CHAPTER 4

TALENT GROWTH AS AN EQUALISER: A VIEW FROM THE ICT INDUSTRY

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In 1848, Horace Mann, a champion of education in the US, wrote, "Education then, beyond all other devices of human origin, is a great equaliser of the conditions of men – the balance wheel of the social machinery."[1] Today in the early 21st century, we see Internet connectivity in much the same light, drawing together nearly three billion people into a global community to facilitate the exchange of ideas, resources and wealth.

However, even as Internet Protocol (IP) networks spread connectivity across the world, aided in part by the advance of mobile telephony, its march and the intensity of Internet use is hampered by a major constraint: a pervasive and worldwide shortage of skilled IP networking professionals measured in the hundreds of thousands, and forecasted to grow to at least 1.2 million by 2015, as we demonstrate below. As part of the broader information and communications technology (ICT) skills gap, the shortfall in qualified networking professionals persists even as high unemployment levels continue in many parts of the world, particularly among young adult populations.

This chapter first details the gap between the demand for talent in IP networking roles and the supply of qualified employees. The second section explores the demand drivers and the impact of the IP skills shortage. The chapter then concludes by identifying specific policies and programmes that governments, businesses and civil society can implement to close the skills gap and fully benefit from the power of the Internet.

SKILLS GAPS IN NETWORKING AND BEYOND

Networking technology is at the heart of the Internet, connecting devices and local networks with the global public Internet. Planning, designing, building, managing and supporting IP networks all require dedicated networking skills. In order to systematically analyse the supply of, and demand for, networking skills, Cisco partnered with the research firm IDC, to analyse the networking talent pool of 29 emerging market countries, across Asia Pacific, South America, Russia-CIS and Middle East/Turkey/North Africa regions.[2] The analysis measured the demand and supply of full-time equivalents (FTEs) in IP networking, defined as ICT professionals spending 100% of their time working with networking technologies.

The common trend across all regions in the analysis is that demand for employees skilled in IP networking far exceeds the available supply. This unfulfilled demand, measured in FTEs, exists today and is forecasted to grow over a three-year period in all regions. While the growth in the shortage of networking FTEs is highest in Russia-CIS (21% compound annual growth rate, CAGR, over 2012 to 2015) and the Middle East/Turkey/North Africa region (28% CAGR), those regions had a smaller absolute FTE gap in 2012 and are starting from a smaller base. At the aggregate level, based on the 29 countries in the sample, we see unfulfilled demand in networking FTEs rising from 762,523 FTEs in 2012 to 1,211,783 FTEs by 2015. Table 1 highlights summary level results by region (see Annex for detailed methodology and results).

The analysis highlights pervasive shortages, today and into the future, of various types of networking skills across all the countries and regions covered. Shortages exist for employees with both 'essential networking skills', comprising core networking (routing and switching) including network security, IP telephony and wireless networking; and 'emerging networking technology skills' related to specific technologies such as unified communications, video traffic, cloud computing, mobility, data centres and virtualisation. While essential networking roles comprise the majority of all FTEs demanded across the whole sample (67% in 2012; 62% in 2015), demand for personnel to fill emerging networking positions is on the rise as these new IP technologies spread (2012 to 2015 CAGR of 19% compared to 9% for essential networking positions).

At the country level, various differences appear in the growth of unfulfilled demand in networking skills, as well as in the level of unfulfilled demand measured as a share of total (filled and unfilled) demand. As illustrated in Figure 1, there are several countries where unfulfilled demand for networking skills is growing at very fast rates, such as in Kazakhstan, Turkey, Ukraine and Egypt (with 2012 CAGRs of 42%, 40%, 37% and 34%, respectively). Saudi Arabia appears as an outlier with the highest forecasted gap in unfulfilled demand for FTEs at 78% of total demand. The most advanced economies in the sample – Australia, South Korea, Taiwan and Hong Kong – all cluster together and exhibit both some of the lowest forecasted gaps for 2015 and the slowest growth over the period.

