The European Certifications and Qualification Programmes Market in the ICT user sector

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Executive summary

Currently, the increase in Information and Communication Technologies (ICT) innovations, their diffusion and applications need not only multi-level, technological competition but also knowledge and competence-based competition. Both ICT providers and ICT end-user companies need workforces able to develop and manage ICT tools and to understand, build and manage the new ICT–related business. Moreover, considering the shortness of ICT life-cycles, the risk of rapid skills obsolescence is extremely high.

In this scenario, the labour market is forced to face ICT skills gap and mismatch. Certifications and qualifications may fill that gap. In fact, a *qualification* is the process of learning by which a new workforce role is formed; a *certification* guarantees a formal quality control of the acquired skills and competences acknowledged by the market. Moreover, given their functions, certifications should be issued by third parties outside the company, other than training institutions. Certifications can be vendor-centric, if they refer to specific commercial platforms, or neutral, if their contents are defined by independent institutions with a multi-platform approach. They can address ICT *professionals - practitioners* or *individual users* (simply *users* in this report).

The aim of this report is to provide an overview of the current diffusion of certifications in Europe and to take a snapshot of both the supply and the demand for certifications and qualification programmes. As regards the demand, we decided to focus on a sample of 35 large end-user companies in the major European countries. Likewise, this report focuses on all the types of certifications mentioned above: vendor centric and neutral, for professionals and for individual users. It presents an emerging scenario, and gives some keys to reading certifications and qualification programmes features. This picture can be useful for both certifications suppliers and companies which need new IT roles and workforce.

Today in Europe almost 900,000 ICT professionals certifications have been issued and the number of applicants to some ICT certifications exceeds 1,2 million. This indicates that a new trend is emerging. Figures are very promising for users certifications too, which are almost 2 million in Europe (ECDL is the most important one), with more than 5 million applicants. Penetration of users certifications out of active population (defined as people who furnish the supply of labour for the production of goods and services) is about 1.4%; penetration of professionals certifications out of ICT practitioners is much greater, even though it is still lower than in USA and Japan.

This shows that people feel the necessity to get acquainted with the new tools and instruments of the information age and use their newly acquired competences as "leverage" (e.g., to get a job or a career promotion or an increased productivity in their work). In order to do so, they need to be assessed and certified. This trend can be explained and justified by the general inability of traditional learning institutions such as schools and universities to keep pace with the overpowering evolution of technologies and to provide potential users with the specific skills and competences which the world – and companies – in the information age are seeking.

Certifications are not yet equally distributed in Europe, as some countries (mainly Northern European ones) present penetration rates vastly greater than others (e.g., 5% of Scandinavian, and 4% of Italian, active population owns ECDL vs. less than 0.5% in France and Spain). This reflects a different attitude towards ICT certifications, the different promotional and "evangelist" role played by local ICT associations (e.g., AICA in Italy), the different local economy, the diverse local relationships between industry and school system, different recruitment rules which regulate the labour market (e.g. in Italy, Public Administration recruitment is based on competitions and certifications are prerequisites).

With regard to certifications and qualification programmes features, certifications can actually certify complex ICT competences and job profiles when they involve assessments integrated with interviews, observation at the work place, documentation analysis, etc. (e.g. AITTS, EUCIP and EXIN). Similarly, composite qualification programmes can assure the achievement of complex learning outcomes; they can be considered as an effective preparation for the certification of competences and profiles (e.g. AITTS, EUCIP, ICS[2]). What's more, shared ICT skills and competence frameworks should be required, in order to help companies better compare certifications and qualification programmes contents.

On the other hand, field analysis has shown that many large end-user companies are still not realizing the opportunities that ICT certifications offer in terms of accountability, quality control and potential cost savings. Despite the wide range of qualifications, companies often prefer to rely on internal qualifications and training programmes (43% for both ICT professionals and individual users) and do not seek universally acknowledged certifications. This orientation can be attributed to a strong focus on training processes, which in most case are still based on traditional classroom courses and to a lack of interest in external proof of human resources' quality. This situation actually denotes low maturity of end-user companies, concerning the opportunities offered by some new ways of learning and assessing competences. Contrarily, certifications are sometimes considered important when they are required to certify a whole process or the company itself. Furthermore, in many large end users companies, sourcing is getting increasingly common, and in this case, end-user companies are not willing to invest too much in people's formation. Rather, when they lack skilled professionals inside and the know–how to evaluate the external ICT competences required, they may require ICT vendors to be certified as a guarantee of quality.

The scenario described here is characterized by a peculiar dichotomy between the world of individual users, who look at qualifications as a potential to be exploited on the job market and therefore seek certifications, and the world of many end-user companies, which in spite of their need for a highly professional ICT workforce do not yet seem to have fully understood these opportunities of certificates as a means of quality assurance. An exception to this is Public Administrations, which – especially in some countries, such as Italy and the United Kingdom – show remarkable maturity in the field: the percentage of certified workers in Public Administrations is about twice as high as in the other end-user sectors analysed.

