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Cover page designed by Concha Arias Pérez

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Layout Design: François Louis Nicolet

Composition: Jorge Llácer-Gil de Ramales

Editorial correspondence: Llorenç Pagés-Casas pages@ati.es

Advertising correspondence: novatica@ati.es

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Monograph: ICT Certifications for Informatics Professionals (published jointly with Novática*)

Guest Editors: *Luis Fernández-Sanz, María-José García-García, and Peter Weiß*

- 2 Presentation. Certification Systems for Professionalism in Information Technology — *Luis Fernández-Sanz, María-José García-García, and Peter Weiß*
- 5 E-Skills Competences in Europe: A Partnership to Deliver Sustainable Value — *Hugo Lueders*
- 11 The International IT Professional Practice Programme — *Charles Hughes and Colin Thompson*
- 19 The Demand Context: the IT Professional Labour Market — *Matthew Dixon*
- 31 Certifications for Software Professionals Helps to Assure Safety, Reliability in Vital Systems — *Jefferson Welch*
- 36 Survey of ICT Certification Systems for ICT Professionals in Europe — *Roman Povalej and Peter Weiß*
- 46 Perception of Education and Personal Accreditations by IT Professionals in Spain — *María-José García-García and Luis Fernández-Sanz*
- 56 ontoReadiness: A meta-Ontology for Readiness Certification and Career Portability — *Michael L. Brown, Karsten O. Lundquist, Shirley Williams, and Keith Baker*

UPENET (UPGRADE European NETwork)

- 62 From Novática (ATI, Spain)
Internet
Bioinspired Algorithms for Internet Route Optimization — *José-Luis Gahete-Díaz and Fernando Gómez-González*

CEPIS NEWS

- 71 CEPIS Projects: Most Recent Progresses — *François-Phillippe Draguet*

* This monograph will be also published in Spanish (full version printed; summary, abstracts, and some articles online) by Novática, journal of the Spanish CEPIS society ATI (*Asociación de Técnicos de Informática*) at <http://www.ati.es/novatica/>.

The Demand Context: the IT Professional Labour Market

Matthew Dixon

Certifications for IT Professionals exist in the context of the labour market for IT Professionals. The assumption made by those who invest in the training and assessment for such qualifications/certifications, whether for themselves or for their employees, is that there will be a genuine return on that investment, in terms of greater relevant competence in some aspect of IT Professional work, enabling access to better and/or higher paid work. In general, certifications will prove of less interest to recruiting employers when labour market conditions are tight, and of more value (as a possible differentiator between candidates) when 'skill shortages' do not exist. Empirical research carried out for the CEPIS Harmonise project confirms that IT Professional certifications are comparatively low on recruiting employers' lists of priorities for candidate capabilities, and this has important implications for some of the assumptions often made about the certification market.

Keywords: Demand, ICT Professional Skills, Labour Market, Qualification, Recruitment.

1 Introduction

Demand for IT professional certifications exists (only) in the context of the labour market for IT professionals. The assumption made by those who invest in the training and assessment for such qualifications/certifications, whether for themselves or for their employees, is that there will be a genuine return on that investment, in terms of greater relevant competence in some aspect of IT professional work. Some of those who invest in acquiring such certifications will be seeking work (for the first time) as IT professionals, and hoping that they will get a job by virtue of that qualification when it is achieved. The level of the investment made can be significant¹, in both financial and time terms, so the *return* in terms of the value attributed to the certification by (in particular) recruiting employers becomes very important. Evidence on that value ([1] [2] and [3] – in terms of the effect on salary levels) suggests that it can vary considerably between employers, and that overall employer valuation is limited, and probably waning.

While there will always be an intrinsic value of a certification to the person who has achieved it, its financial/market value to that individual will depend on the value attributed by his/her employer (or *customer*, for self employer IT Professionals (consultants/ contractors)). In principle, this could manifest itself by a salary premium for those who possess certain qualifications. However, the primary context in which employers' valuations manifest themselves is, during the recruitment process, where certifications can play a role as a **differentiator** between two or more plausible candidates. Thus in principle where there are two applicants with broadly equivalent capabilities, a recruiting employer might be expected to choose an applicant with a par-

Author

Matthew Dixon has worked in and around the Information Technology world since the mid-1980s, on R&D, Technology Transfer, Training and Qualifications. His focus has been on IT skills policy and research for some 12 years, initially in the United Kingdom, and (since 2001) at the European level. His interests span the policy-research divide, and his contributions have included bringing significant new quantitative evidence to bear on policy analysis, and clarifying the underlying issues around occupational classifications. He recently completed leading a significant CEPIS study for the European Commission on e-skills Foresight Scenarios for the IT Industry in Europe. <md@the-eyrie.net>.

ticularly relevant certification over one without.

In general terms, the value attributed in a labour market to a certification will change over time, and in particular it will shift depending on whether the labour market is 'tight' (with demand for IT professional skills exceeding supply), or 'loose' (where the reverse is true). Where demand exceeds supply, the 'acceptance levels' of recruiting employers in assessing candidates naturally fall (this was particularly evident at the end of the last decade, when employers were recruiting relatively unskilled people for IT professional work). Thus the value attributed will generally be lower in such conditions than when there are limited (or no serious) skill shortages: greater 'power' then lies with the employer, who (with an excess of applicants) can demand higher capabilities in the candidates. These 'higher capabilities' can include more qualifications. The value of the certification(s) as differentiator plays a role where there is a choice between a number of applicants, but falls away where there is only one or none (i.e. a significant shortage).

Empirical data elaborating the realities around these general economic principles (of supply and demand in the context of recruitment of IT Professionals) was gathered for the Harmonise project². Each partner carried out surveys of a) employers recruitment practices and b) the specifications of job (vacancy) adverts in its own country. The

¹ particularly for an unemployed person.

² see <http://www.cepis-harmonise.org/php/uploads/media/HARMONISE_Description.pdf>.

