# ICT Skill Development in the Asia-Pacific Region
## Part one: the gap between demand and supply

**Inside**

## Summary

*The developing countries in the Asia-Pacific region have, during the last ten years, experienced phenomenal growth in the development of their Information and Communications Technology (ICT) industry, and in the consumption of ICT products, following exponential ICT penetration, particularly in urban centres of the region. The Asia-Pacific region is emerging as the major source of ICT products to the world. China is the now the largest source of ICT hardware products, and India the preferred source of ICT software and business process outsourcing services. Other emerging economies in the region, notably Indonesia, Malaysia, Philippines and Vietnam, are also expanding their ICT-led economic development with increasing exports of ICT products and services, and rapidly increasing domestic consumption of ICT products and services.*

*As a first in the series of two complementing APDIP e-Notes, this APDIP e-Note summarizes the major findings and conclusions of a recent study on ICT human resources development in the Asia-Pacific region, undertaken by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). The conclusions of this study indicate an increasing gap between the demand and supply of ICT skills in this region. The demand for ICT professionals in the developing countries of the region will rise to 90 million by 2010. The supply of ICT professionals, however, from the present and potential colleges, universities and training institutions in the region would not be able to supply over 10 million ICT professionals each year that the region needs to fully bridge the gap.*

*The quality of skills being imparted at present is seen by the ICT industry as inferior and unacceptable. In most cases, employers have to retrain fresh graduates, involving considerable investment of time and financial resources. Demand and supply imbalances are also evident at individual skill and occupational levels. The development of ICT user skills is seen as a much bigger challenge with the need to train or retrain some 239 million non-ICT professionals in ICT skills as ICT usage in the region increases.*

*In the wake of increasing usage and penetration of ICT, some traditional occupations may become redundant while other new occupations will emerge and the skill needs in most occupations will significantly alter. Strategic actions at the national levels are required to sharply increase the ICT skill development capacity, both in terms of the numbers to be trained and the quality of training imparted. Development of regional ICT skill classification standards is an urgent requirement. National ICT skill classification standards need to be harmonized with the developed regional standards. Given the dynamic nature of ICT, the need for building models and systems that would track the ICT skill demand and supply trends on a continuous basis is essential.*

## Where is the Asia-Pacific region heading in the global ICT markets?

The global ICT market size has steadily risen from approximately US$1 trillion in 1993 to a value of nearly US$3 trillion in 2005, and is projected to increase by about 6 percent a year to reach a size of US$4 trillion in 2010. The growth of the domestic ICT market in the Asia-Pacific region has been growing faster than the world average. As a consequence, the share of the Asia-Pacific region's ICT market (excluding Australia, Japan and New Zealand) in the global ICT market is estimated to have increased from 5 percent in 1993 to about 9 percent in 2005, and is projected to increase to about 14 percent in 2010 (Figure 1).

The region is also emerging as the major source of ICT products and services to the world ICT markets, with China and India recognized as world leaders in ICT hardware and software services, respectively. The regional export of ICT products and services to markets outside the region, mainly to the developed countries of the west, has been rapidly increasing during the last ten years. This trend is likely to continue and indeed accelerate in the next decade.

**Fig 1: World and Asia Pacific ICT Market**

Expanding domestic use of ICT and increasing export of ICT products and services from the region have led to rapid expansion of the ICT industry in the region and consequently, to an exponential growth in the need for ICT professional skills and ICT user skills. These trends are likely to accentuate in the years to come.