In conclusion, the ICT qualifications and certifications market is evolving rapidly: the dialectic confrontation with the needs and the policies of end-user companies is doomed to heavily influence its trend over the next few years.

Box 1: Key Messages

Key Messages

- **ICT certifications for professionals are almost 1 million in Europe, but they still have to grow**

- **ICT certifications for individual users are at least 2 million in Europe and are growing fast (especially ECDL)**

- **A significant part of the qualifications adopted by interviewed companies (~45%) are actually not certifications, but only internal qualification programmes or assessments**

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1.   Introduction

This section presents the goals of the study, the definitions adopted for certification and qualification and the background scenario in which they were born. Section 2 focuses on the supply of certifications; it indicates their volumes in Europe and qualitatively describes some major available certifications. Section 3 offers a snapshot of the demand of qualifications and certifications based on a survey conducted on 35 large European end-user companies. Finally, some conclusions are drawn in Section 4. Summary boxes throughout the text highlight the main findings of the research.

1.1   Goals

Aim of this study is to provide an overview of the current diffusion of certifications in Europe and to take a snapshot at both the supply and the demand of certifications and qualification programmes. This report presents an emerging scenario, and gives some tracks to understanding certifications and qualification programmes features. This picture can be useful for both certifications suppliers and large end-user companies which need new IT roles and workforce.
More specifically, the study tries to answer the following questions:

- Which main institutions supply certifications in Europe?
- How many and what kinds of ICT certifications and qualification programmes are available in Europe?
- What kinds of needs do large end-user companies have in terms of ICT certifications and qualifications?
- Do large end-user companies have ICT job profiles/competences frameworks or ICT career paths related to ICT qualifications?
- Are large end-user companies' needs more focused on specific product-oriented certifications, or would they prefer profile – oriented certifications?
- Does the current ICT certifications supply meet companies' requirements?

1.2   Definitions and areas of investigation

A *vocational qualification* (which will be called simply *qualification* in this report) is the process of learning and assessing by which a workforce role is trained and formed, not necessarily followed by the issuing of an acknowledged certification.
A certification is "the credential [and the] evaluation process whereby an individual's knowledge and/or skill in a particular subject area is verified against a set of predetermined skill standards by means of an objective assessment" (CompTIA, 2004, pp. 18-19). Consequently, certifications cannot exist without a reference skill – a competence framework against which they can be verified. What's more, as certifications should be compliant with specific criteria applied for quality assurance, the control process should be exercised by a third and independent party with respect to the courseware and software platforms providers. Actually, only few of the existing certifications are 100% compliant with such strict requirement. In general, certifications give an objective and acknowledged title, help to use a common language, facilitate the preservation of competences as they usually require systematic updating of the contents acquired, and can be considered as a "level gauge" of performances.

Certifications may also enclose qualification programmes. They can include training courses or learning paths aimed to prepare for the certification assessment

Certifications can be *vendor-centric (vendor-specific)*, if they refer to commercial platforms, or *non-vendor-centric (vendor-neutral)*, if their contents are defined by independent institutions. Usually, the former are product-oriented certifications (e.g. Microsoft, CISCO); the latter are profile oriented certifications, usually focused on competences and job profiles for developing and managing technologies at different levels and in different sectors (SW, data, networks, security, etc.), e.g. ECDL, EUCIP, Exin, ICS[2].

Finally, a major distinction should be done between certification for *individual users* (or simply users) and for *professionals/ practitioners*. While the former address all ICT users, who need to have their ICT competences assessed and certified as a tool to do a job which is primarily related to a non-ICT-sector of industry, the latter address ICT practitioners, who want to demonstrate a specific knowledge or competence in their core activity ICT field, and are mainly used by companies as a form of basic training or as a criteria to hire acknowledged trained people.

This report focuses on all the types of certifications mentioned above: vendor centric and neutral, for professionals and for individual users. As regards the investigation of certifications and qualification programmes demand, it focuses on a sample of 35 large end-user companies in the major European countries in the Finance, Retail, Energy, Manufacturing, Public Administration and Telecom business sectors.
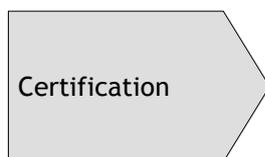
Box 2: Definitions

Definitions

| Qualification | • A process of learning and assessing by which a workforce role is trained and formed |
| | • It does not necessarily lead to the issue of an acknowledged certification |

| Certification | • A credential evaluation process whereby an individual's knowledge and/ or skill in a particular subject area is verified against a set of predetermined skills standard by means of an objective assessment* |
| | • It awards an objective and acknowledged title |

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* CompTIA, *The Situation And The Role Of E-Skills Industry Certification In Europe*, August 2004

1.3   Background scenario

At the beginning of the Information and Communication Technologies (ICT) widespread revolution, the labour market was above all forced to face an ICT skills shortage (insufficient number of skilled people). In fact, companies needed new job profiles but institutional curricula were not able to concretely answer those requirements because they have always had difficulties in managing the "real time acquisition" of competences. Therefore, some large ICT suppliers started

to define their specific ICT know-how standards and to develop the related certifications and qualification programmes. They became "the driving force for ICT certifications" and at the end of the 1990s both "*vendor-specific*" and "*vendor-neutral*" certifications had grown.