Estimates of numbers of IT Practitioners employed in the United Kingdom from mid-1960s

(Source: UK Labour Force Survey, with various adjustments)

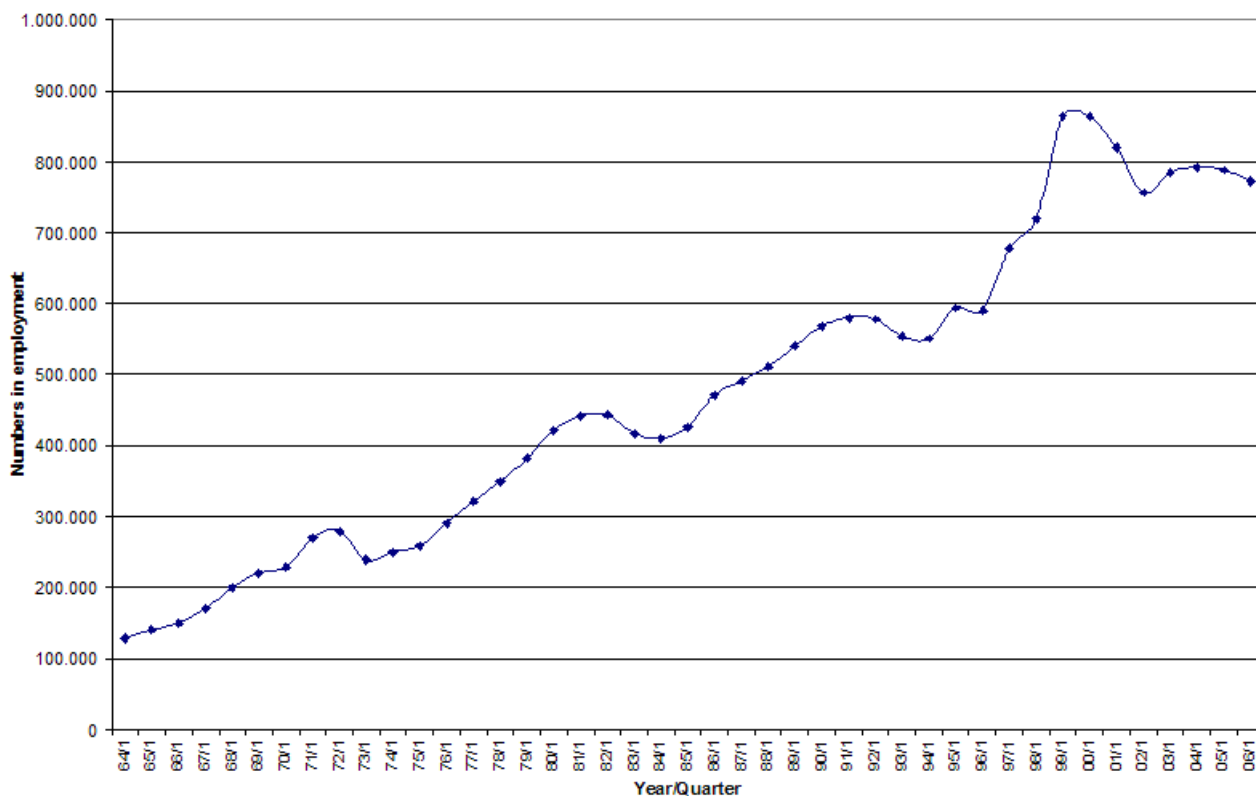


Figure 1: Development of UK IT Practitioner Employment Level over four Decades.

results of this work, covering data for Austria, Estonia, Germany, Italy and the United Kingdom, are summarised in the forthcoming report of the project.

The 'bottom line' of this empirical evidence is that qualifications are comparatively low on recruiting employers' lists of priorities for candidate capabilities, with *direct experience in the role being recruited for* and understanding of, ideally *familiarity with, the software environment being operated* by the employer being the highest priorities.

2 The IT Professional Labour Market in Europe

The demand for skilled IT professionals has generally exceeded its supply over the forty or so years since the early days of significant commercial computing. The relentless growth of demand, as the power of each new wave of enabling technologies was reflected in strong market growth, has meant that the traditional labour market supply channels for professional people, in particular Tertiary/Higher Education courses in IT-related fields, were repeatedly 'struggling to catch up' in terms of their capacity.

But the growth was not always steady. Periods of very strong growth (sometimes more than 15-20% annual increases in the numbers of IT Professionals employed) were often followed by set-backs resulting from recession, loss of business confidence and as a consequence a drop in demand. Figure 1 shows the growth in IT Professional numbers (for the UK) over four decades.

The swings in activity from time to time (there seem to have been peaks every 9-10 years), have generally been considerably larger than in most other labour markets for professionals, and have posed problems for the smooth development of the IT (supply) industry and use of IT in user sectors: periods of strong growth resulted in significant skill shortages (particularly towards the end of the growth phase), and the easing phases saw, *inter alia*, shake-outs and redundancies. As is well known, the final years of the last decade showed the greatest surge of all (in the history of IT so far). An example of the scale of the challenge for traditional IT professional supply channels can be seen from what happened to demand and supply in the United Kingdom over 1998. At the end of the year, there were some 120,000 more IT practitioners in employment in the UK than there were at the beginning of the year [4]. The three main reasons for this unprecedented demand growth are well documented:

- The work undertaken in both private and public sectors to tackle the risks associated with the millennium date-change problem ('Y2K').
- The effort needed to make financial systems ready for the introduction of Euro-trading (even in countries that did not join the Euro-zone).
- The dot.com boom at the time.

At the European level, the CEPIS study carried out in 2001/2 [5], gathered data on IT Practitioner employment

