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Networking Skills in Europe: Will an Increasing Shortage Hamper Competitiveness in the Global Market?

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Individuals and Organizations Consulted on Aspects of this Study

Over 950 interviews were conducted as part of this project, and the resultant data forms the basis of IDC's networking skills demand analysis. The following individuals were consulted on the content and format of the questionnaire used for the end-user survey referred to in this white paper:

- André Richier, Principal Administrator, European Commission, Enterprise and Industry Directorate General, Innovation Policy Directorate, Technology for Innovation, ICT Industries and e-Business
- Graham Vickery, Principal Administrator, Information, Computer and Communications Policy Division, Directorate for Science, Technology and Industry, OECD
- Desirée van Welsum, Administrator, Information, Computer and Communications Policy Division, Directorate for Science, Technology, and Industry, OECD
- Grazyna Staniszewska, Member of the European Parliament, Committee on Regional Development and Committee on Culture and Education
- Paolo Schgör, Chairman EUCIP, European Certification for Informatics Professionals, Product Development and Quality Board, Italy
- Peter Strickx, Chief Technology Officer, Federale Overheidsdienst Informatie- en Communicatietechnologie (Fedict), Belgium
- Stirling Wood, Strategic Manager for the IT, Engineering, Construction, and the Built Environment Sectors, Qualification and Curriculum Authority (QCA) — U.K. government's education regulator
- Víctor M. Izquierdo Loyola, Subdirector General de Empresas de la Sociedad de la Información, Ministerio de Industria, Turismo y Comercio, Spain
- Vladimir I. Drozhzhinov, PhD, Steering Committee Chairman, eGovernment Competence Center, Russia

WHITE PAPER

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EXECUTIVE SUMMARY

This white paper, based on a data survey of over 950 CIO-level respondents in 31 countries in Western and Eastern Europe and IDC's proprietary IT skills model, shows that organizations may again face an increasing shortage of people with networking skills. While shortages were found to be lower than those predicted before the onset of the economic downturn, the demand for networking skills still outstrips supply. This is most notable in the areas of security and new network developments such as IP telephony, security, and wireless networking. Collectively, we refer to the associated skills as advanced network technology skills:

- **Advanced network technology skills:** IDC estimates that the actual number of skilled people needed to fill the advanced skills gap will be around 160,000 in 2005, growing to some 500,000 by 2008. These figures represent skills gaps as a proportion of total demand of 8.1% in 2005 and 15.8% in 2008. The number of skilled people is based on IDC's proprietary skills model, which calculates full time equivalents (FTEs). For the estimation above, IDC has assumed that people on average spend 25% of their time working with the advanced networking technology *(please refer to IDC's Skills Glossary in the Appendix)*.

- **Total networking skills:** Overall, IDC estimates a shortage of people with networking skills of around 230,000 in 2005, increasing to 615,000 by 2008. In percentage terms, the gap, as a proportion of demand, is expected to increase from 6% in 2005 to 11.8% by 2008. Again, these estimations are based on IDC's FTE calculations and an assumption of each person spending on average 25% of their time working with networking technology.

- **Application, business, and multiple skills sets** are seen by more than 50% of respondents as becoming more important in the future — only overtaken by advanced technology skills. This is a clear indication of the growing importance of networking technology as a platform for supporting business software applications and the related business processes, rather than a completely distinct environment with clear lines of delineation.

- **For the EU as a whole**, IDC estimates a shortage of skilled people in 2005 of 120,000 increasing to some 350,000 in 2008, representing skills gaps of 7.1% in 2005 and 13.9% in 2008. These estimates are based on FTEs and assumptions of an average of 25% of time spent working with networking technology.

- **Central Eastern European countries** have relatively high skills gaps (e.g., 11.5% in 2005 for advanced technologies compared to 7.1% for the whole of the EU). They are also facing the highest demand for advanced networking technologies up to 2008. Steps may need to be taken to avoid a situation where a lack of skills hinders the rollout of new technologies. However, the reason for this is not related to the technologies themselves. Rather, as we shall see later in this study, it is linked to the widespread acknowledgement of the increasingly critical role played by networking technology in supporting business processes. There is a very real risk that not having sufficient skills to implement advanced networking solutions will negatively affect business efficiency and competitiveness, and possibly economic growth.

- **Western European countries** currently have relatively low skills gaps but are facing growing demand for advanced networking technologies up to 2008. They should quickly take stock of their readiness to supply new skills into the market; otherwise, they could also soon be facing skills shortages. Again, the issue here is the potential negative impact on business development and competitiveness should the issue not be addressed.

- **Changing role of the network:** 89% of all respondents said the importance of the network in their organization would increase in the future, with results varying little by industry, size of organization, or region.

- **Skills certification** is seen as important by 72% of European organizations, particularly at the time of recruitment. This is especially the case in public sector organizations.

- The **European Union's revised Lisbon strategy and the i2010 initiative**, announced respectively in March and June 2005, aim to strengthen competitiveness, and increase productivity levels and economic growth through the use of ICT. As their impact has not yet been factored into our skills model, a key question becomes: how does Europe ensure that the recommendations of the European e-Skills Forum are implemented and the necessary skills will be there to support the rollout of the Lisbon strategy?

METHODOLOGY

This white paper presents the results of the special IDC study commissioned by Cisco on the demand and supply of networking skills in 31 countries across Western and Eastern Europe in the period 2004–2008. It covers general networking and advanced networking skills (e.g., IP telephony, wireless networking, and security). The countries covered are:

- **Established EU Member States:** Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the U.K.
- **EFTA countries:** Norway and Switzerland.
- **Recent EU Member States:** Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia.
- **Non-EU Central Eastern Europe (CEE):** Bulgaria, Croatia, Romania, Russia, Turkey, and Ukraine.