At the present time, the problem has switched from ICT skills shortage to ICT skills gap and mismatch. In fact, the relentless increase in ICT innovations, their diffusion and possible diverse applications, necessitate a multi-level competition – not just technological but also knowledge and competence based. Both ICT providers and ICT end-user companies need a workforce able to manage ICT tools and to understand, build, and manage, the new ICT–related business processes as well as see the new ICT trends and potentials. But all employees ought also to be able to manage ICT tools, and now, in some business sectors such as finance, or job functions such as marketing or logistics, it is becoming more and more difficult to clearly demarcate practitioners and users. Moreover, considering the shortness of ICT life-cycles, skills may become rapidly obsolescent.

Actually, in the last few years, many other certifications and qualification programmes have been developed and several input initiatives have been also carried out by institutional partners:

- European 'Recommendations' have emphasized the important role of vocational training in improving qualification levels of the workforce. The key concepts stressed in the Bruges-Copenhagen Process (2001-2002) were: promotion of mobility and inter-institutional cooperation; promotion of transparency, information and guidance; recognition of competences and qualifications; improvement of educational and vocational training; quality assurance.
- Several European countries have been paying more attention to vocational training than they had ever done before (for example, the United Kingdom, Germany, France, but also Spain, Italy and some east European countries such as Hungary have strengthened their national educational and vocational training); and some countries have focused strongly on ICT qualifications and certifications and supported the elaboration of national ICT competence frameworks (e.g. the UK with the Sfia framework and Germany with their AITTS system.
- Schools and universities are beginning to introduce qualification programmes and certifications into their curricula in partnership with external certification bodies.
- Career Space, a consortium of nine major ICT companies, (BT, Cisco Systems, IBM Europe, Intel, Microsoft Europe, Nokia, Philips Semiconductors, Siemens AG, Thales), and EICTA, the European Information, Communications and Consumer Electronics Industry Technology Association, with the support of the European Commission, has been developing a project "to put in place a clear framework for students, education institutions and governments that describes the roles, skills and competencies required by the ICT industry in Europe. […]"
- Further proposals for ICT certifications frameworks have been made by other independent institutions (see, as an example the EUCIP framework or the European Computer Driving License – ECDL) proposed by Council of European Professional Informatics (CEPIS))
- The eSkills Forum initiative, started after Copenhagen (2002) and supported by the European Commission is promoting and fostering actions from all EU member states and the main stakeholders of industry, trade unions, ICT associations, training institutions to enhance eSkills and develop the European ecompetence framework, in order to become the basis to build shared ICT qualification and certification systems

However, despite the amount and variety of initiatives and qualifications created in recent years and present on the international market, ICT professionals, ICT users as well as companies, do not still fully exploit these opportunities.

2. Supply scenario

Session 2.1. presents some main institutions which supply ICT certifications in Europe, volumes of some main ICT certifications available in Europe and aims at providing a snapshot of how many certifications are issued, their distribution by area and penetration. Session 2.2. suggests some keys to reading and evaluating certifications and qualification programmes and describes what kinds of ICT certifications and qualification programmes are available in Europe.

2.1 Certifications census

2.1.1 Analysed certifications

The certifications considered for the census analysis are reported in Table 2.1.

Table 2.1 - Certifications considered for the census analysis.

Certification	Description of certification	Institution	Typology
CCIE	Cisco Certified Internetwork Expert[1]	Cisco	Vendor- specific
CISSP/SSCP	Certified Information Systems Security Professional/ Systems Security Certified Practitioner	ISC[2]	Vendor-neutral
ITIL	IT Infrastructure Library	Specific board with EXIN (see below); in UK it is managed by ISEB	Vendor-neutral
ECDL	European Computer Driving Licence	CEPIS/ ECDL Foundation	Vendor-neutral
EUCIP Core	European Certification of Informatics Professionals	CEPIS	Vendor-neutral
Microsoft	*ICT Professionals*: MCDST, MCSA, MCSE, MCAD, MCSD, MCDBA	Microsoft	Vendor- specific

All the certifications analysed are practitioner-oriented, apart from ECDL which is user-oriented, and Microsoft, which issues certifications for both professionals and users. Moreover, certifications analysed can be vendor- specific or vendor-neutral. The institutions specified in Table 2.1 refer to the organizations, which define the standards and contents of qualifications and actually issue certifications. These institutions may differ from organizations managing learning and examination processes.

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[1] CCIE is not the certification of Cisco with the highest volumes, but it is reported as an example as it is the only one for which public data are available.