This problem extends beyond networking. Similar gaps and mismatches can be found in the broader ICT industry, sectors driven by science, technology, engineering and mathematics (STEM) skills, and the general economy as a whole. For example, in the US from 2005 to 2012, three to four times more job openings appeared for STEM related positions than for non-STEM roles.[3] Cisco estimates that in 2014, there will be a shortage of more than one million information security (including networking professionals worldwide.[4] In Europe, the 'e-skills' gap in 2011 was approximately 255,000 individuals, forecasted to rise to nearly 375,000 in 2015 based on a cautious GDP growth estimate, or 864,000 if the continent experiences stronger economic growth.[5] The Global Talent Competitiveness Index 2013 report highlights that in the next two decades, there is a potential shortage of nearly 40 million 'high-talent' individuals across the globe, which amounts to an unfulfilled demand of 13% for such workers.[6]

RISING DEMAND FOR NETWORKING PROFESSIONALS

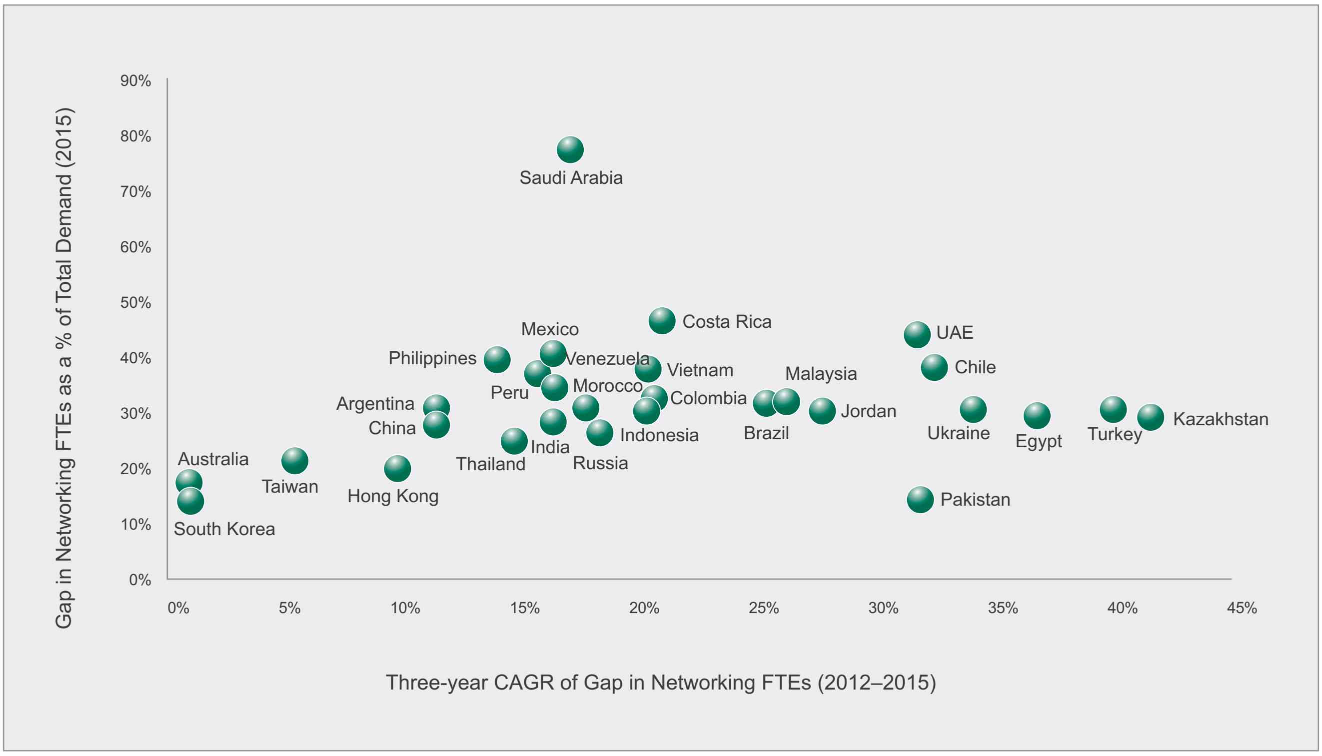
A number of factors appear to impact demand for networking employees. While identifying the causal drivers of the gaps through statistical analysis is beyond the scope of this chapter, some potential drivers are discussed.