We have drawn on the results of a large-scale user survey conducted between March and May 2005 to make predictions about future issues around the use and development of skills and the role of the network in European organizations. More than 950 CIO-level telephone interviews were conducted across the following vertical sectors: government, telecoms, healthcare, education, and enterprise. Respondents represent organizations of all sizes, with 36% coming from organizations of more than 1,000 employees and the remainder of respondents evenly distributed across smaller size bands. Several face-to-face interviews were also conducted with international and national ICT service providers.

The survey data has been used to populate IDC's skills model, which is also based on economic and statistical indicators, including GDP, unemployment rates, IT workforce estimates, education enrollment data, and population growth, from sources such as Eurostat, OECD, ILO, national statistical offices, and EITO, as well as IDC's own technology and services market forecast data.

Please refer to the appendix of this paper for a more detailed methodology description as well as an IDC skills glossary.

SITUATION OVERVIEW

The Impact of the Economic Downturn and the i2010 Initiative

In the late 1990s, Europe experienced strong economic growth and investments in ICT boomed. Consequently, it was becoming harder to find new people with *the right skills*, leading to a skills gap in the market. Collaboration developed between governments, learning institutions, and the ICT industry to address this issue. However, few thought that these trends would change as suddenly as they did with the economic downturn in 2001.

Over the past four years, from an economic perspective, Europe has been divided in two: countries that are still experiencing strong growth (largely the Central and Eastern European countries) and countries that are now seeing low economic growth and the highest unemployment rates in many years (largely the Western European countries). At the same time, the use of ICT has become more sophisticated. In many cases, new technologies and an increasing use of global sourcing models have been seen as a way of increasing efficiencies and improving cost structures. So, while IT-related jobs have not been immune to the increased unemployment rates in Western Europe, pockets of skills gaps still exist, particularly in newer, more advanced technology areas.

As early as March 2000, the European Council set out a 10-year development plan for addressing low productivity levels and stagnating growth in the European Union — a plan known as the Lisbon Agenda. Two of the factors mentioned as contributing to low productivity in the European Union countries were inadequate investment in ICT and inadequate investment in training and education. In September 2004, the European e-Skills Forum, established by the European Commission as a platform for cooperation between all relevant stakeholders, released its blueprint "e-Skills in Europe: Towards 2010 and Beyond." On the back of the revision of the Lisbon strategy in March 2004, the European Commission launched the i2010 initiative in June 2005 to speed up progress.

The Commission believes that investment in ICT is at the heart of driving innovation and thereby growth and efficiencies and is necessary for improving Europe's competitiveness in the global marketplace. By tabling the first "Competitiveness and Innovation Framework Program (CIP)" in April 2005, the Commission adopted an integrated response to the objectives of the revised Lisbon strategy. Running from 2007 to 2013, it proposes a budget of more than €4 billion over this period. In addition, under the seventh Research Framework Program (FP7), €1.8 billion annually will be earmarked for research in areas, such as fixed and mobile communications, embedded systems, nano-electronics, and audiovisual content.

Why is this important to a study of the demand and supply of networking skills? According to the European Commission, a quarter of the EU's GDP growth and 40% of productivity growth are due to ICT. The ICT industry generates 8% of Europe's GDP and employs 6% of its workforce. However, ICT represents only 18% of all R&D investments in the European Union, compared with over 30% in all major OECD countries. If successfully implemented, these initiatives could have a strong impact on the competitiveness of European organizations.

In the coming years, IDC expects new technological developments and a general return to growth in European economies to have a strong impact on the demand for ICT, including networking skills. As an example, IDC forecasts demand for advanced networking technologies, as defined in this study, to grow by an average annual growth rate of 18% between 2004 and 2008. IDC would argue that based on the findings in this survey, Europe could fall short in the supply of the networking skills needed to satisfy this demand and for the European Commission to achieve its policy goals.

The Changing Role of the Network

The use of ICT in organizations has changed dramatically in the past five years. As part of the user survey for this study, IDC asked respondents about the use of networking technologies in their organizations. Some of the key findings were:

- More than 60% of all respondents, regardless of region, said that they used the network to underpin business processes and to communicate with customers, suppliers, and business partners. Public sector organizations showed a less advanced use of the network (57% of respondents), while telecom service providers were most advanced (87% of respondents).
- 89% of all respondents said the importance of the network in their organization would increase in the future, with results varying little by industry, size of organization, or region.

These results indicate that the network is truly becoming the backbone of both private and public sector organizations, underpinning internal and external communication and business processes. This is also confirmed by IDC's market forecasts. Investment in networking equipment is expected to grow by an annual average rate of 9.5% in Europe until 2008, while investment in other commercially applied hardware products will grow only 3.5% and in software products by 6.8%.

FUTURE OUTLOOK

Future Needs for Networking Skills

The increasingly central role of the network in communicating with external contacts and underpinning central business processes has strong implications for the skills needed in organizations in the future. Professional IT staff — even those that are not working solely with networking technologies — will be expected to have some networking skills and to understand the impact of the network on other technology areas.