Box 3: Certifications analysed

Certifications analyzed

Certification	Institution	Individual users	Profes-sionals	Product oriented	Profile oriented	Vendor centric	Vendor neutral
• ECDL	• CEPIS	✓		✓			✓
• EUCIP	• CEPIS		✓		✓		✓
• MOS	• Microsoft	✓		✓		✓	
• ITIL	• Exin/ ISEB		✓		✓		✓
• AITTS	• Consortium		✓		✓		✓
• CISA, CISM	• Isaca		✓		✓		✓
• CISSP/ SSCP	• ISC²		✓		✓		✓
• CCIE, CCNA, CCNP	• Cisco		✓	✓		✓	
• MCDST, MCSA, MCSE, MCAD, MCSD, MCDBA	• Microsoft		✓	✓		✓	
• OCA, OCP	• Oracle		✓	✓		✓	
• Java, Solaris	• Sun		✓	✓		✓	

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2.1.2 Volumes of certifications issued/ applicants

Table 2.2. and Table 2.3 provide all the numerical data on certifications census divided into users and professionals

Table 2.2 – Volumes of analysed certifications for professionals

Certification	Data	Scandinavia	Italy	UK	Germany	France	Spain	Other European countries	Total Europe	Other worldwide countries	Total World
CISSP/SSCP	Total issued	342	125	1,536	253	153	117	1,320	**3,846**	31,475	**35,321**
CISSP/SSCP	Issued in 2004	88	54	420	90	58	34	308	1,052	6,456	7,508
CISSP/SSCP	Total applicants[2]	490	178	2,194	363	216	165	1,890	4,828	44,965	49,793
CISSP/SSCP	Applicants in 2004	126	77	600	129	82	48	441	1,300	9,223	10,523
Microsoft	Total issued	229,506	28,572	63,557	225,586	39,132	22,905	265,725	874,983	3,364,418	**4,239,401**
Microsoft	Issued in 2004	31,792	4,517	7,940	28,996	7,526	4,292	46,778	131,841	362,431	494,272
Microsoft	Total applicants	298,133	36,210	95,568	292,103	60,247	32,891	351,171	1,166,323	4,432,720	5,599,043
Microsoft	Applicants in 2004	31,792	4,517	7,940	28,996	7,526	5,371	45,699	131,841	362,431	494,272
CCIE	Total issued	163	119	720	523	209	132	1,263	**3,129**	9,292	**12,421**
ITIL	Issued in 2004	2,000	150	500	7,500	1,250	217	4,383	**16,000**	14,588	**30,588**
ITIL	Total applicants[3]	11,115	834	2,779	41,683	6,947	1,206	24,359	88,923	81,077	170,000
EUCIP	Total issued	34	188	5	3			470	700	-	**700**
EUCIP	Issued in 2004	32	107					167	305	-	305
EUCIP	Total applicants	84	517	27	9			1,563	2,200	-	2,200
EUCIP	Applicants in	68	319					714	974		974

[2] Estimated according to success rate.
[3] Estimated according to information gathered from EXIN.

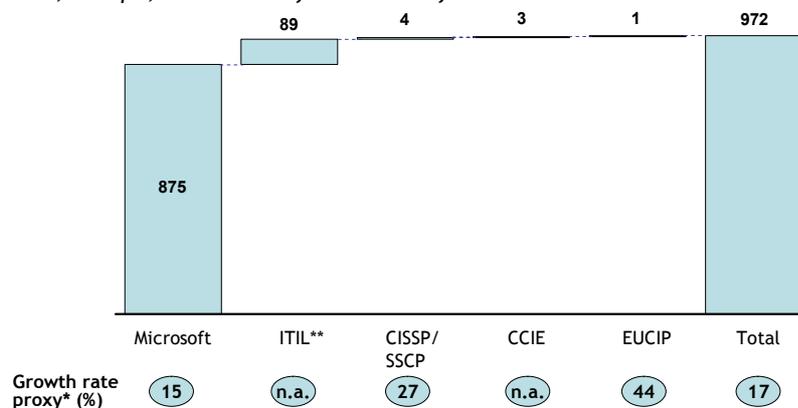| Certification	Data	Scandinavia	Italy	UK Germany	France	Spain	Other European countries	Total Europe	Other worldwide countries	Total World
	2004									

Box 4: ICT Professionals Certifications

ICT certifications for professionals are almost 1 million in Europe

2004, Europe, Thousands of issued certifications

	Microsoft	ITIL**	CISSP/SSCP	CCIE	EUCIP	Total
(bar value)	875	89	4	3	1	972
Growth rate proxy* (%)	15	n.a.	27	n.a.	44	17

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* Certifications issued in 2004 / Total certifications issued
** Total applicants

Table 2.3 - Volumes of analysed certifications for users

Qualification	Data	Scandinavia	Italy	UK Germany	France	Spain	Other European countries	Total Europe	Other worldwide countries	Total World
ECDL	Total issued	206,303	469,509	468,138	92,269	16,876	2,281	688,944	**1,944,320**	137,932	**2,082,252**
ECDL	Issued in 2004	14,632	131,237	120,987	21,764	3,947	966	145,330	424,231	50,808	475,039
ECDL	Total applicants	605,349	1,057,130	1,258,877	280,687	90,699	20,947	1,996,326	4,704,666	562,833	5,267,499
ECDL	Applicants in 2004	36,848	203,876	238,145	49,751	14,694	5,824	289,233	801,523	195,127	996,650

