Africans, Indians and coloureds) and women are under-represented in the ICT labour force. While the number of blacks and women in the ICT workforce has increased since 1990, the pace has been relatively slow. By 2000, black staff in the ICT sector was under-represented at the skilled and management levels. The dominance of white males, especially in the echelons of ICT management (87% male and 65% white in 2000) continues.

Supply of ICT Courses Public and Private

Supply trends in higher education indicate that, over the past ten years, apart from some fluctuations, there has been a general increase in the number of graduates in ICT and related fields.

Particularly important is that in 2001, more than 75% of all people who acquired ICT-related qualifications obtained them from private institutions that offer courses at the pre-graduate level. It is clear that, although the higher education sector provides access to graduate programmes in theory-based ICT skills, more flexible private training organisations provide the bulk of focused professional training.

Most courseware offered by private ICT-training businesses is presented at post-school leaving certificate level (Matric). Less than 1% of all courses claimed to be targeted at the equivalent of a higher education qualification, such as an undergraduate degree level. The majority of providers do not indicate that they require entry qualifications.

Private training driven by providers and the industry does allow for responsiveness to changing skills needs. The short duration of most courses and the frequency with which they are offered enables corporate and individual clients to shape their training programme to meet their needs.

The traditional higher education institutions (universities and technikons) are critical to the training of high-level ICT workers, which produce a small proportion of graduates. Of these, only a small proportion pursues postgraduate study in ICT. This has serious implications for the supply of high-level ICT workers. Holders of these qualifications would be expected to specialise, conduct R&D, and to undertake innovative work. Furthermore the same postgraduates are critical to the staffing of higher education faculties in the ICT field.

Self-Learning of ICT Skills

Very little is known of the extent, content and intensity of in-house ICT training. It is presumed that in-house training takes place mostly in enterprises with the workforce size or financial resources to undertake the provision of such training. For these reasons, most small and micro enterprises are unlikely to be doing ICT-training in-house, leaving them dependent on private training providers.

The Demand of ICT Skill

The rhetoric around general ICT skills shortages is frequently exaggerated and would be best understood in terms of specific short-term scarcities in particular skills that can coexist alongside an oversupply of other skills in a specific sub-sector. Furthermore, there are claims of skills shortages that are not necessarily valid and are consequences of particular employment practices. For example, recruitment practices that involve raising entry requirements will reduce the 'available' pool of labour, and this in turn may be reported as a skills shortage.

6. The Growth of ICT Skills and the Development of Soft Skills in the ICT Sector

In the ICT sector, workers are asked to be technically proficient and to be able to work competently with their peers and clients. Consequently ICT companies seek and reward people with a confident ability in displaying these repertoire of skills.

According to the literature on competence and skill, soft skills are described as being inter-personal and intra-personal skills that are necessary to be effective in the workplace and include skills relating to communication (written, verbal), collaboration/teamwork, initiative, leadership ability, coaching/mentoring/people development, personal mastery/self-reflection, planning and organising, presentation skills, problem-solving skill. Taken from the ICT world, the difference between soft skill and hard skill assumes a relevant importance in all professions. Soft skills, are not meant as competences related to the software industry (capacity to design a ICT programme and so on) but they are linked to the social dimension of profession which emerge in the context of work.

Soft skills are not differentiated from hard skill (competences related to the hardware component) but they are distinguished by technical skill that each profession has. As in every enterprise, the ICT companies do not want soft skills per se but ability or competence to operate effectively and appropriately in situ in the workplace, recognising and orienting to context.

Since the early 1990's, in many respects, Australia has been a leader, in terms of the breadth and depth of the research and initiatives, in addressing generic skills needs. Key initiatives have included the Mayer Commission (1992), which identified eight key competencies, the employer-led Employability Skills Framework (2002), which incorporated the Mayer key competencies, and the Essential Skills Action Plan.

Professional bodies such as ICT Engineers Australia, commencing with National Review of Engineering Education (1996) and reported as Changing the Culture: Engineering Education into the Future have also embraced the necessity for the holistic development of professionals by emphasising the development of both hard and soft skills in their education.

This initiative expressed the compelling need for engineering education to undergo a culture

change, emphasising that the profession must become

...more outward looking, more attuned to the real needs of community. Courses should promote environmental, economic and global awareness, problem solving ability, engagement with information technology, self-directed learning and lifelong learning, communication, management and teamwork skills, but on a sound base of mathematics and engineering technology.

The Australian movement towards soft skills brought to the concept of "competence as essentially dealing with practice". In this respect and considering the practical setting of work the competence can be always considered "competence-in-practice".

The area of multi-literacy pedagogy uses constructivist perspectives to highlight the role of a student's socio-cultural capital in their own development and their interactions to gain knowledge. The term 'situated practice' is derived from multi-literacy pedagogy. It is a descriptor that is used to articulate the importance of first understanding and addressing a student's own experience, which have been defined by cultural and sub-cultural diversity, before their learning practices can inform, engage and ultimately transform.

The Smyth County Industry Council, a governing body based in the US, conducted a survey and identified 60 soft skills which can be grouped into three main traits:

- Positive work ethic.
- Good attitude.
- Desire to learn and be trained.

A good attitude is defined as a behavioural skill which can be developed through continuous training and represents the reactive nature of the individual and his way of looking at things with the anticipative perspective.

Most of the ICT leaders observed that they could find workers who have "hard skills" i.e. the capability to operate machinery or fulfil other tasks, but many potential hires lack the "soft skills" that an ICT company needs.