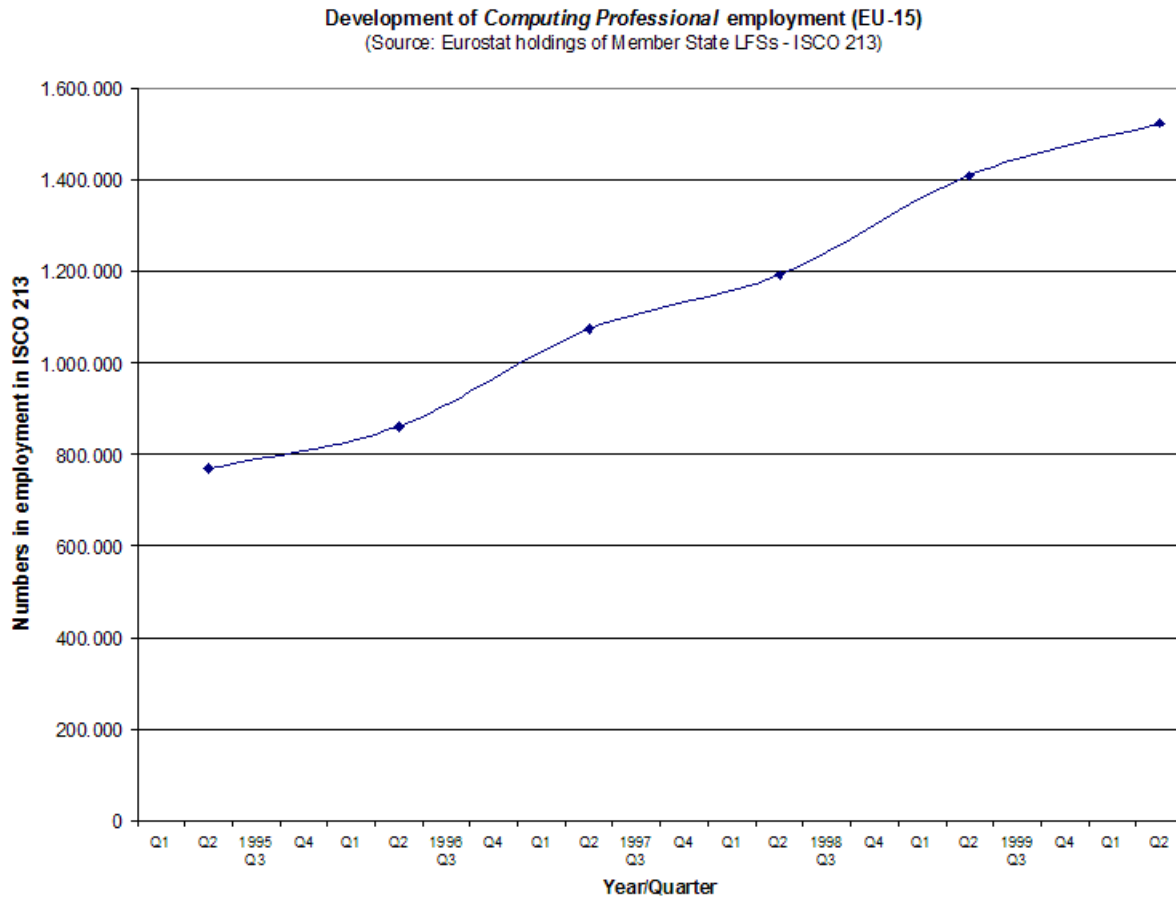


Figure 2: Development of European 'Computing Professional' Employment Level from 1995.

within the European Union as a whole, from the Eurostat holdings of Member State 'Labour Force Surveys'. This focused on "Computing Professionals" (ISCO³ 213).

Figure 2 (from analysis for [5]) shows the growth of Computing Professionals in the EU over the second half of the 1990s.

3 Sources of Supply

By contrast with the phenomenal growth of IT Practitioners in the UK in 1998, the numbers of graduates emerging during 1998 from IT courses in UK universities was some 10,000, of which only some 6,000 chose to work as IT professionals. This loss was more than made up for by the significant number (~5,000) of graduates of other courses (e.g. history, english, mathematics, accountancy) who chose (were recruited for) such work. However, this detail is of little consequence, when one realises that, of the 120,000 new IT professionals at the end of 1998, nearly 110,000 did

not come direct from IT courses! Thus (in such conditions) the contribution of the 'linear' supply flow of 'new professionals' through traditional Tertiary Education courses was almost negligible. While the scale of 'mismatch' in this example was probably unique, the key conclusion that must be recognised is that the 'linear supply model' generally assumed for the established professions is certainly not (yet) in place for the IT Profession. With few exceptions, supply of 'new IT professionals' arises from a wide range of sources, of which 'new graduates from IT Higher Education courses' is one (in some Member States the dominant one) but by no means the only one [6].

The main sources of new supply of IT Professionals can be viewed as including:

- Graduates of Higher Education (HE) informatics/computing⁴ courses, arriving onto the labour market.
- Existing employees being 'trained up' by their employer to become IT practitioners.
- 'Occupational transfers' entering IT practitioner work in the sector via some kind of conversion learning from other kinds of work.
- Graduates from non-informatics HE courses.
- New market entrants with IT knowledge from other parts of the formal education system (e.g. from secondary vocational, or even general, education courses).

³ International Standard Classification of Occupations.

⁴ although Eurostat uses *computing* for the relevant HE subject category statistics, *informatics* is used to refer to courses on informatics, computing, information systems, ICT, computer science, etc.

- New IT practitioners arriving on the national labour market from *inward-migration* from outside the EU.

- IT practitioners re-entering the labour market (e.g. from unemployment or career-breaks).

- IT practitioners moving in from other sectors.

The IT professional labour market is therefore by no means simple in its characteristics and behaviour, and any serious study of the overall position of IT professional certifications needs to bear this in mind.

4 Defining the IT Professional Market

Much work has been done over recent years on efforts to clarify the nature of the different functions, roles, and specific 'occupations' within IT Professional work. Significant outcomes to this are, at EU Member State level:

- The CIGREF Nomenclature in France.

- The Structure of the Advanced IT Training System (AITTS) in Germany.

- The Skills Framework for the Information Age (SFIA) in the UK, and related (though less highly-elaborated) developments exist in a number of other Member States.

In addition, at the European level, following the initial work of the *Career-Space* consortium (see <<http://www.career-space.com/>>), interested stakeholders, led by CEDEFOP and CEPIS, have been developing specifications for *CEN Workshop Agreements* (CWAs), leading towards an agreed set of profiles that would represent the planned *European e-Competence Framework*. Of particular interest in this *CEN/ISSS Workshop* are:

- *Phase 1 (2002-3)*: Establishing an initial profile set for IT Practitioners (based on the Career-Space IT Industry Consortium 'generic job profiles'), and some broad principles for Tertiary Education curriculum development (resulting in publication of CWAs 14925 and 15005⁵).

- *Phase 2 (2004-5)*: A deeper, broader analysis of the current position, an initial interpretation of the proposed European Qualifications Framework (EQF) for IT Practitioner Work, and elaboration of the nature of a European *Meta-Framework* – a framework for assessing existing IT Practitioner Skills Frameworks (this was reported in CWA 15515⁵).

The European Certification of Informatics Professionals (EUCIP) development, led by CEPIS and the European Computer Driving Licence Foundation, is also bringing an important new framework at the European level: a number of *EUCIP Profiles* have been developed as part of the contribution that the various EUCIP certifications bring to the underpinning knowledge and un-

derstanding of some of the more important IT Professional roles (see <<http://www.eucip.org/>>).

In addition, a number of the *major IT player* employers (in particular in, but not limited to, the IT Supply industry) have developed their own frameworks for the competencies of their IT Practitioners.