Our user survey supports this analysis. When asked about the importance of future skills sets, it is clear that the use of networking technologies is becoming more sophisticated in Western and Eastern European organizations:

- **70% of all respondents indicated that security skills would become more important** in the future, indicating the business criticality of the network.
- **69% expected wireless networking skills to increase in importance**, while **57% expected this to be the case for IP telephony skills**, showing a more sophisticated use of the network for communication.
- **52% of respondents expect network-centric applications (such as messaging and video conferencing) and understanding the network's impact on the business to be more important in the future**, while 48% expect cross technology skill sets to increase in importance. These results underline the closer integration between the network and business.

Asked specifically about plans for hiring new skills in the next 12–24 months, security skills ranked highest (70% of respondents), followed by wireless network skills (56%), and cross technology skills (54%) — results that vary little by region and size.

Skills for understanding the network's impact on the business were also mentioned as one of the skill sets that would be needed in the next 12–24 months by 50% of all respondents, with higher proportions in countries outside Western Europe and in the smaller organizations (1–249 employees). This underlines the issue that Eastern European countries need to manage the availability of networking skills carefully in order to reduce the risk of slowing business development through not having an adequate supply of networking skills.

Total Networking Skills Shortage

As shown in Table 1, IDC estimates that demand for networking skills in European organizations in 2005 will reach almost 963,000 full time equivalents (FTEs). This number represents the total amount of work that needs to be done in the networking space, and the number of people needed to do this work — assuming they all spend 100% of their available time on networking. However, in terms of **actual number of people** with networking skills, IDC estimates the demand to be around four million skilled people assuming that people on average spend 25% of their time working with networking technology as part of other responsibilities.

Consequently, the undersupply of FTEs in 2005 of 57,668 is likely to represent an actual **shortage of skilled people** of around 230,000 in 2005, increasing to 615,000 skilled people by 2008. In percentage terms, IDC estimates that the total networking skills gap will increase from 6% in 2005 to 11.8% by 2008.

TABLE 1

Total Networking Skills in Europe, 2004–2008, FTEs and Skilled People Estimates

	2004	2005	2006	2007	2008	CAGR 04–05
Demand	886,223	962,888	1,054,478	1,167,569	1,298,067	10.0%
Supply	851,899	905,220	969,198	1,054,711	1,144,277	7.7%
FTE gap	34,324	57,668	85,280	112,857	153,790	45.5%
Skilled people gap estimation	**135,000**	**230,000**	**340,000**	**450,000**	**615,000**	**45.5%**
% FTE gap of demand	**3.9%**	**6.0%**	**8.1%**	**9.7%**	**11.8%**	

Note: *The skilled people gap is estimated on the assumption that — on average — people with networking skills spend 25% of their time using these skills.

Source: IDC, 2005

Demand for Advanced Technology Skills

As described above, the survey showed strong future demand for advanced technology skills across all regions, industry sectors, and sizes of organization.

Overall, IDC estimates a shortage of some 40,000 FTEs in Europe in 2005 growing to almost 125,000 by 2008. However, if we assume that people with advanced technology skills spend on average 25% of their time using that particular skill, then the **shortage of people with advanced technology skills** will be almost 162,000 in 2005, growing to nearly 500,000 by 2008. These figures represent skills gaps of 8.1% in 2005 and 15.8% in 2008 as shown in Table 2.

A gap of 15.8% starts to represent a severe challenge to organizations needing the skills; it could hinder advanced technology adoption and the European Commission's plans for the improvement of productivity and innovation.

TABLE 2

Estimated Shortage of People with Advanced Technology Skills by Country, 2005 and 2008

	2005 Full Time Equivalent Gap	**2005 Skilled People Gap Estimation**	2005 Gap %	2008 Full Time Equivalent Gap	**2008 Skilled People Gap Estimation**	2008 Gap %
Austria	993	**4,000**	8.2%	3,229	**12,900**	17.8%
Belgium	676	**2,700**	5.9%	2,531	**10,100**	15.9%
Bulgaria	230	**900**	11.2%	742	**3,000**	20.6%
Croatia	312	**1,250**	15.9%	839	**3,400**	25.2%
Cyprus	31	**150**	17.2%	58	**250**	20.4%
Czech Republic	785	**3,150**	11.5%	1,331	**5,300**	12.3%
Denmark	464	**1,850**	5.6%	1,921	**7,700**	14.9%
Estonia	108	**400**	16.8%	259	**1,050**	25.4%
Finland	462	**1,850**	7.1%	1,335	**5,300**	15.9%
France	3,692	**14,800**	6.1%	10,072	**40,300**	11.7%
Germany	5,281	**21,100**	6.1%	21,957	**87,800**	17.5%
Greece	270	**1,100**	4.9%	1,354	**5,400**	13.1%
Hungary	522	**2,100**	10.5%	1,198	**4,800**	13.9%
Ireland	303	**1,200**	5.7%	1,886	**7,500**	18.7%
Italy	2,581	**10,300**	7.0%	5,207	**20,800**	9.8%
Latvia	180	**700**	16.5%	457	**1,800**	24.9%
Lithuania	209	**850**	14.3%	507	**2,000**	20.2%
Netherlands	1,513	**6,100**	7.3%	4,169	**16,700**	14.6%
Norway	772	**3,100**	10.6%	1,435	**5,700**	12.0%
Poland	1,790	**7,200**	10.5%	4,573	**18,300**	16.3%
Portugal	614	**2,500**	8.6%	1,538	**6,200**	16.4%
Romania	1,108	**4,400**	16.0%	2,435	**9,700**	17.5%
Russia	2,848	**11,400**	9.4%	15,011	**60,000**	24.5%
Slovakia	382	**1,500**	14.1%	811	**3,200**	18.3%
Slovenia	175	**700**	12.1%	604	**2,400**	26.1%
Spain	2,709	**10,800**	7.1%	10,459	**41,800**	15.7%
Sweden	841	**3,400**	7.0%	1,989	**8,000**	12.2%
Switzerland	843	**3,400**	7.0%	1,837	**7,300**	11.3%
Turkey	3,548	**14,200**	22.9%	7,976	**31,900**	29.1%
U.K.	4,839	**19,400**	7.0%	9,890	**39,500**	9.3%
Ukraine	1,308	**5,200**	17.1%	7,037	**28,100**	33.5%
Total Europe	**40,388**	**161,700**	**8.1%**	**124,649**	**498,200**	**15.8%**

Note: The skilled people gap is estimated on the assumption that, on average, people with networking skills spend 25% of their time using these skills.