The survey highlighted that CEOs and human resource managers said they are ready to hire workers who demonstrate a high level of "soft skills" and then train them for the specific jobs available. The ever-changing impact of technology has given hard-skills-only workers a short shelf life.

According to results of the Workforce Profile, (source: www.workforce.com) the more valuable employee is one who can grow and learn as the business changes. This finding has a bigger relevance for ICT workers.

It is recognised that Soft skills are as important as traditional hard skills to an employer looking to hire -- regardless of industry or job type. This could offer a major breakthrough as educators and training providers seek to develop and cluster training courses to fit business and industry needs.

7. The Need of a New ICT Soft Skills Education Supply

In general, when talking about ICT it is believed that IT jobs involve working in the backroom with no interaction with people and poor communication skills.

While IT market has been growing rapidly in the last few years and organizations continue to spend a significant amount for IT to maintain and improve productivity because their business operations rely heavily on technologies, few investments have made in the ICT professions need analysis and related education curricula. As technologies become a

commodity product which is available to all due to the decrease in price and improvement in performance, organizations need to actively seek ways and strategies to gain competitive advantage through differentiation by exploiting the available technologies. The strategy of companies refers to "adaptation" as the existing technology and software to the specific productive system operative in specific "situ".

To address the issues of IT skills shortages and the misconception about the nature of IT professions, the role of education is recognized by many parties including governments, industries, employers and professional associations. Specifically, Universities are expected to take the major role in developing the IT skills demanded by the industries. The IT curricula at Universities, therefore, need to be continually evaluated and revised to ensure that the programs still reflect the demands of the marketplace. Considering the ICT professionals who link the Demand with the ICT Supply, Business knowledge seems one of the most important skills that ICT professional should possess and it includes knowledge of business functions, ability to interpret business problems and develop appropriate technical solutions, and ability to understand the business environment. In addition, some knowledge such as the ability to work collaboratively in a team project environment, ability to develop and deliver effective, informative and persuasive presentations, ability to plan, organize and lead projects and ability to plan, organize and write technical manuals, documentations and reports (in short soft skill) are also considered crucial for the profession.

The soft skills are the second half of the coin of the ICT intermediate profession which accompany the Technical skills which are also important for IS professionals including general knowledge in data and process modelling for system analysis and design, programming, database development, information systems planning, management and evaluation and information access and security. The importance of soft skills that include teamwork and collaboration, planning and leading projects as well as presentation and writing skills for ICT profession is considered a key competency which can play a decisive role when an organisational problem is to be set.

The soft skills can be classified within a matrix where the rows represent the ICT knowledge content and the columns show the ICT career development.

Monitoring and Controlling, Time Management and Management skills in general pertain the ICT profession which are at higher level of project management. The ability to adapt material to the client and to develop and deliver effective, informative and persuasive presentations, are also useful soft skills. Ability to teach others something, being a key competence in team work, is part of the ICT jobs chain.

8. Multiple Meaning Framework for Soft Skills

Scholars have shown that the competence at work is based on the behaviour of a person and on its technical expertise.

In the ICT industry there is an increasing demand for engineers not just having excellent competence in their field of specialization but also a good understanding and practical experience in the so-called social or soft skills. For these reasons non-technical courses such as language training, self-management, personality development, communication skills, project management, economics and others have been developed in university curricula in recent years Part of these soft skills are Communication Skills and Team Work, and Negotiation Skills and Project Management.

9. Soft Skill for the ICT Enterprise

In this final section the need of soft skills for the ICT activity, with particular emphasis to the starting up of the ICT business, is discussed with the view to point out the role of women in the ICT sector.

When balanced with a good management team and an effective human resource management system, soft skills provide a way to get the highest return on the investment in terms of human capital.

Soft skills are critical to all facets of the ICT venture. They can provide great energy and cohesion for the members of the enterprise.

In general, a new ICT enterprise shows a culture of teamwork and commitment coupled with high quality technical execution. Technical and professional skills of the people in the new economic venture are the basic knowledge and the basic assumption for the business activity while the soft skills are the added value which can position the new company along better performance and higher competitive advantage.

Soft skills like leadership, decision making, conflict resolution, negotiation, communication, creativity and presentation skills, are a crucial component of the ICT competence which sustain the "hard component" (technical skills) to achieve the economic objectives.

Both soft and hard skill should be managed by a third one skill represented by the "management skills".

Numerous studies have shown that the vast majority of projects, which focus on systems development and deployment in big organizations, are late, over-budget, or cancelled. These studies have also shown that the underlying causes of project failures are rarely technical. Most project failures can be attributed to breakdowns in communication between executives and the talent, teams, and project managers. When the talent management system, including executive teams and skill sets (technical, professional and soft skills), are not balanced and optimized, then financial capital and human capital do not pay the returns for which one hopes.

Many entrepreneurial ventures fail even though they have great ideas and great talent because they lack the appropriate structures and processes to move forward. In addition, when the focus is too much on 'hard technical skills,' the dynamics in the workplace become difficult to manage and many ICT companies never see their first anniversary because they lack soft skills. It is worth noting that the soft skill, as they are classified and developed by the literature and the practice at work, related mainly to the skills which are typical female skills. This is why the relationship between women participation in the labour market and soft skills is a relevant link.

Without social or soft skills poor decisions are made, negotiations go poorly, communication lacks passion, and leadership withers away fairly quickly.

Some of the skills are related to attitudes, while others are processes, and still others relate to awareness. Similar skills are being grouped together into 6 different categories being:

- Focus on Humility and Self Confidence
- Emotional Intelligence Quotient (EQ)
- The Core Incompetence
- Sensitivity to Context - Timing is Everything
- Managing Perceptions
- Continuous Learning

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