Table 1: Regional comparisons of networking employment gaps

Gap in the Number of Full-time Equivalent Employees Needed in Networking Positions	2012	2015	CAGR
Latin America	174,866	296,163	19%
Russia-CIS	60,949	107,390	21%
Middle East/Turkey/North Africa	47,945	102,108	28%
Asia Pacific	478,763	706,122	14%

Source: Lee (2013); Adam (2013); Adducci et al (2013); Kroa et al (2013)

Figure 1: Country comparisons of networking employment gaps



Notes: CAGR – Compound Annual Growth Rate; FTEs – Full-time Equivalents
Source: Lee (2013); Adam (2013); Adducci et al (2013); Kroa et al (2013)

A relationship appears to exist between increasing Internet connectivity and the networking skills gaps, based on Internet, mobile broadband and fixed broadband penetration. By observing correlation coefficients, which measures the linear relationship between two variables, we can see that in general, the greater the Internet user base in a country, the larger the gap in networking FTEs (with a correlation coefficient of 0.55). Similar relationships to the gap exist in the cases of mobile broadband subscription (0.55) and fixed broadband subscription (0.59; see Table 2).

Increasing digitisation within economies, as well as globalisation, fuels the expansion of IP networks and the demand for networking labour. The connectivity needs of citizens, organisations, governments and businesses increase as they further integrate ICT systems into their daily lives and operations. Businesses in particular, are embracing ICTs to increase operational efficiency, reduce expenditure, increase revenue and better compete against their peers. Firms slow to adopt ICTs risk falling behind as Brynjolfsson et al (2009) demonstrate; their analysis shows that particularly in industries that are utilising ICTs intensively (such as finance and health care), higher-performing firms are pulling away from their competitors at a faster rate. They note that the "difference between being a winner and being a lagging firm in ICT-intensive industries is very large and growing. Using technology effectively matters more now than ever before."[8]

In addition, services enabled by ICTs – business process outsourcing, call centres, software development and systems integration, research and development, and analytics, for example – are growing rapidly, aided in part by the ability to locate these services in remote destinations far from the customer and client base because of networking and high-speed communications.[9]

Economic growth can also drive up the demand for networking professionals because of subsequent ICT investment and the talent needed to connect and manage communications networks.[10] In some cases, ICT employment has even demonstrated resilience to economy-wide cycles. For example in Europe, employment in ICT grew at an annual average rate of 4.4% from 2000 to 2010, and even exhibited positive growth during the global financial crisis. Between 2008 and 2010, ICT employment growth continued at 2.65% in Europe.[11] It may be that during economic crises, the focus on ICT skills development is heightened, as when normal business activity resumes, the ICT employment gaps return, often to an even greater degree.[12]

Table 2: Relationships between the networking gap and Internet penetration

Correlations between Gap in Networking FTEs as a % of Total Demand and Internet Penetration	Correlation Coefficients
2012 Internet Users Penetration	0.55
2012 Mobile Broadband Subscription Penetration	0.55
2012 Fixed Broadband Subscription Penetration	0.59

Source: ITU World Telecommunications Indicators Database 2013; Lee (2013); Adam (2013); Adducci et al (2013); Kroa et al (2013); authors' calculations

THE MISSED OPPORTUNITY

Skills gaps in the ICT industry (comprising of IP networking technology, as well as other sub-categories such as software development, database design and others) reflect a shortfall in reaching potential economic output. Countries that are unable, or unwilling, to match their supply of networking FTEs with overall demand miss an opportunity to grow their economies.

Chapter 1.3 of the *Global Information Technology Report 2013: Growth and Jobs in a Hyperconnected World* articulates the mechanisms by which the ICT industry creates employment and economic activity. For example, broadband deployment leads both to short- and long-term growth due to direct labour and capital investment, as well as indirect and induced labour created by upstream suppliers and services. The total short-term employment impact has been measured at up to 2.78 additional direct, indirect and induced jobs created per employment opportunity focused on broadband network construction. The broader adoption of ICTs across an economy by consumers, enterprises and governments – termed 'digitisation' – is credited with providing a "US$193 billion boost to world economic output, and created six million jobs" in 2011.[13,14]