5 Measuring the IT Professional Market

In order to clarify, in a consistent and comparable way, the structure and nature of the labour market for IT Professionals in the EU, it is necessary to find agreement on a structure of occupations (or occupational profiles), and then gather labour market data against these. This may be possible with the appearance and acceptance of the planned *European e-Competence Framework*⁶, but at this stage, comprehensive, consistent labour market information for the European Union as a whole is only available using two categories of the International Standard Classification of Occupations (ISCO) – an occupational classification nearly 20 years old (an update is planned for 2008). The two relevant occupations within ISCO are Computing Professionals and Computer Associate Professionals. The specification of the occupational activity for these two ISCO codes is as follows:

- **Computing Professionals** (ISCO 213) "conduct research, plan, develop and improve computer based information systems, software and related concepts, develop principles and operational methods as well as to maintain ... systems ... ensuring integrity and security of data".

- **Computer Associate Professionals** (ISCO 312) "provide assistance to users..., control and operate computers and peripheral equipment and carry out limited programming tasks connected with the installation and maintenance of computer hardware and software".

In spite of the considerable limitations of this categorisation, a basic understanding of the structure of the IT Professional labour market can be gained by examining the data for recent years from the European Union Labour Force Survey (EULFS⁷) for these two occupational groups. Figure 3 shows the development of employment levels in these two categories, and the total of the two (a good proxy for the numbers of *core, technical* IT Practitioners) over recent years, for the 'EU-15'.

Of course, as indicated, the dis-aggregation into these two occupational categories is insufficient to clarify the many different sets of knowledge, skills and competences required of IT Practitioners, and so provide some indications of the requirements for relevant certifications. What is needed is an agreed occupational (or skills/competence) framework, recognising the range of different IT Professional roles in the marketplace. Unfortunately gaining agreement on such a classification framework is particularly difficult, largely because of the lack of maturity of the work organization involved.

Figure 4 illustrates the principles involved in the dynamics of work organization for IT Professionals, and the emergent identification of skill-sets and training market re-

⁵ for more information, visit: <<http://www.cenorm.be/cenorm/businessdomains/businessdomains/iss/cwa/ict-skills.asp>>.

⁶ The aspiration of the next phase of the CEN/ISSS ICT Skills Workshop.

⁷ The Eurostat Holdings of EU Member State *Labour Force Surveys*, or equivalent.

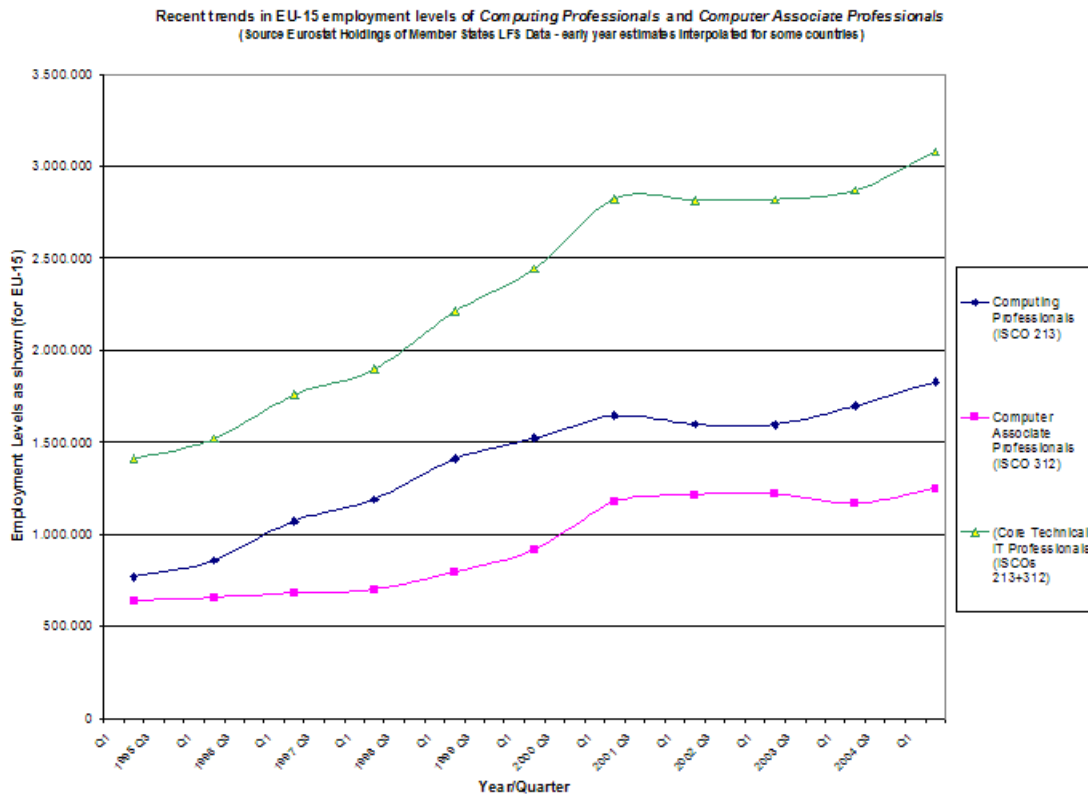


Figure 3: Development of European IT Practitioner Employment Level since 1995.

sponses that arise from it. It is taken from CWA 15515 [7] – a comparatively comprehensive state of the art review of this area.

Amongst other things, CWA 15515 examines in some depth the relationship between occupational competence and qualification/certification learning outcomes. It is evident that this relationship is not seen uniformly around the European Union, and this is likely to continue to pose challenges for getting agreement on EU-level competence and qualification frameworks.

6 The Development of Demand over Recent Years

Demand for IT Professionals is a **derived** demand: labour/skills are needed to work on producing products and services for which people are prepared to pay. So it is the demand for I(C)T activity that drives demand for IT Professionals. Employment levels in a particular occupation are **the lower** of the levels of demand for such labour and the supply of it. On the surface that would mean that, where supply of skilled labour is generally *following* (trying to keep up with) the remarkable growth in demand, IT Professional employment levels would correspond to *supply* levels.

However, in reality, things have not worked out in this way: employment levels have self-evidently grown much more quickly than just what could be supplied by Informatics Higher Education (or other appropriate *learning supply channels*), and so while supply of people with the right IT Professional skills has indeed been heavily constrained, actual supply has not. This is because the work was there to

do, and enterprises (and public sector organisations) have had to do it, so that employers have found people to do this work – even if these people did not – at recruitment time – have the right, or even adequate, skills. This means that, in practice, this labour market has experienced a significant shortage of 'quality' skills, but not a shortage of skills.