Source: IDC, 2005

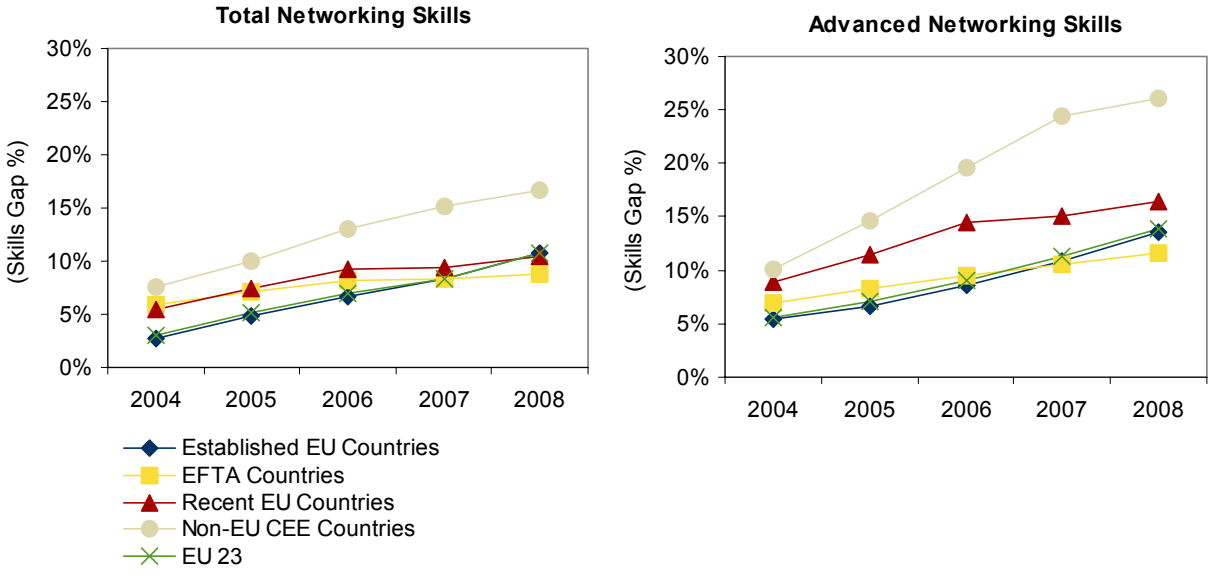
Country Analysis

Figure 1 shows the proportional skills gap for total and advanced networking professionals by four main groupings of European countries: established EU, EFTA, recent EU, and non-EU CEE countries.

The established EU countries as a region have the lowest total networking skills gap in 2004 at 2.8% of demand, growing to 10.8% by 2008. For advanced networking skills, the gap increases from 5.4% in 2004 to 13.6% in 2008. The region is still suffering from low economic growth and the highest unemployment rates in decades. However, other IDC studies have shown that organizations are starting to change focus from pure cost control to investing in technologies that can improve efficiencies in the long term and help grow the revenue line. While the improvement overall in the IT markets is slow, IDC expects that this will accelerate over the period depicted and that pent up demand will cause a higher gap by 2008 — particularly as many students and graduates have turned away from IT-related studies in the past few years. The EFTA countries, Norway and Switzerland, are seeing relatively higher gaps in 2004 at 5.9% for all networking skills and 7% for advanced networking skills but are growing less strongly to 8.7% and 11.6% in 2008 for all networking and advanced networking skills, respectively.

FIGURE 1

Total and Advanced Networking Skills Gap, Percentage by Region, 2004–2008



Note: Established EU Countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, and the U.K.; EFTA Countries: Norway and Switzerland; Recent EU Countries: Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia; Non-EU CEE: Bulgaria, Croatia, Romania, Russia, Turkey, and Ukraine; EU 23 excludes Luxembourg and Malta.

Source: IDC, 2005

The **recent new EU member states** and those that are currently negotiating accession to the EU saw investments in ICT technology double over past five years. The massive investments in IT in general, and in networking technologies in particular, have created an unprecedented demand for IT professionals. Even though most new EU members offer a substantial pool of graduates with technical skills well suited to the IT industry, demand still outstrips supply. IDC estimates that in 2004, the recent EU countries had a skills gap of 8.9% of demand for advanced technology skills growing to 16.4% by 2008. Correspondingly, the **non-EU CEE countries** show signs of even higher gaps for advanced technology skills at 10.1% in 2004 and growing to 26.1% in 2008.

Country Rankings

An alternative way of looking at the gap in advanced technology skills is to look at how the percentage gap for each country compares to the European average percentage gap in 2005 and 2008, respectively. This comparison has been carried out using indexation.