The analysed institutions account worldwide for about 5.3 million user applicants and 5.8 million professionals applicants, of which respectively 4.7 and 1.3 million in Europe. The difference between Europe and the rest of the world (mainly US and Japan) outlines the gap Europe has to lower for the professionals qualifications and certifications.
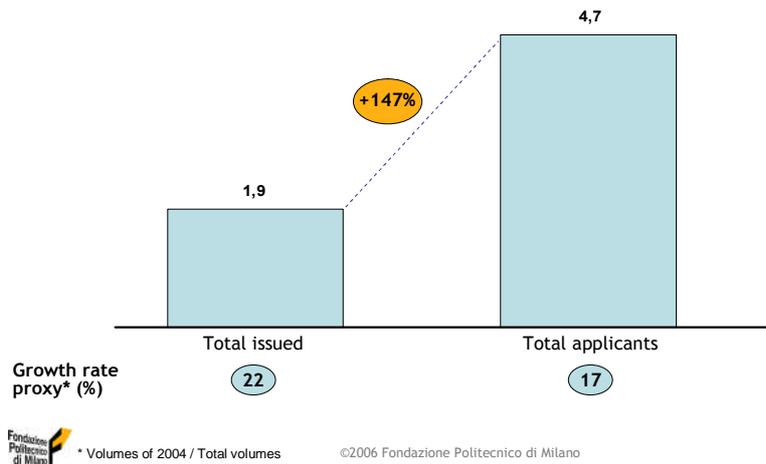
Box 5: ICT Certifications for Users

ICT certifications for individual users are at least 2 million and are growing fast

2004, Europe, Million of certifications (ECDL only)

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* Volumes of 2004 / Total volumes

2.1.3 Distribution of certifications by area and their penetration

The number of certifications is not distributed homogenously among European countries and they have a different penetration in Europe: some are issued mainly or in any case consistently in Europe (e.g., ECDL and ITIL), while others are mainly non-European (e.g., Microsoft and CISSP/SSCP). Scandinavia, in first place, and then Germany, show a strong culture oriented towards certifications, while the diffusion in France and Spain is not widespread yet. Italy and U.K. are mature market for ECDL. EUCIP has already been introduced in Scandinavia, Italy and Greece and will be introduced in Spain in 2006.

With respect to ICT certifications for users, as the numbers of inhabitants varies widely throughout European countries, it is useful to analyse the penetration rate per active population of the analysed certifications. This may help to identify the cultural inclinations of some countries (Northern vs. Southern European countries) to encourage ICT certifications for users.
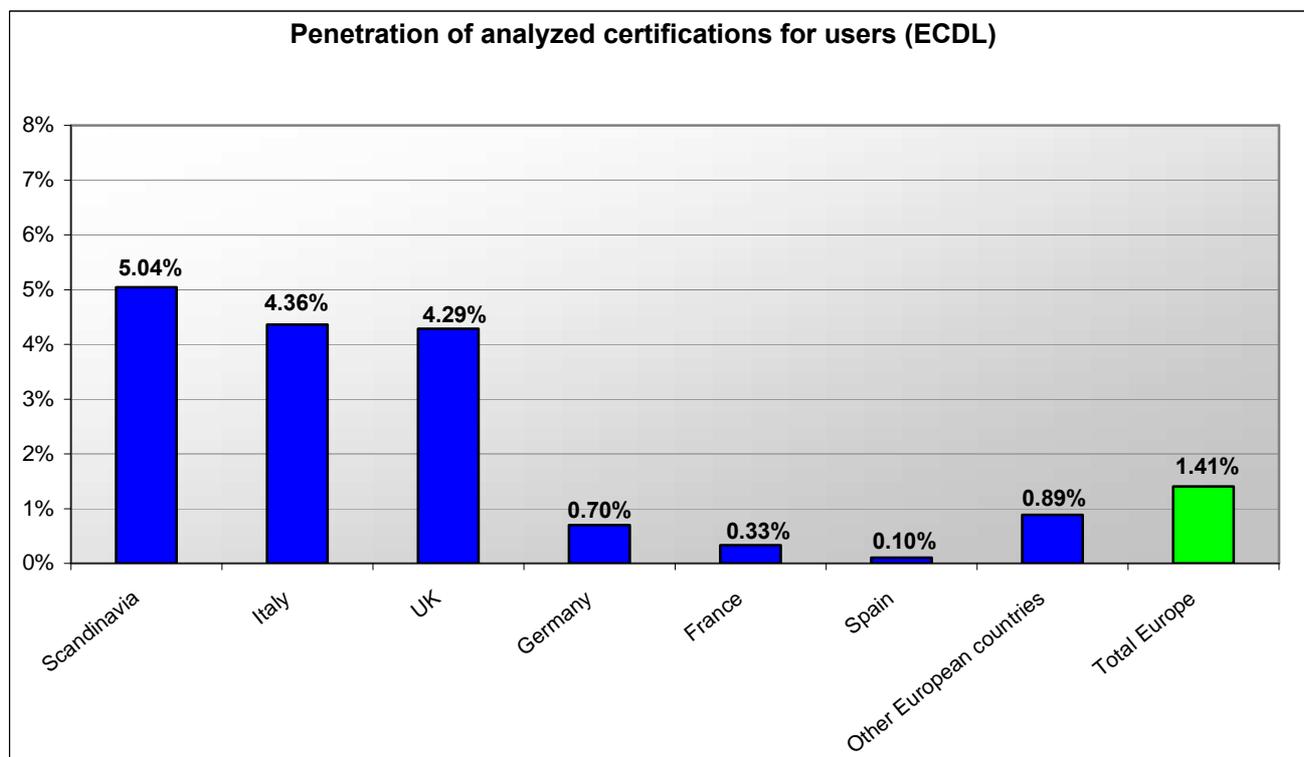
Figure 2.1 – Penetration of analysed certifications for users.