## How can we define and classify ICT skills?

There is no universally-accepted definition for what constitutes ICT skills, nor any universal standards for classifying ICT skills. In the United States, the largest user of ICT, its Bureau of Labour Statistics has a classification scheme that focused on the traditional hardware and electronics of ICTs. The ISCO88 international standards for occupational classification lists 23 occupations related to ICT. New and improved schemes have been proposed in Europe and the United States that cover new and emerging occupations in ICT.
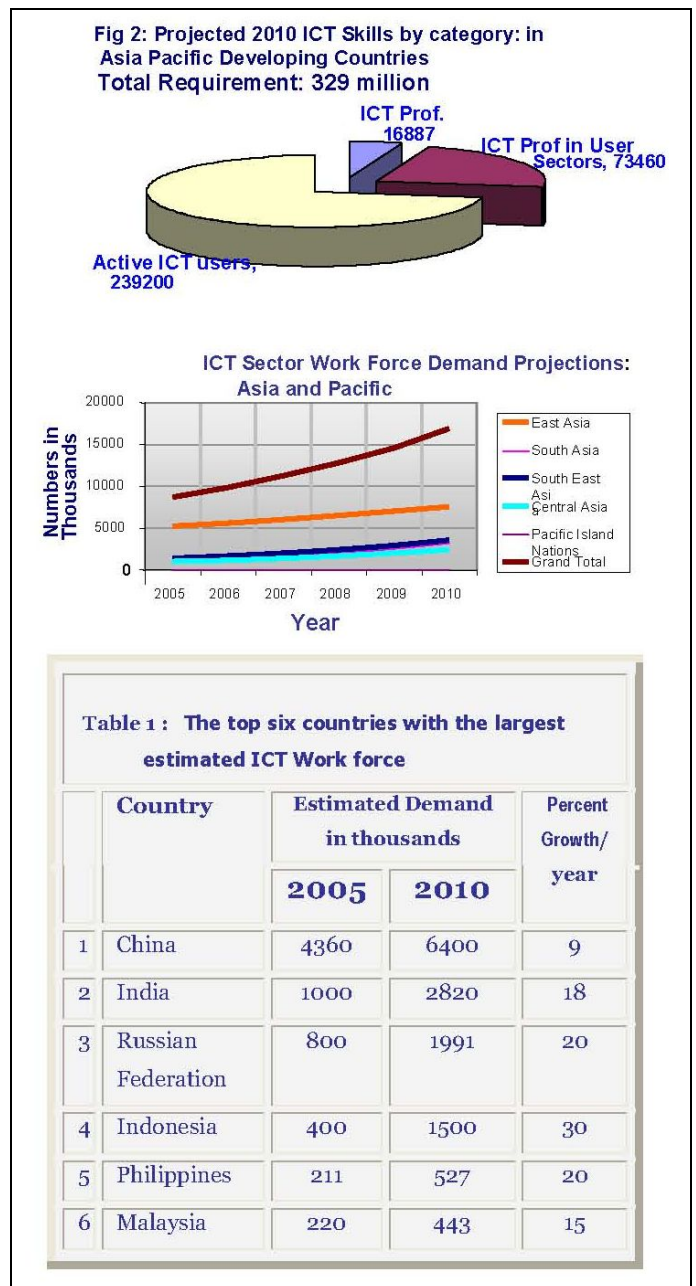
In the Asia-Pacific region, ICT skill and occupation classification has taken place in some of the countries at the national level. However, these national definitions and classification schemes are not harmonized with one another.

With rapid expansion of the domestic use of ICT, the ICT user skills within the region need to be recognized as of equal importance to the professional ICT skills. This would mean that new occupations may need to be recognized that have amalgamation of ICT and domain skills. Such new occupations are already being recognized in Europe and the United States, the same must happen in this region.

## What are the present and potential needs for ICT skills in the Asia-Pacific region?

The estimates and projections of demand for ICT skills in the developing countries of the Asia-Pacific region were made on a country by country basis, analyzing and evaluating the existing trends and emerging developments in each country. The demand for ICT skills was projected in two broad categories - professionals in the ICT supply industry and professionals in the ICT user sectors. The total demand for professionals in the ICT supply industry is expected to rise sharply and reach a level of about 17 million in

2010. The demand for professionals in the ICT user sectors will rise faster to reach a level of 73 million in 2010 (Figure 2).



**Fig 2: Projected 2010 ICT Skills by category: in Asia Pacific Developing Countries Total Requirement: 329 million**

ICT Prof. 16887
ICT Prof in User Sectors, 73460
Active ICT users, 239200



**ICT Sector Work Force Demand Projections: Asia and Pacific**

| Table 1 : The top six countries with the largest estimated ICT Work force | | | |
|---|---|---|---|
| | Country | Estimated Demand in thousands | | Percent Growth/ year |
| | | 2005 | 2010 | |
| 1 | China | 4360 | 6400 | 9 |
| 2 | India | 1000 | 2820 | 18 |
| 3 | Russian Federation | 800 | 1991 | 20 |
| 4 | Indonesia | 400 | 1500 | 30 |
| 5 | Philippines | 211 | 527 | 20 |
| 6 | Malaysia | 220 | 443 | 15 |

In addition, it is expected that the need for ICT training and retraining of non-ICT professional will be extensive as ICT penetration and diffusion gains momentum in the region. These ICT users have been named here as 'active ICT users'. The ICT skill demand for ICT active users is estimated to rise to about 239 million by the year 2010. Major demand for ICT professionals is expected to be concentrated in six countries, namely, China, India, Indonesia, Malaysia, Philippines and Russia. These six countries together will account for nearly 80 percent of the total regional demand for ICT professionals.