In 2005, Greece is estimated to rank number 1, with the lowest percentage gap. However, IDC estimates that by 2008, Greece will have fallen to eighth place unless action is taken to address the issue. These positions represent an increase in the gap from an estimated 1,100 skilled people in 2005 to an estimated 5,400 skilled people in 2008. Similarly, Denmark will go from second place to eleventh over the period. Seen in terms of the gap of actual number of people for the whole of Europe, these two countries represent only around 2%.

The developing gap in Germany — representing a change in ranking from sixth in 2005 to seventeenth by 2008 — has a much larger impact on the total European gap. One of the reasons for the change in the German ranking is that the country's economy has suffered heavily in the past few years, leading to high unemployment rates. Among other factors, the increasing gaps result from pent-up ICT investments, which will start to materialize over the period. Consequently, Germany will likely have to take strong action to address the issue. An expedient solution would be to consider filling the gaps by attracting people from other, lower cost countries in Europe. However, this would perhaps not address a more long-term view and could prove difficult and politically insensitive, since these countries are already facing strong skills gaps of their own.

The U.K. and Italy will improve from positions 10 and 8 to first and second place. However, even in 2008, when these countries are taking the top spots, the over-demand for skilled people will be significant in actual numbers at 39,500 and 20,800, respectively. However, as shown in Table 2, the gap does not grow significantly in percentage terms between 2005 and 2008. Consequently, although both countries will still need to consider action in order to fill these gaps, this can probably be done by some targeted investments in education and training without having to make major alterations to educational policy.

The Czech Republic is estimated to see one of the highest improvements in ranking from being placed at 21 to seventh position. The country has a highly skilled workforce and high education levels, and attracts new skills into ICT professions. Nevertheless, the improvement in position still covers a 70% increase in the gap of skilled people from 3,150 to 5,300 over the period.

TABLE 3

Advanced Technology Skills Gap Index

Description	2005 Ranking	2005 Skilled People Gap Estimate	2008 Ranking	2008 Skilled People Gap Estimate
Greece	**1**	1,100	**8**	5,400
Denmark	**2**	1,850	11	7,700
Ireland	**3**	1,200	21	7,500
Belgium	**4**	2,700	14	10,100
France	**5**	14,800	**4**	40,300
Germany	**6**	21,100	17	87,800
Switzerland	**7**	3,400	**3**	7,300
Italy	**8**	10,300	**2**	20,800
Sweden	**9**	3,400	**6**	8,000
U.K.	**10**	19,400	**1**	39,500
Finland	11	1,850	13	5,300
Spain	12	12,000	12	41,800
Netherlands	13	6,100	**10**	16,700
Austria	14	4,000	19	12,900
Portugal	15	2,500	16	6,200
Russia	16	11,400	25	60,000
Hungary	17	2,100	**9**	4,800
Poland	18	7,200	15	18,300
Norway	19	10,800	**5**	5,700
Bulgaria	20	900	24	3,000
Czech Republic	21	3,150	**7**	5,300
Slovenia	22	700	29	2,400
Slovakia	23	1,500	20	3,200
Lithuania	24	850	22	2,000
Croatia	25	1,250	27	3,400
Romania	26	4,400	18	9,700
Latvia	27	700	26	1,800
Estonia	28	400	28	1,050
Ukraine	29	5,200	31	28,100
Cyprus	30	150	23	250
Turkey	31	14,200	30	31,900

Note: The skilled people gap is estimated on the assumption that — on average — people with networking skills spend 25% of their time using these skills.

Source: IDC, 2005

Overall, the new EU and other Eastern European countries rank the lowest, indicating that these are the worst off — which they are in percentage terms, as shown in Table 2. However, in many cases the actual numbers are relatively low, so quick action now to attract and train people in new skills could make a major difference in three years. While countries in Western Europe have generally faced stagnation, efficiency drives, and cost cutting over the past few years and are only slowly recovering, the situation faced by the new EU and other Eastern European countries are materially different.

IT markets in Central and Eastern Europe are expanding strongly, and the demand for more advanced skills has risen sharply as a result. Several factors contribute to this trend, including ongoing demand from both telecom operators and enterprises for reliable and robust network architecture, intensive development of Internet access and data networks both in the private and in government sector, and a need to address both external and internal security issues.

Furthermore, in the short to medium term, the increasing demand for wireless access and ensuing usage of wireless infrastructure, and the transition from existing network environment to the new IP-based environment will gain speed. These factors will only exacerbate the elevated deficit of highly qualified personnel — wireless networking experts, security systems professionals, and project managers — in the IT industry. While a technologically able workforce exists in the region, there is a shortage of professionals skilled in new technologies. The human resource factor will become critically important in service delivery, as there is a clear correlation between project success and the availability of skilled IT consultants. Both the IT industry and the different agents influencing business competitiveness (i.e., governmental regulations, tax policies, etc.) should strive to create conditions that encourage investment in training on innovative technologies.

Certification Important to Evaluate Staff: Vendor Backed Certification Highest Accolade

It is clear from our study, that there is an impending networking skills gap developing in Western and Eastern Europe. One of the questions that this raises is how European organizations will go about finding and attracting the right skills.

We asked respondents how important it is that they view professional certifications when they hire new staff with networking skills:

- 72% of respondents said that certification at time of recruitment was either very or relatively important. Western European employers in particular consider certification to be important, with 31% responding that it was a very important element in the hiring process, compared to 16% in the rest of Europe.
- Public sector organizations (health, government, defense, and education) and telecom service providers place higher importance on certification than other industry sectors (27% and 29% very important compared to 17%).