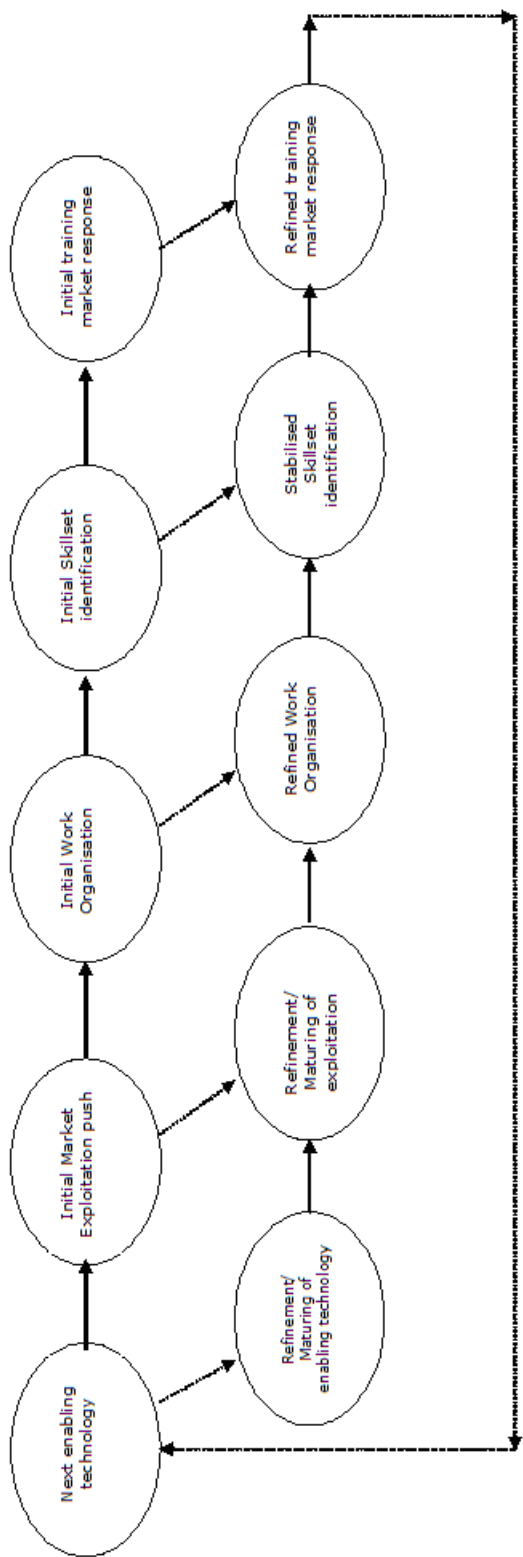
As seen in Figure 3, until around the turn of the century, EU employment levels grew steadily. But, as shown for the UK, in addition to the steady growth, the development from the early days of computing also shows a certain cyclical effect, with pauses in the growth pattern after the early 1980s and early 1990s that arise from the general loss of economic growth and confidence in European economies at those times.

While there is a wide range of factors that can impact on the development of ICT activity, and the resultant derived demand for IT Professionals, a comparatively small number of these is dominant. In particular, over the last three decades, it is believed [6] that *general economic and investment climate* and the *rate of IT innovation* have been the major drivers of levels of IT Professional demand.

The most significant *pause* in an otherwise strong, clear pattern of growth was the sharp easing following the 'bursting of the dot.com bubble'. Interestingly the timing of this varied between Member States, but IT Practitioner employment levels generally lagged by about a year behind the generally assumed peaking of IT activity.

7 The Response of the Supply Channels

As indicated in Section 3, there are some eight different



This diagram attempts to clarify what *drives* the development of specifications of ICT skills/competence needs. It shows how the emergence of each new ICT enabling technology (delivering useful new functionality, whether hardware or software) produces a series of responses in the marketplace, both from ICT supply companies (who believe they can make money by helping deploy the new technology for their customers), and from ICT User Organisations (who believe that the new technology could help improve their business activity and performance, whether public or private). In each case, efforts to pick up the new technology lead to the need for each organisation involved to develop or refine the structure through which it deploys its Human Resources in this work, and from this to clarify the (at least, technical) skill requirements in the different jobs or roles. In the (general) absence of enough people with such capabilities, these in turn produce specific learning or training needs, to which the suppliers of ICT training provision respond through this "secondary" marketplace. Very often this chain of activity will be driven by assumptions about the new technology that do not (all) turn out to represent the essence of the contribution of the new approach. As a result, there can often be a "second phase" to the process, where each step is refined by being built more soundly on the realities of this technology's characteristics. Now these are evident since it has matured. Since there is (as of late 2005) no real sign of the waves of new technologies abating, it will remain very important for all thinking about work organisation and skill/competence need specification for ICT to recognise the very dynamic nature of the context. As can therefore be inferred, consensus on structures of employer skill-set needs can often follow several years after emergence of each new wave of technical functionality.

Figure 4: Evolution of Work Organisation for IT Exploitation*

* diagram reproduced from [7] with kind permission of the European Committee for Standardisation © CEN