The employment impact of ICT is particularly acute in emerging markets where ICT-related positions tend to be compensated at rates above the country's average wage, and have strong indirect and spillover effects. For example in India, four indirect employment opportunities were created by every new job in the ICT-enabled business processing industry.[15] Similar analysis highlights that each ICT position created leads to two to three jobs in other sectors in the Philippines, and 2.4 jobs in South America. Even in developed countries such as the US, each ICT-related position leads to four additional jobs created in a local economy.[16]

In addition to the loss of potential employment effects, accepting a prolonged networking skills gap is a direct lost opportunity both to advance the ICT industry in a country, as well as to gain from the indirect impacts to other sectors of an economy. National competitiveness can also suffer, as it is strongly correlated with the level of development of a country's Internet network environment (with network readiness and country competitiveness having a correlation coefficient of 0.90).[17] A prolonged shortage of networking employees may also hinder development of a country's innovation edge, as country comparisons also show a high correlation between network readiness and innovation (with a correlation coefficient of 0.86).[18]

EXPANDING SUPPLY AND POLICIES TO CLOSE THE NETWORKING SKILLS GAP

Increasing the overall supply of IP networking professionals in a given economy is challenging in the very short term because the nature of specialised training requires coursework and certification. However, targeted policies and programmes can make a significant impact and grow the labour supply. The existing pool of qualified labour in any country is determined by three main factors: the number of new employees with networking skills (graduates) entering the labour force; the ease by which individuals can shift careers into networking; and immigration of new talent from other countries. Public policy and targeted training programmes can help increase these three elements of networking skills supply.

In terms of public policy, more effort needs to be put in to increase the number of trained ICT, and specifically, IP networking graduates from universities, technical colleges and technical training centres. Diminishing interest in formal ICT training, such as networking and computer science, is resulting in falling replacement rates and contributing to the growing gap in unfulfilled networking demand. In the US, the number of computer science bachelor degrees conferred has steadily fallen from a peak of 59,968 in 2004 to 38,496 in 2009.[19] Education policy can target specific groups to embed interest (starting early with primary and secondary education) as well as provide employment training (university level and transitioning adults).

Integrating elements of computer science, such as basic coding logic and problem solving, as well as general Internet technologies, into general primary and secondary education curricula can help to introduce students to the basic functioning of computers, IP networking and software.

This helps to generate interest in and curiosity about these topics at an early age.[20] However, many schools do not place the same value in computer science training as other basic courses. While technical ICT training, including computer science coursework, may be present in curricula, particularly at the high-school level, often the courses are presented as electives and do not count towards graduation requirements. Proactive education policies include allowing students to fulfil graduation credit requirements with ICT and computer science courses, or even mandating basic ICT training as part of a science or maths requirement, ensuring sufficient ICT training opportunities exist for teachers, and supporting development and implementation of higher-level ICT placement courses such as those in the Advanced Placement and International Baccalaureate programmes. Organisations such as the STEMconnector and Computing in the Core are proactively advocating for policy change and legislation that will ensure greater support for ICT training.[21]

Public policy on immigration also impacts the immediate supply of skilled networking employees. Strict limits on the number of temporary and immigrant visas that can be issued for skilled labourers can impede the ability to satisfy unfulfilled demand. In the US for example, applications for H1-B visas (reserved for workers in high-skilled fields including ICT and networking) reached the outlined limit within a week after the application process opened.[22] Similarly in Saudi Arabia, the large unfulfilled demand for employees with networking skills is partly a result of strict visa regulations that exacerbate the difficulties that businesses face in finding employees with technical skills and the ability to understand and communicate in English.[23] Some countries have even implemented visa programmes specifically targeted at technology workers and entrepreneurs such as Canada's Entrepreneur Start-Up Visa (being marketed to frustrated H1-B visa holders in the technology hubs in the US), Chile's Start-Up Chile programme and the EU Blue Card programme focused on attracting high-skilled workers to alleviate Europe's growing digital skills gap.[24]