Although experience was also important for most in the hiring process, the availability of a professional certificate at the time of hire makes it easier for employers to assess candidates in the hiring phase and have some degree of confidence that the new recruit has a minimum of understanding and capability.

It was also very clear from the survey that industry backing for the certification adds more value (62% of respondents) than certification backed only by state or government bodies (42% of respondents). This is particularly the case in countries outside Western Europe and the European Union (72% of respondents said industry backing added value), for telecom service providers (72%), and for larger organizations with more than 500 employees (67% of respondents).

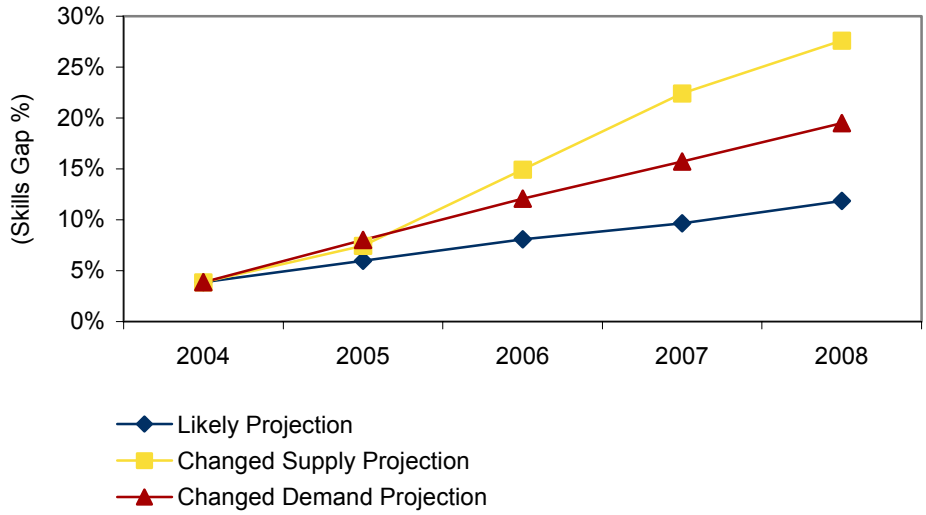
It is IDC's view that these results show that the model developed in the late 1990s with collaboration between employers, the ICT industry, and government bodies, may again prove to be a valuable approach for addressing the development and training of new skills in the coming years.

Projections

Estimates of future developments are always based on a series of assumptions that have higher or lower degrees of certainty. While the data presented in this white paper represents IDC's best estimate of the situation for demand and supply of networking skills, we have developed two alternative projections. These, as well as the likely projection, are shown in Figure 2.

FIGURE 2

Total Networking Skills Gap %, 2004–2008 — Alternative Projections



Source: IDC, 2005

- **Likely projection:** This is the picture presented in the white paper. IDC believes that this scenario represents the most balanced view of the demand and supply situation of networking skills.

- **Changed supply projection:** It is assumed in the model that students enrolled in relevant graduate studies during the years 2001–2004 will graduate between 2005 and 2008 and thereafter enter the labor market. In this projection, it is assumed that a higher proportion of graduates from relevant studies will enter a networking technology profession than is assumed in the most likely projection. While some countries have seen high growth in enrollment numbers for science and computing degrees through the period, others have seen a dwindling interest in these studies among their younger generations. Consequently, in some countries a stronger linkage between the supply of networking skills and student enrollment will cause the skills gap to narrow while in others it will widen.

- **Changed demand projection:** We have assumed higher overall spending on IT (including resources) either due to better economic projections or due to IT expenditure, as a proportion of GDP, increasing over the forecast period. In this scenario, demand for networking skills is higher (across all countries) than in the most likely scenario presented in this paper.

The projections indicate that a change to the supply of networking skills, i.e., fewer students, has a bigger impact on the skills gap than the projected change in demand, i.e., higher IT spending. When demand for IT technology increases, there is generally a time lag before this increase is translated into higher demand for skills, as organizations aim first to increase efficiencies before hiring new resources. Similarly, the projections show that considering the time lag in getting new people through an education process the most efficient response to addressing future skills gaps is to increase efforts in attracting people towards technology (new graduates, unemployed, and people returning to the job market alike).

CONCLUSION

This white paper shows that the demand for networking skills in Western and Eastern Europe still outstrips supply. While shortages in general networking skills are narrow across many countries, gaps widen in the area of advanced networking technology skills.

When considering the pervasiveness of networking technologies and the increasingly business critical role of the network in organizations of all sizes, any potential shortage of skills can have implications for adoption of new technologies that could improve efficiencies. A shortage could hold back Europe's competitiveness in the global market. It is important to note the following:

- Our forecast of shortages is based on current known or expected factors. The situation may worsen as the European Union rolls out its plans under the revised Lisbon strategy and the i2010 initiative, which also aim at helping the adoption of ICT in small and medium enterprises — the largest part of Europe's demographic make-up. We are seeing only a low skills gap in general networking skills and higher gaps in advanced technologies. A key question is: how does Europe ensure that the recommendations of the European e-Skills Forum are implemented and the necessary skills will be there to support the rollout of the Lisbon strategy? As it stands, there are not enough skills to meet any extra requirements and any new increase in supply of skills will take a while to work through the system, potentially slowing down the initiatives. Therefore, governments need to address the supply side of skills at the same time as they address their initiatives to make sure that the foundation is in place.

- The composition of skills needed by European organizations is changing. Not only is the linkage between business and ICT becoming much clearer and much stronger, but also the convergence of the network with other IT technologies is creating a major change in the skills needed by IT-related staff. It is increasingly difficult to imagine, for example, that an application developer can work without any knowledge of network technologies or without an understanding of how his/her work affects (or is affected by) the network. Hence, organizations are increasingly looking for people with cross-technology skills and people that really understand how to best use ICT to support business goals, strategies, and processes.