The penetration of user certifications is computed as the ratio of total applicants out of the active population (http://laborsta.ilo.org, 2003-2004) and are represented in Figure 2.1.

As regards certification for professionals, the total penetration of certifications issued up to 2004 out of the number of ICT practitioners in Europe is about **20%,** according to the estimates of the number of ICT practitioners in Europe (4.5-4.6) million made by Petersen et al. (CEDEFOP, 2004). However, these figures look heavily underestimated (probably by a factor 3 or 5)[4] and, in this case, Europe would behind the other leading markets, USA and Japan.

The different diffusion of certifications throughout Europe can be attributed to several causes, and this analysis might be devolved to a specific investigation. However, some possible reasons may be: local different ICT labour market conditions, different relationships between social parties, laws and rules related to quality assurance formal processes, to ICT data security, etc. Of course, an important role is played by the local ICT associations (e.g., AICA in Italy) which can act as "evangelist" and promote certifications; but specific local law requirements for public competitions (e.g., in Italy an IT user certification is required to participate to a competition for Public Administration) and in general, different recruitment rules, which regulate the local labour markets, can also determine a larger or smaller diffusion of ICT certifications.

Diverse local economies can influence choices, too, in fact, small and medium enterprises have very different ICT needs from large companies in terms of ICT tools to be used and competences to be enhanced. Different local relationships between industry and school system can also foster or slow down ICT certifications development; for example, the dual system in Germany or the strong partnership between companies, schools and vocational training institutions in France could have checked the spread of these types of certifications in the past; contrarily, local partnerships between

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[4] ICT practitioners in Italy only were estimated as about 1,2 million by Assinform, 2005

ICT certifications suppliers such as CISCO with Universities enabled the improving of local market of certifications.

New labour market reforms from local Governments and their level of involvement into ICT labour market issues can also give a strong stimulus to certifications (e.g. the support given by the German Ministry of Education and Research to AITTS or the partnership between Government and employer associations in the UK to foster new e-skills qualification frameworks and standards).

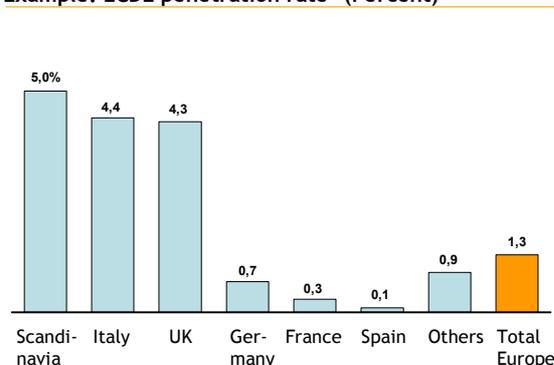**Box 6: ICT Certifications distribution**

Certifications are not homogenously distributed in Europe

Drivers
- Local different ICT labour market conditions
- Different relationships among social parties
- Laws and regulations of quality assurance formal processes
- Role played by local ICT associations, which can act as "evangelists"
- Specific local legal requirements for public examinations
- Local relationship between industry and school system

Example: ECDL penetration rate* (Percent)

Scandi-navia	Italy	UK	Ger-many	France	Spain	Others	Total Europe
5,0%	4,4	4,3	0,7	0,3	0,1	0,9	1,3

* Issued certifications / active population   ©2006 Fondazione Politecnico di Milano

2.1.4 Growth rate proxy

As it was impossible to collect sufficient information on growth rates of certifications issued and applicants, two proxies were calculated as *[Certifications issued in 2004]/ [Total certifications]* and *[Applicants in 2004]/ [Total applicants]*. The higher the index is, the younger the certifications and the higher the growth rate. Table 2.4 and Table 2.5 report growth rate proxies of analysed certifications.