Tailored training programmes can also accelerate the number of skilled networking employees joining the labour force. Direct training programmes are often administered through government agencies, academia or through public-private partnerships (PPPs). These programmes can help target young people as well as support transitioning adults with technical skills to embark on new career paths. One such example of this approach is the Joining Forces IT Training and Certification Program. This partnership between the US government and ICT industry companies[25] focuses on equipping transitioning military service members with technical training to prepare them for industry ICT certifications, so they can find employment after their military careers. Another PPP involving the US government, the US Technical Training Institute (USTTI) has been providing in-depth technical training in ICT to in-career individuals around the world since 1982 (see box below). Similarly, Raja et al. (2013) detail a number of PPP ICT training programmes

USTTI: A MODEL FOR GLOBAL COMMUNICATIONS TRAINING

In 1982, US ambassador Michael R. Gardner launched a unique PPP initiative to "provide tuition-free training to developing country officials and entrepreneurs who build, regulate and maintain the communications infrastructures" of their countries. Structured as a not-for-profit entity, the programme was dubbed the US Telecommunications Training Institute, or USTTI, and continues to be supported today through funding and staff time contributions from various US government agencies and corporate members.

The programme offers tuition-free training in 84 courses, including Internet technology, cybersecurity, emergency communications, spectrum management, rural connectivity, and satellite applications, among others. In the first training year (1983), 134 graduates came from 62 developing countries for training in 13 courses. Over the 32-year history of the programme, over 1,940 courses have been taught, to 9,076 participants from 171 different developing countries.

Students are selected for their potential to apply the learned lessons in their home country context. One concrete example of the programme's overall contribution to shaping international telecommunications policy is that of the participants in two major global treaty conferences in 2012 (the World Radio Congress, WRC-12, and the World Conference on International Telecommunications, WCIT-12) at least 42 country delegations were either chaired or vice-chaired by USTTI graduates. The shared background, experience and knowledge obtained through the USTTI programme helps to provide a common understanding and platform to better reach global consensus and cooperation on the future of international communications regulation.

Source: USTTI

established between government and industry across a range of emerging economies, including Egypt's EDUEgypt, India's National Skill Development Corporation of India and Mexico's MexicoFirst. Each of these emphasise ICT training and certification, and are delivered in partnership with government and/or non-profit partners.[26]

Another approach is through corporate programmes whereby businesses offer direct apprenticeships or training and share technical know-how through coursework. One example is Cisco's Networking Academy programme, which prepares students for entry-level ICT jobs through the PPP model. To date, over five million students have been trained in elements of networking technology and there are approximately one million students annually studying in over nine thousand academies across 170 countries. Monitoring and evaluation of the programme, based on surveys of over 36,000 Networking Academy graduates (who have completed at least four courses) worldwide indicates that 92% of students obtained a new job and/or further educational opportunity following their graduation from the Networking Academy coursework. Using industry standard methods indicates that upwards of 1.2 million Network Academy students between 2005 and 2013 have gained new employment because of the Networking Academy programme.[27]

Other programmes focus on mentoring students to provide opportunities to experience and learn about careers in technology-related fields. One such programme, US2020, aims to match one million STEM mentors with students at youth-serving non-profit organisations. The goal of US2020 is to increase access and awareness of STEM skills and careers among girls, under-represented minorities and low-income children. Another programme, Girls Who Code, involves summer training for girls in high school centred on project-based computer science education with real-world tech industry exposure. Conveyed in an intensive daily summer session working with female mentors, the teenage girls are exposed to a wide range of ICT applications, including mobile application development, robotic programming and front-end web design. The scheme allows the young women to observe how computer science is utilised in different workplaces through field trips to start-ups and interviews with employees.

CONCLUSION

In 1848, Horace Mann spoke of the equalising power of education. Today, we see that it is the Internet, and skills training in IP networking technology, that can help further disseminate the opportunities provided by ICTs.

As our research demonstrates, unfulfilled demand for IP networking skills exists across the world, and specifically in the 29 emerging countries we examined. This is in line with other analysis pointing to existing ICT skills gaps and the shortfall in STEM-related training. Unfortunately, these gaps are only expected to grow in the near future, driven in part by economic growth, increasing connectivity, greater digitisation of our economies and the trend towards globalisation.

The presence of this IP networking gap highlights a missed opportunity for countries, as it indicates a shortfall in reaching potential economic growth, employment and social development. But the gaps are manageable. Filling them and increasing the supply of qualified networking talent requires dedicated public policy, specific training programmes, and public participation on the part of governments, citizens and private enterprise.