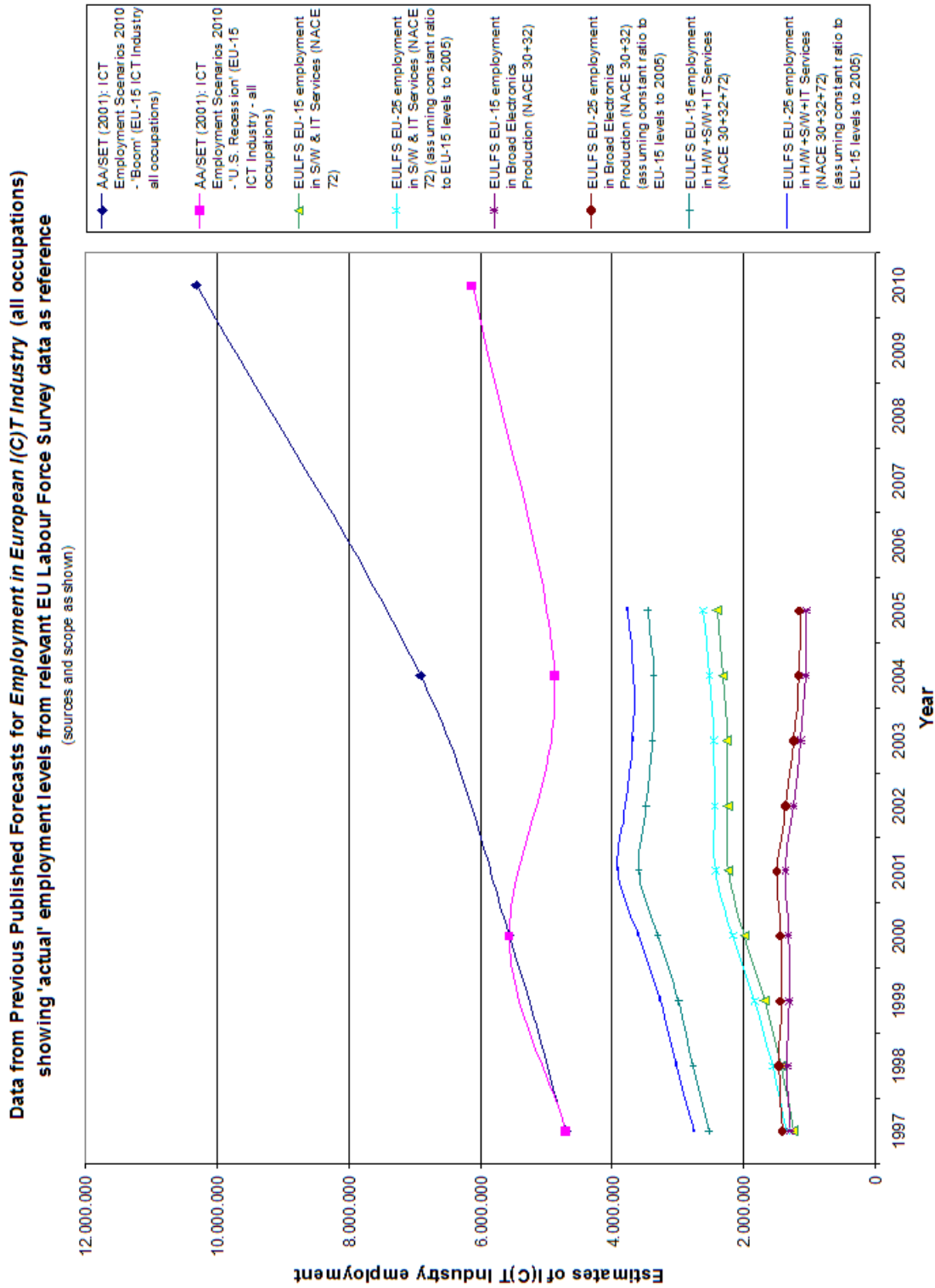


Figure 5: Development of European I(C)T Industry Employment Levels: Forecast Estimates + "Actuals".

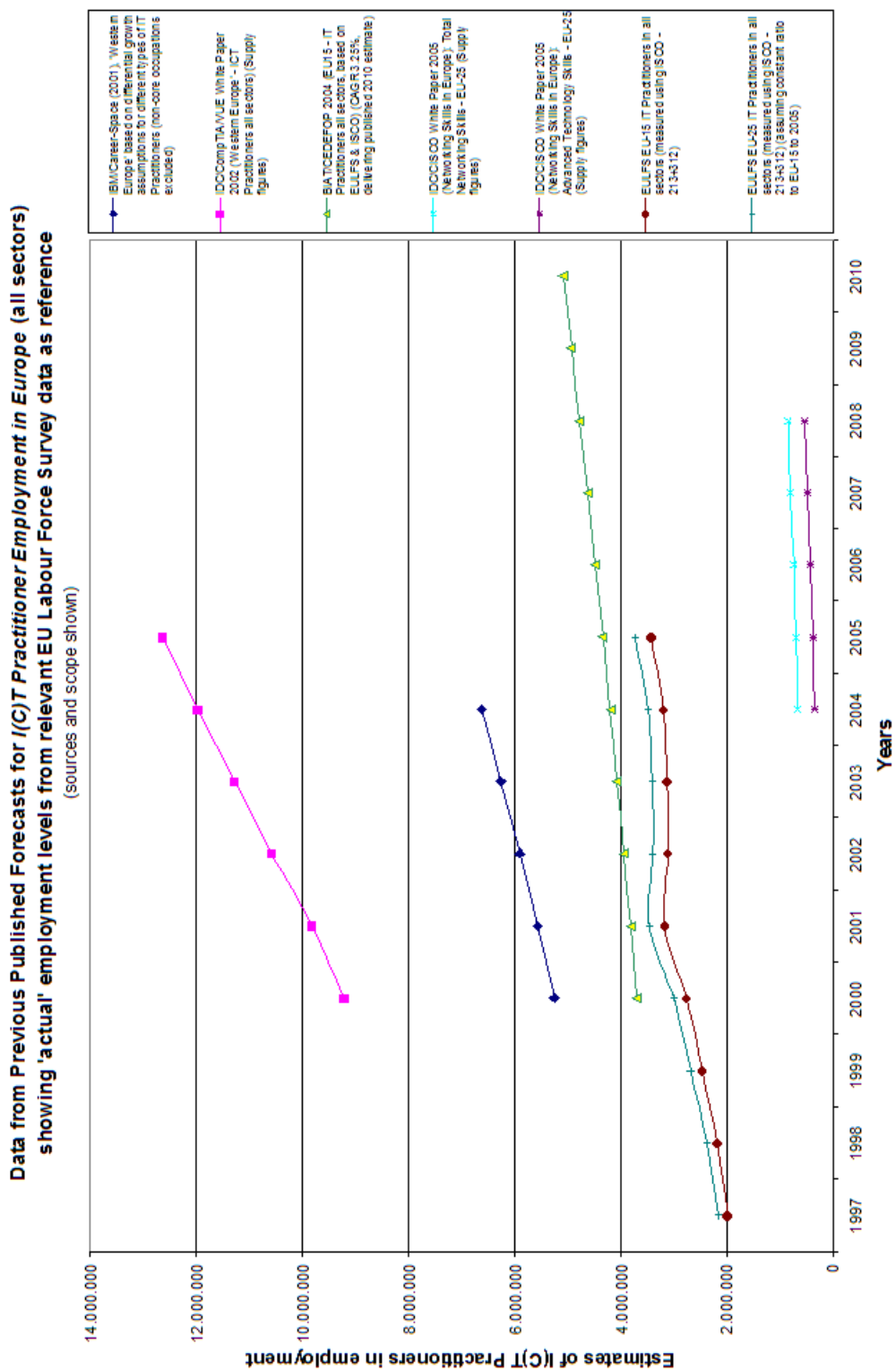


Figure 6: Development of European I(C)T Practitioner Employment Levels: Forecast Estimates + "Actuals".

sources of supply of 'new' IT practitioners (ignoring the inevitable labour market *churn* that occurs, to a greater or lesser extent, all the time, but which makes no net change to the IT Professional workforce).

The 'supply dynamics' associated with these different 'supply channels' (i.e. the nature and speed of inflows) vary considerably. While each will involve an element of delay, these delays are different in nature, and so duration. For example:

- IT professionals from other sectors, and those re-entering the work-force can move in relatively quickly – there is generally no element of (re-) training necessary, simply movement through the recruitment process.