- The shortages in networking skills vary by country and by region and each will have a unique set of challenges for addressing any shortage. For many Western European countries, one of the challenges will be to attract students and the unemployed back into IT-related jobs. While the IT sector was once a highly popular choice for many, its attractiveness has lessened as the industry has struggled through recession. In many countries, enrollment in computer science or related studies has decreased, leading to a much smaller pool of people that can be easily trained in networking technologies.

- For countries in Central and Eastern Europe three key challenges lie ahead in coping with predicted skills gap growth:

  - Motivating students to study technology. Students are increasingly entering fields of study such as economics and law.

  - Meeting additional demand for skilled networking professionals from international vendors entering the region in large numbers to implement offshore sourcing strategies.

  - Curbing the exodus of qualified professionals — particularly in countries that are still negotiating entry to the European Union.

APPENDIX

IDC Skills Glossary

The **definition of networking skills** used in the model is: people needed to plan, design, manage, and support the networking technologies in the organization. The definition of skills needs to be broad due to the proliferation of networking technologies in organizations of all sizes. IDC further uses the following two classifications of skills:

- **Full time equivalents:** IDC's model is based on assessing the demand and supply of full time equivalent networking skills, since this provides the most reliable foundation for modeling. Full time equivalents are defined as spending 100% of their time working with the networking technology.

- **Skilled people:** However, it is clear that most people with networking skills do not spend 100% of their time working with networking technologies. For example, in many companies with fewer than 250 employees — one of the typical sizes of organizations in Europe — IT staff will perform several tasks, including PC software and hardware installation and desktop support. Often tasks around planning, managing, and supporting the network will take up only a portion of the work time. Further, in very small organizations, the task of ensuring that the network works and that the appropriate security is available often falls to people with non-IT jobs, such as office managers or the resident super user, resulting in an even lower proportion of their work time. Consequently, for this study, IDC defines skilled people as people that have, as part of their job function, some involvement in the planning, design, management, and support of networking technologies. For the purpose of presenting the data in this study, IDC has assumed that, on average, skilled people spend 25% of their time working with networking technologies. Particularly in large companies with complex network environments, this assumption will be much too low. However, when taking into

account the very large number of small organizations in Europe, where the network "runs itself" with the occasional reboot, IDC believes that an average of time spent between 20%–30% is reasonable. Consequently, 25% (or a factor of 4 applied to our model's FTE data) will provide a reasonable estimate for the number of skilled people.

IDC's Proprietary Skills Model: Model Description and Methodology Overview

Introduction

This section describes the methodology behind IDC's skills model, which forms the basis for developing networking skills demand and supply numbers for Cisco, as commissioned in February 2005.

The document further describes the data sources and official statistics that have been used as input into this model.

Model Objectives and Background

During the late 1990s and early 2000s, IDC was commissioned by Cisco on several occasions to provide assessments and forecasts of the demand and supply situation for skills in the network technology arena in Europe. The technology market was at this time booming and there was a real need to quickly attract new talent into the market in order to fulfill demand.

With the slowdown in both technology markets and economies in the early 2000s, organizations introduced extreme cost control and reduced headcounts wherever possible. However, as markets are slowly picking up across Europe, demand is again increasing and with this the need for technology skills.

At the beginning of 2005, Cisco again commissioned IDC to provide a view of the demand and supply of networking skills in the market. However, the brief was this time to provide a more detailed view of specific skills — general networking skills, and advanced skills (security, wireless networking, and VoIP) — as well as basing the data on a model that could potentially roll out across the world.

As important factors and assumptions had changed dramatically since the original model was constructed in the late 1990s, such as much lower growth expectations for both country GDP and IT spending overall, a new model that reflects these changed environments has been constructed, the methodology of which is described below.

Methodology

As a starting point in developing this new model, IDC wanted to make sure that it fulfilled several key objectives:

- Must use, as input, statistical information from reputed sources
- Statistics must be available in a broad range of countries across the world to ensure consistency in case the model is expanded outside the initial 31 European countries
- Must take into account economic developments in each country, based on historical and, where available, official forecasts

- Must take into account employment and unemployment rates in countries
- Must take into account enrollment and graduate data for higher education as these are indicators of current and future potential skills availability
- Must form part of a holistic view of the IT and workforce markets to ensure that there is no "sub-optimization"