ANNEX: MEASURING THE NETWORKING SKILLS GAP

In 2012 and 2013, IDC and Cisco partnered on a research project to measure the IP networking skills gap in 29 countries across four geographic regions. By applying IDC's Networking Skills Model analysis, the research identified the demand for full-time employment in networking, as well as the existing supply of networking talent, in 2012 out to 2015. Networking was segmented into 'essential networking skills', which comprises core networking, including network security, IP telephony and wireless networking; and 'emerging networking technology skills', related to specific technologies such as unified communications, video traffic, cloud computing, mobility, data centres and virtualisation.

The country markets analysed were, in South America: Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru and Venezuela; Russia-CIS: Russia, Ukraine and Kazakhstan; Middle East/Turkey/North Africa: Egypt, Jordan, Morocco, Pakistan, Saudi Arabia, Turkey and the United Arab Emirates; and Asia Pacific: China, South Korea, Australia, India, Indonesia, Philippines, Taiwan, Thailand and Vietnam.

SOUTH AMERICA

		2011	2012	2013	2014	2015	5-year CAGR
Essential Networking	Demand	356,957	393,767	432,591	474,589	520,813	9.9%
	Supply FTE	280,186	301,809	328,891	356,573	391,706	8.7%
	Gap FTE	76,772	91,958	103,700	118,016	129,107	13.9%
	Gap (%)	21.5%	23.4%	24.0%	24.9%	24.8%	N/A
Emerging Networking	Demand	151,359	183,461	216,535	266,078	313,967	20.0%
	Supply FTE	88,362	100,553	113,329	129,491	146,911	13.6%
	Gap FTE	62,997	82,908	103,207	136,586	167,056	27.6%
	Gap (%)	41.6%	45.2%	47.7%	51.3%	53.2%	N/A
Total Networking	Demand	508,316	577,227	649,126	740,666	834,780	29.9%
	Supply FTE	368,548	402,361	442,219	486,064	538,616	22.3%
	Gap FTE	139,768	174,866	206,906	254,602	296,163	41.5%
	Gap (%)	27.5%	30.3%	31.9%	34.4%	35.5%	N/A

RUSSIA-CIS

		2012	2013	2014	2015	2016	5-year CAGR
Essential Networking	Demand	180,853	191,805	210,914	235,497	258,099	9.3%
	Supply FTE	149,726	157,601	174,408	192,620	205,907	8.3%
	Gap FTE	31,126	34,203	36,506	42,876	52,192	13.8%
	Gap (%)	17.2%	17.8%	17.3%	18.2%	20.2%	N/A
Emerging Networking	Demand	98,301	113,825	134,883	158,928	188,502	17.7%
	Supply FTE	68,478	77,791	86,106	94,415	109,836	12.5%
	Gap FTE	29,823	36,033	48,777	64,514	78,666	27.4%
	Gap (%)	30.3%	31.7%	36.2%	40.6%	41.7%	N/A
Total Networking	Demand	279,153	305,629	345,797	394,425	446,601	12.5%
	Supply FTE	218,205	235,393	260,514	287,035	315,743	9.7%
	Gap FTE	60,949	70,237	85,283	107,390	130,858	21.0%
	Gap (%)	21.8%	23.0%	24.7%	27.2%	29.3%	N/A

MIDDLE EAST/TURKEY/NORTH AFRICA

		2012	2013	2014	2015	2016	5-year CAGR
Essential Networking	Demand	129,052	140,299	157,743	176,403	195,341	10.9%
	Supply FTE	99,527	104,208	111,404	119,053	125,622	6.0%
	Gap FTE	29,525	36,091	46,339	57,351	69,718	24.0%
	Gap (%)	22.9%	25.7%	29.4%	32.5%	35.7%	N/A
Emerging Networking	Demand	54,253	71,317	87,695	105,075	131,800	24.8%
	Supply FTE	35,832	43,232	51,094	60,318	71,657	18.9%
	Gap FTE	18,421	28,086	36,601	44,757	60,144	34.4%
	Gap (%)	34.0%	39.4%	41.7%	42.6%	45.6%	N/A
Total Networking	Demand	183,304	211,616	245,438	281,479	327,141	15.6%
	Supply FTE	135,359	147,439	162,498	179,371	197,279	9.9%
	Gap FTE	47,945	64,177	82,940	102,108	129,862	28.3%
	Gap (%)	26.2%	30.3%	33.8%	36.3%	39.7%	N/A