- The conversion learning through which those migrating in from other occupations will pass will take, at least, months.

- The in-company up-skilling of workers from lower-level occupations will generally take, at least, weeks.

- The flows of inward-migrant IT Practitioners will involve the delays associated with conforming to Visa/Work Permit processes (significant numbers of weeks).

- The flows of 'fresh graduates' (whether from informatics courses or not), generally takes place once a year – and a certain level of induction training will be necessary.

It is therefore inevitable that supply will lag demand in this labour market. In particular, institutions in the University sector can take many years to respond to market changes, where (as generally) course curricula and examinations have to be changed, and in some cases new teaching staff recruited.

8 The Nature of Skill Shortages and Policy Responses

Few employers have *never* complained about skill shortages – the difficulty of finding and successfully recruiting 'high quality talent', given the many attractive opportunities open to good performers. Enterprises in most economic sectors have, particularly at times of strong growth, been unable to quickly or easily find the 'good' people they seek, and, at some time or another, have complained about perceived problems associated with the most obvious source(s) of supply (young people coming through the formal education system), and sent signals to governments urging them to 'do something about it'. Most EU Member State governments now have elements of skills policy in place, and a range of different approaches and initiatives to increasing skills supply have been tried, not all of which have been successful.

How, then, can and should governments try to respond to reported concerns about shortages of supply within different labour markets? Clearly, even though the problem of perceived skill shortages can emerge in a wide range of sectors, public policy would generally tend to view certain types of work/certain sectors, as being more (strategically) important for the national economy than others. Information (and Communication) Technology is, due not least to its

all-pervasiveness and its ability to have a positive impact on productivity in most (user) sectors of the economy, certainly one of those sectors. Indeed IT skills (or *e-skills*) policy programmes exist in most if not all Member States, although these tend to focus mainly on IT *user* skill needs, as an enabling ability for the population to be able to participate in the knowledge economy, and in particular, to be able to access the increasing numbers of public services delivered by e-government.

The question of labour market shortages of IT professional skills is essentially a different matter than the supply of appropriate user skills throughout the workforce. As with other aspects of policy-making – there is growing interest in *evidence-based* policy development, generally around the question of possible *market failure*. Thus, in response to concerns raised about IT professional skill shortages, the question is quickly asked: what is the nature and scale of such shortages?

The reality is that it is comparatively *very difficult to provide unequivocal hard evidence of skill shortages*. The most meaningful measure of labour market shortages is generally agreed to come from responses to employer surveys in relation to hard-to-fill-vacancies, recognising that skill shortages are only one of the possible causes of such problems experienced by employers, with others generally arising from the attractiveness of the vacancy offer as perceived in the market-place. For example, a lack of applicants for a particular job in a particular enterprise would not be so surprising if the salary that was being offered was comparatively low, and/or if the physical context (e.g. working environment, site location) of the work were in some way unappealing. In such a situation, an employer experience of hard-to-fill-vacancies would not necessarily arise from an absence of good, appropriately skilled, people looking for such work.

This all emphasises the need for caution in relation to the assessment, for policy purposes, of assertions of shortages.

9 Forecasting Future Demand for IT Professional skills

It is not surprising that, if assessing skill shortages is not easy, assessing *future* skill shortages is very much less easy. Much has been written about attempts to assess future skill needs, and recent efforts at the European level are beginning to tackle the considerable diversity of relevant data across the EU, in order to develop consistent estimates of future sectoral and occupational employment levels for Europe as a whole.

In respect of IT Practitioner skills, the main recent studies providing quantitative forecasts in relation to e-skills were reviewed in some depth for the recent CEPIS study for the European Commission (CEPIS, 2007). In particular, the approach used in the following studies was considered in as much detail as was published.

Studies forecasting I(C)T Industry employment/skills levels for Europe:

- The 2001 Study for the Finnish Electrical by Abo

Scenario	Pace of Technological change	Economic Climate	Pace of Off-shoring
A: Renaissance	Rapid	Positive	Moderate
B: Steady Climb	Moderate	Positive	Moderate
C: Global	Rapid	Positive	High
D: Fight back	Rapid	Turbulence	Moderate
E: Dark Days	Moderate	Turbulence	Moderate
F: Decline	Moderate	Turbulence	High

Table 1: The six Scenarios Developed for the Foresight Study.

Academy (SET/ÅA, 2001).

Studies forecasting I(C)T practitioner employment levels for Europe (showing scope):

- The 2001 IBM/Career Space forecast (Western Europe) (Career-Space, 2001).
- The 2002 IDC Study for CompTIA/VUE (Western Europe) (IDC, 2002);
- The 2003 BIAT/Cedefop study (EU-15) (Petersen, W. & Wehmeyer, C. (2003)).
- The 2005 IDC White Paper on Networking skills for CISCO (EU-25) (IDC, 2005).

Figures 5 and 6 show the forecasts from these studies, alongside "what actually happened" in the labour market from EULFS evidence, for *IT Industry employment levels*, and *IT Practitioners across the whole economy*, respectively.

As can be seen, most forecasts were clear over-estimates, some very significantly so.

10 Determinants of Future Demand

As with other areas of policy-making and planning, what is sought above all is identification of the *key drivers* that will enable some kind of understanding of what will determine future developments.

As indicated above, the CEPIS 'Foresight Scenarios' project [7] concluded that the number of factors that are likely to make a major impact on future demand for IT professionals is comparatively small. That project has researched e-skills Foresight Scenarios for the IT (supply) Industry in Europe, on behalf of the European Commission (D-G Enterprise and Industry). This was a major piece of original research, and involved, *inter alia*, the identification of significant number (some 90) of Change Drivers - independent *trends* that could have an influence on the supply and or demand of e-skills in the future. However, as well as examining the impact of these on the supply and demand of the three types of e-skills defined by the Euro-

pean e-Skills Forum⁸, the study found that, as far as future demand for IT Professional skills for the IT (supply) industry was concerned, three core-drivers were likely to have the most impact – the two already mentioned, plus the rate of off-shoring of IT Professional work beyond the EU.

The study analysis explored in more detail six scenarios, designed around different combinations of high and low values of the three core-drivers, as follows (see Table 1).

A simple but effective mathematical model was used to explore the possible quantitative development of employment levels under the six scenarios, with the outcomes shown in Figure 7.

The *qualitative* implications of the six scenarios, in terms of the likely impact on supply and demand for three broad levels of IT practitioners are shown in Table 2.

The *quantitative* implications of the scenario trajectories are estimated, in the report, in terms of the possible supply-demand imbalances in 2010 and 2015.