Table 2.4 - Growth rate proxies for analysed certifications for professionals

Qualification	Data	Scandinavia	Italy	UK	Germany	France	Spain	Other European countries	Total Europe	Other worldwide countries	Total World
CISSP/SSCP	Issued 2004/ total	26%	43%	27%	36%	38%	29%	24%	27%	21%	21%
CISSP/SSCP	Applicants 2004/ total	26%	43%	27%	36%	38%	29%	24%	27%	21%	21%
Microsoft	Issued 2004/ total	14%	16%	12%	13%	19%	19%	18%	15%	11%	12%
Microsoft	Applicants 2004/ total	11%	12%	8%	10%	12%	16%	13%	11%	8%	9%
EUCIP Core	Issued 2004/ total	93%	57%					35%	44%		44%
EUCIP Core	Applicants 2004/ total	80%	62%					46%	50%		50%
Total	*Issued 2004/ total*	23%	22%	20%	45%	48%	20%	19%	17%	11%	12%
Total	*Applicants 2004/ total*	8%	14%	10%	4%	6%	16%	12%	11%	8%	9%

Table 2.5 – Growth rate proxies for analysed certifications for users

Qualification	Data	Scandinavia	Italy	UK	Germany	France	Spain	Other European countries	Other worldwide countries	Total Europe	Total World
ECDL	Issued 2004/ total	7%	28%	26%	24%	23%	42%	21%	37%	22%	23%
ECDL	Applicants 2004/ total	6%	19%	19%	18%	16%	28%	14%	35%	17%	19%

The figures in the previous tables highlight some points:

- EUCIP is a very recent certification with a high growth rate.
- ECDL is still growing, especially in Spain and non-European countries, while it is quite stable in Scandinavia.
- CISSP/SSCP is growing especially in Italy, Germany and France.
- Microsoft has almost stabilized and its market seems mature.
- In general, Germany seems to be the most dynamic market for professionals certifications and Spain for users certifications.

2.2   Qualitative description of supply scenario

2.2.1   ICT certifications and qualifications analysis according to significant aspects

In the last few years, new learning and certification models have been developed focused on concepts such as "competence – based", competence in action, learning outcomes, professional standards and expected performances, etc.

However, the many different approaches adopted have created a great deal of confusion and misunderstanding amongst all the actors involved in the qualification processes.

In accordance with several studies in this field and the current international debate, we agree on that:

- *competences* are knowledge put into action in concrete contexts;
- *performances* are behaviours producing definite and measurable outcomes;
- *learning outcomes* are observable learning results demonstrable by particular examinations;
- *profiles* are sets of key competences recognised through performance assessments such as certifications.

These points of views lead to greater flexibility in learning, professional requirements and company expectations.

With respect to ICT job profiles, they are a complex and sometimes contradictory aggregate of hard knowledge, personal growth expectations, operative competences involving social behaviours, technical expertise, learning abilities. They can best be developed through experience and interaction with colleagues, vendors and clients in both virtual and real practical contexts, even though their strong technical core content, which rapidly becomes obsolescent on account of rapid ICT innovation and diverse applications, makes it indispensable to make continuous structured upgrades and updates.

ICT individual user competences, even though less complex to outline than competences for ICT practitioners, are really becoming more and more sophisticated and contextualised in the different disciplines. New, more flexible learning frameworks will be necessary and institutes offering ICT certifications will be engaged in the challenge.

According to these prerequisites, qualification programmes can meet the market requirements when they help individuals learn to use, develop, manage, exploit, ICT, and supply companies with ICT professionals and users able to perform well within concrete work contexts.

Certifications, i.e. the evaluation process concerning competence assessment, should guarantee in an independent way, the real ability of an ICT practitioner or user to perform well in practice.

The indicators used to analyse the extent to which certifications and qualification programmes satisfy these requirements are:

- Qualification programmes learning outcomes and certification contents
- Certification path
- Learning process
- Examination stage

Box 7: ICT Certifications features

Some certifications are more "full-fledged" than others

	Contents	Learning main focus	Assessment main focus
Full-fledged: competence oriented (e.g., EUCIP, AITTS, ISC^2,Exin)	• Work processes • Job functions • Behavioural and managerial competences (only for some)	• Work experience • Learning on the job	• Interviews • Analysis of real projects documentation • Discussion
Traditional: knowledge oriented	• Products • Operations • Development	• Classroom lessons • E-learning • Reference books	• Tests

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2.2.2 ICT certifications for professionals and the reference qualification programmes

The results described below were taken from an investigation on ICT certifications and related qualification programmes for ICT professionals. 9 vendor – specific (from CISCO, Microsoft, Oracle, SUN) and 12 vendor – neutral (from AITTS, EXIN, EUCIP, ISACA, ISC^2) certifications were considered.

AITTS is a new type of ICT certification which was devised in Germany about 5 years ago from a Consortium comprising the Industrial Metalworkers Union (IG Metall), the Unified Service Industries Union (ver.di), the Central Association of Electric Engineering and Electric Industries (ZVEI), the German Association for Information Technology, Telecommunication and New Media (Bitkom) under the aegis of the German Ministery of education and research.