## Can the region meet its present and potential needs for ICT skills?

The total college and university enrollment in the developing countries of the Asia-Pacific region is estimated at 15 million per annum and rising each year by nearly 6 percent. There is an increasing trend towards enrollment in ICT and related technical areas. In addition to ICT training provided by universities and colleges, a large number of private training institutions provide short-term occupation-specific ICT training. In spite of the sharp increase in ICT professional training at the university/college level and training provided by private institutions, the supply is likely to fall far short of the demand for ICT professionals. A yearly shortfall of nearly 3 million is estimated.

The quality of training and skills imparted by existing universities and colleges is seen by most ICT employers as inferior and not up to the acceptable level. Thus, in addition to the demand/supply gap in numbers, there is an increasing skill quality gap.

There is not only demand/supply imbalance at the aggregate level, it is apparent that there are also imbalances in the demand and supply of ICT skills at specific skill and occupational levels within the ICT sector. The ICT skill demand/supply matrix varies from country to country. But on a regional basis, it can be seen that some ICT skills are woefully in short supply. For example, skills related to: ICT application, ICT security, graphics and animation, ICT research and training, and localization and open source programming.

## What are the strategic options to achieve and maintain balance in the demand and supply of ICT skills?

The enrollment in ICT courses in universities and colleges of the region has to be increased significantly. In some of the countries the increase necessary to bridge the demand supply gap could be as much as 50 percent over the existing levels of enrollment. The quality and nature of training provided by the present and potential ICT training institution has to undergo significant change. Broad-based conceptual training will need to be supplemented with skill-based training, cognitive and analytical skill development. Given the dynamic nature of the ICT industry there is a need for continuous interaction between the ICT employers and ICT trainers.

The large number of professionals that must be trained and retrained as new technologies emerge indicates that the traditional modes of training may not be adequate to address the emerging gaps. Distance learning and remote training could be employed to supplement the traditional classroom training model.

The skill classification standards for the region need to be developed and harmonized with national standards. Quality of training in universities and colleges, and other training institutions need to be closely and constantly monitored. One of the strategic options for this purpose would be the establishment of regional and national ICT skill certification centres.

The ICT skill demand and supply trends need to be monitored at national and regional levels on an ongoing basis.

## Conclusion

The developing countries of the Asia-Pacific region are increasing their share of the world ICT markets and their domestic ICT consumption. As a result, the demand for ICT skills both in the ICT supply and user sectors is increasing rapidly. There are significant gaps between the demand and supply of ICT professionals. Existing institutions for ICT training in the region are unable to meet the demand for ICT professionals both in terms of the numbers needed and the quality of training demanded by the ICT employers.

The demand/supply imbalance is evident not only at the aggregate level but also at specific skill and ICT occupation levels. The ICT skill demand/supply gaps are likely to worsen unless the existing supply is increased through significant expansion of enrollment in existing training institutions, establishment of additional ICT training capacity, and most importantly through employment of innovative training methodologies including distance- and technology-based self-learning.

Monitoring the quality of ICT skills imparted by the ICT training institutions on a continuous basis is a necessity. This could be achieved through establishment of ICT skill certification centres at the national and regional levels.

The policy makers in the region must recognize that the expanding diffusion and adoption of ICT in the region will not only lead to increased demand for ICT professionals, it will also lead to significant changes in the demand for occupational skills across all economic sectors. In the wake of ICT adoption, some traditional occupations may disappear altogether, others will need significant changes in their skill sets and many new occupations will appear. In all occupations, however, the need for ICT skills will significantly increase.

It is necessary to recognize at the policy level what challenges the increasing gap between demand and supply of ICT skills pose. But that only constitutes part of the solution; concrete strategic action is needed as well. It has been discussed at several occasions what actions can be taken to handle the demand/supply

imbalance, for example at the Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT) Regional Forum on ICT Capacity Building in 2007. The second part of this series on ICT skill development in the Asia-Pacific region will discuss in further detail, the outcome of the forum and what actions can be taken to overcome the challenges facing ICT skill development in the Asia-Pacific region.

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*This APDIP e-Note is based on the author's paper, 'ICT Human Resource Development in the Asia-Pacific Region', which was presented at the APCICT Regional Forum on ICT Capacity Building held on 5 - 6 March 2007 at Incheon, Republic of Korea. The full paper can be requested from the author at raina@un.org*

## Additional Reading

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