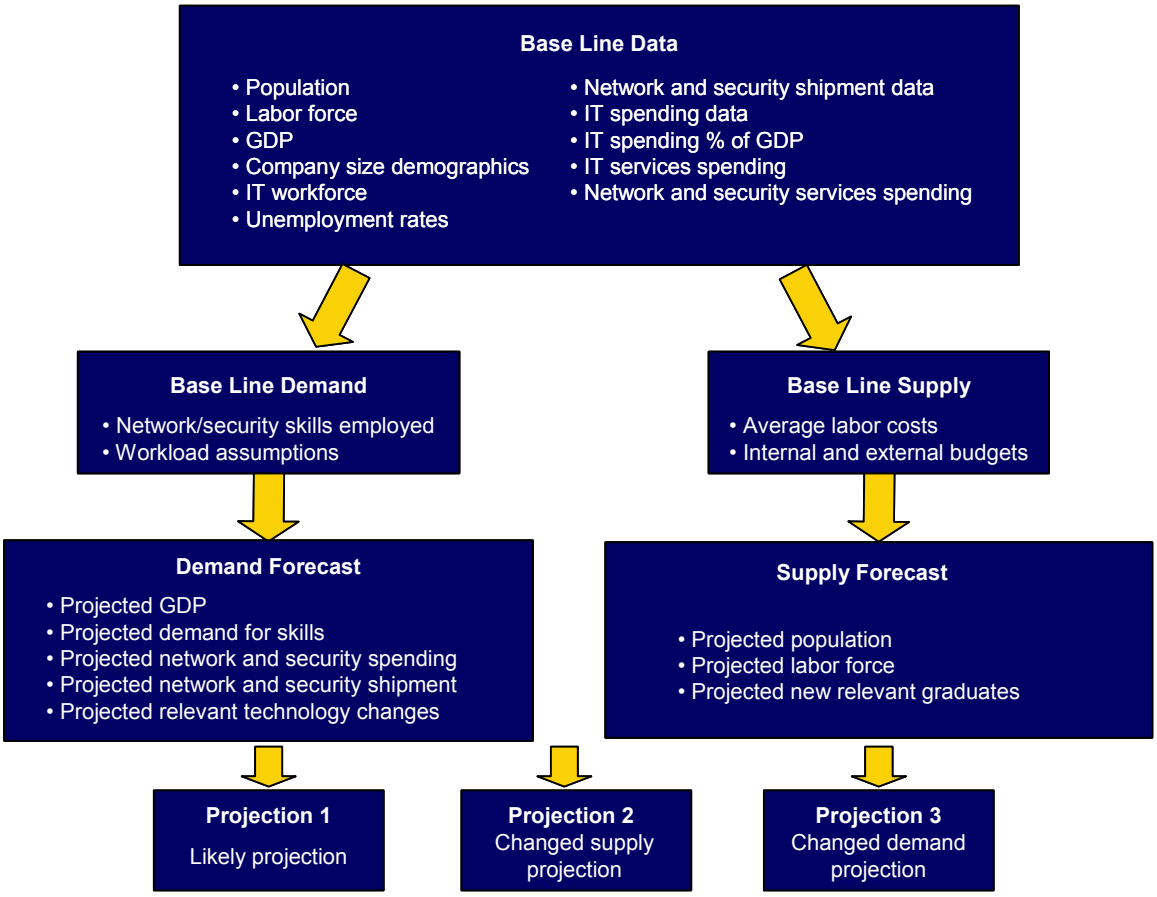
As a first principle in developing the model, IDC established 2004 as a baseline year, since several factors are known or, as a minimum, have high confidence factors attached, such as GDP in each country, employment/unemployment rates, IT spending, IT services spending on network and security related services, network and security related shipment data, etc.

Forecast for supply and demand of skills have then been developed based on several data points and predictions from IDC and recognized international sources.

Figure A-1 shows an overview of the model in terms of the data inputs and relationships for the development of the supply and demand skills numbers.

FIGURE A-1

Model Overview and Data Input



Source: IDC, 2005

Projections

Cisco requested that IDC develop three scenarios for skills development in the period 2004–2008.

The first scenario — named the Likely Projection — is based on the most likely assumptions around GDP and labor force growth, as well as IDC's projections for IT services and technology spending. The other two scenarios are based on different assumptions relating to either demand or supply. However, please note that the base year, 2004, remains static in all three scenarios, as this is the de facto year.

Scenario two — named Changed Supply Projection — assumes that enrolment in relevant graduate studies in the years 2000–2003 will have a stronger impact on the supply of new skills than assumed in the likely scenario.

Scenario three — named Changed Demand Projection — assumes that there is a stronger link between spending on relevant technologies and demand for skills than assumed in the likely scenario. This scenario therefore also assumes slightly higher overall spending on IT (including resources) either due to better economic projections or IT expenditure as a proportion of GDP increasing over the forecast period.

Data Sources

The following data sources have been used to develop the model:

- Population per country: Eurostat and National Statistical Offices
- GDP and projected GDP: Eurostat
- Labor force, employment and unemployment rates: ILO plus country household surveys from national statistical offices
- IT workforce: ILO plus country household surveys from national statistical offices
- Company size demographics: OECD and IDC
- Average labor costs: country industry associations, job market advertising
- IT spending percentage of GDP: Eurostat and EITO
- Projected new relevant graduates: based on Eurostat enrollment data from 2000–2003
- Projected population: based on Eurostat data on development in population from 2000–2003
- Projected labor force: based on ILO data on development in labor force from 2001–2003 and projected population
- IT spending data: IDC
- Internal and external IT budgets: based on Eurostat and EITO plus IDC data
- IT services spending: IDC

- Network and security services spending and projected network and security spending: IDC
- Network and security shipment data and projected network and security shipments, including projected relevant technology changes: IDC
- Workload assumptions: Based on IDC data and results of user survey undertaken for this project

Conclusion

As with any forecast and model exercise, several assumptions have to be made, the accuracy of which can usually only be established with a hindsight view in the future.

Several occurrences can affect the forecast:

- Better or worse economic conditions in the countries than are currently expected
- Technology shifts that occur suddenly (and therefore have not already been taken into account in IDC's forecasts)
- Government policy changes that support or suppress IT spending (examples of existing policies are regulatory changes, such as Basel II, data protection acts, or others)
- Improved performance of the IT services sector, which will stimulate demand for skills and, as experience has shown, the attractiveness of IT-related education

However, it is IDC's opinion that the model and the underlying assumptions are sound and realistic at the time of publication of the data.