ASIA PACIFIC

		2012	2013	2014	2015	2016	5-year CAGR
Essential Networking	Demand	1,164,674	1,265,087	1,385,712	1,517,379	1,653,117	9.2%
	Supply FTE	887,315	949,376	1,023,319	1,115,334	1,227,801	8.5%
	Gap FTE	277,359	315,710	362,394	402,045	425,316	11.3%
	Gap (%)	23.8%	25.0%	26.2%	26.5%	25.7%	N/A
Emerging Networking	Demand	573,434	680,691	806,464	938,690	1,088,380	17.4%
	Supply FTE	372,029	456,796	551,029	634,613	715,345	17.8%
	Gap FTE	201,405	223,896	255,436	304,077	373,035	16.7%
	Gap (%)	35.1%	32.9%	31.7%	32.4%	34.3%	N/A
Total Networking	Demand	1,738,107	1,945,778	2,192,177	2,456,068	2,741,497	12.1%
	Supply FTE	1,259,344	1,406,172	1,574,348	1,749,946	1,943,145	11.5%
	Gap FTE	478,763	539,606	617,829	706,122	798,352	13.6%
	Gap (%)	27.5%	27.7%	28.2%	28.8%	29.1%	N/A

NOTES

[1] Mann (1848)

[2] Lee (2013); Adam (2013); and Adducci, Pineda and Villate (2013)

[3] Meeker and Wu (2013)

[4] Cisco (2014c)

[5] Cattaneo et al. (2013)

[6] Lanvin and Evans (2013)

[7] ITU (2013)

[8] Brynjolfsson et al. (2009)

[9] Dongier and Sudan (2009)

[10] However, with regard to overall talent competitiveness and the supply of skilled ICT networking employees, there appears to be no statistical relationship between the extent of the networking skills gap and the Global Talent Competitiveness Index (correlation coefficient of 0.17). An even weaker relationship appears between the networking skills gap and the Global Knowledge (GK) component (correlation coefficient of 0.0). The lack of a statistical relationship may be due to the fact that the GTCI is a snapshot view of an economy's degree of skills development, while the networking gap reflects a dynamic market view of the demand and supply of those skills. It is plausible that a given country can have a high level of talent competitiveness and either extreme of labour market conditions (large unfulfilled demand, as well as excess supply) depending on the stage in the business cycle.

[11] Cattaneo et al. (2013)

[12] Lanvin and Fonstad (2010)

[13] In the context of employment impacts as a result of greater integration of ICT, it is important to note that job displacement can occur. In this paper however, we focus specifically on IP networking technology and IP networking skills and employment.

[14] Bilbao-Osorio et al. (2013)

[15] NASSCOM and McKinsey & Company (2005)

[16] Imaizumi et al. (2013)

[17] Calculated using the country data from the 2013 Network Readiness Index and 2013 Global Competitiveness Index

[18] Calculated using the country data from the 2013 Network Readiness Index and 2013 Global Innovation Index

[19] National Science Foundation (2012)

[20] It is important to note that basic and advanced networking courses can also be more impactful when coupled with dedicated programmes to ensure high-speed connectivity to schools and universities. For example, the US's Universal Service Program for Schools and Libraries (also known as the E-Rate Program) provides funding from the universal service fund collected from telecom providers to assist in expanding Internet connectivity. Since 1998, the programme has provided billions of dollars of funding to over 100,000 schools and libraries for broadband connections.

[21] Cronin et al. (2013)

[22] US Department of Homeland Security (2014)

[23] Adams (2013)

[24] It should be noted that attractive immigration policies can sometimes negatively impact a home country in situations where highly skilled domestic talent may decide to emigrate to other markets. Attractive immigration policies can cut both ways, helping and hurting a domestic market depending who is instituting the policies.

[25] White House (2013)

[26] Imaizumi et al. (2013)

[27] Cisco (2014a); and Cisco (2014b)

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