11 Conclusions for The Future of IT Professional Certifications

As indicated at the beginning of this paper, the secondary market for training and assessing IT Professionals for relevant certifications arises from the (primary) labour market for recruitment of these professionals.

In general, the greater the excess of demand over supply, the less value is likely to be placed by employers on qualifications held by applicants – the 'easier' the labour market, the more significant the task of discrimination between candidates becomes, and so the (comparatively) higher the value of certifications.

It is significant that, although the Foresight Scenarios report suggests that most of the six scenarios for supply and demand for IT Practitioner skills for the supply Industry are likely to involve some kind of net shortage for 2010 and 2015, the levels of the shortages are considerably lower than some of the severe shortages predicted in some of the private sector forecasts of the past. Certainly unless the three core-drivers conspired (for example, with a significant *reduction* in the off-shoring trend to economies beyond the

⁸ ICT *Practitioner* skills, ICT *User* skills, and *e-Business* Skills – see European e-Skills Forum (2004).

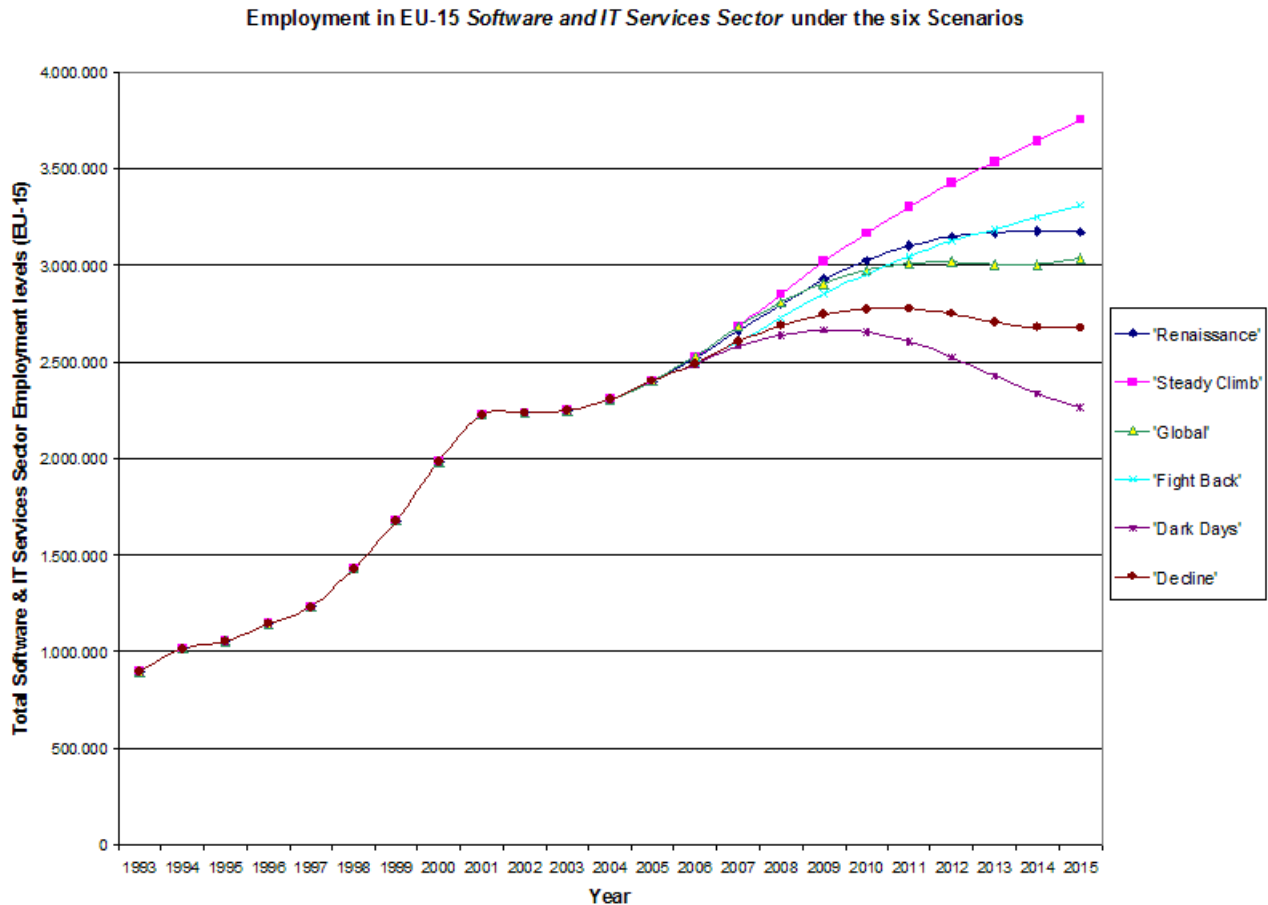


Figure 7: Estimates of Future European IT Industry Employment Levels for six Scenarios.

EU) towards high demand within the EU, the serious shortages experienced at the end of the 1990s would be very unlikely to be repeated. With lower levels of demand growth (or even demand *easing*), the relative supply available to recruiting employers would grow, and factors, like the possession of relevant certifications, that enabled them to differentiate in their recruitment selection processes would begin to assume more importance.

More fundamentally, given the comparatively low current employer valuation confirmed by the Harmonise project, the future development of IT Professional certifications will depend on how employers' real valuations of them will change in the future. Significant increases in demand for such certifications cannot be expected without significant changes in employers' attitudes.

Such change could (in principle) take place, but it is difficult to see how much change will occur through the existing market mechanisms. While a "top down" (regulatory) approach might have more success, there is little evidence to suggest that sufficient political will exists, either at the national or at the EU level, to try to introduce regulation into this marketplace.

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IT practitioner Skill level	State of Skills within European Union (IT Industry)	'Renaissance'	'Steady Climb'	'Global'	'Tight back'	'Dark Days'	'Decline'
Low	Supply of Skills within EU	+	+	+	-	-	-(+)
	Demand for Skills within EU IT Industry	+	+	+	+	+	-
Medium	Supply of Skills within EU	+	+	+	+	-(+)	-(+)
	Demand for Skills within EU IT Industry	++(+)	+	++	+	+	+
High	Supply of Skills within EU	+	-(+)	+	-(+)	-(+)	-
	Demand for Skills within EU IT Industry	++	+	+	++	+	+
Overall	Supply of Skills within EU	+	+	+	-(+)	-(+)	-(+)
	Demand for Skills within EU IT Industry	++	+	++	+	+	+

Table 2: Broad Assessment of the Supply and Demand Implications of the six Scenarios.

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