With regard to *qualification programmes learning outcomes* and *certification contents*, the vendor–specific ICT certifications and qualification programmes analysed just focus on products, operations and development functions. Contrarily, vendor–neutral certifications and qualification programmes

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are mainly focused on unitary and organic work processes and cover the main job functions, such as strategy, operations, sales, development, and IT service supply. Moreover, some vendor-neutral ICT certifications and qualification programmes take into account social behaviours and managerial competences in order to build fully-fledged ICT profiles. However, speaking of learning outcomes, on the one hand, and of certifications contents on the other one, shared, univocal ICT skills and competence frameworks should be rather useful, in order to help the demand better compare different certifications and qualification programmes.

With regard to the *certification path*, several certifications require previous work experience; some of them take into account previous studies. Less than 50% of the ICT certifications analysed require specific, compulsory preparation, that is, training, formation, learning, and nearly all of them are vendor- neutral.

Some interesting elements emerge from the analysis of the *learning process,* very close to the preparation stage in meaning and concept. Apart from the fact that only some vendor–neutral ICT certification programmes consider it as compulsory to access the final certification stage, most of them only cover the preparation in class by e-learning or provide reference books and manuals. Only six (from ISC^2, AITTS and EUCIP) include on the job formation.

Finally, with regard the *examination stage*, most certifications certify people by tests; only few (from AITTS and one qualification from EUCIP and one from EXIN) require assessments, interviews, documentation analysis and discussion.

According to the features mentioned above, and given that competence is knowledge put into action in a specific context, the question is how can qualification programmes enhance competences if they are only focused on e-learning or class training; similarly, another question is how can certifications based on tests demonstrate and guarantee that people have the competences learned. And this is even truer with regards to social behaviours and managerial skills.

The importance given over the last years to learning outcomes on the one hand and competence assessment on the other, must not be misunderstood. In fact, it doesn't mean that the learning process is unimportant or the examination of competences can be reduced to multiple choice tests. The focus on learning outcomes and assessments, makes qualification and certification processes much more flexible. Any individual can get an award if they are able to demonstrate their capabilities to perform well in specific contexts. But this demonstration entails learning, on the one hand, and a direct or indirect observation of behaviours through interviews, documentation analysis, etc., on the other one.

Germany and the UK have been proceeding in this direction. The former is more focused on learning processes than the latter but both are engaged in finding criteria to highlight and express complex behaviours within working contexts, job profiles in action, to be shown and evaluated; they both refer to informal – non formal ways of learning and help people make explicit tacit knowledge developed at work. In our analysis, the three types of certifications, which attempt either to support learning process or elaborate examination stages with advanced assessments, are AITTS, EUCIP, EXIN and ICS^2.

2.2.3 ICT Certifications for Users and reference Qualification programmes

With regard to ICT certifications for individual users, the two main investigated, are from ECDL (European Computer Driving Licence), and Microsoft (Microsoft Office Specialist).

Learning outcomes and certification contents are focused on competences related to the use of PC, which have homogeneous features. No compulsory preparation stage is required, although some training, e-learning and reference books are in any case strongly recommended. Their focus is of course on examination that consists in a test.

In this specific case, it may be correct to speak of competences which can be assessed by a PC test because the subject learned is simply how to use a PC. Moreover, it can be acquired through e-learning, traditional lessons in class and manuals as the context where competences are to be put into practice is the PC.

However, PC use can be contextualised and takes place also in contexts different form the workplace, e.g., leisure time. For this reason, ICT certifications suppliers for users, such as ECDL, have just started to think of new ways of supporting the learning of PC, e.g. by tailoring it to specific disciplines and industry needs or in order to enlarge, in the whole population, not only in workforce, the accessibility to e-Government and private on line services.

3.   Qualifications demand

This section provides a picture of the main large end-user companies' needs of certifications and qualification programmes and their focus (on specific product-oriented or profile – oriented certifications); of how far large end-user companies have ICT job profiles/competences frameworks or ICT career paths related to ICT qualifications; of whether the current ICT certifications supply meets companies' requirements

3.1   Main findings

The study highlights two main trends among large end-user companies with no particular differences between ICT professionals and ICT users qualifications:

- companies interested in product or profile oriented certifications;
- companies interested in internal **qualification programmes**.

With regard to the first trend, end-user companies seem presently interested in product-oriented certifications in the following cases:

- Certification of specific business processes is needed. In fact, certifications can address both people and company processes. The latter are usually necessary when a customer requires its vendor to certify a specific supply process. The reason can be for example quality assurance, mutual integration of tools and working areas, etc.
- Product-oriented certifications are concerned with specific ICT tools that people use in their company. Usually, in that case, there is a steady relationship with the reference ICT vendor.
- When end-user companies have not skilled professionals inside and know –how to evaluate the external ICT competences required, they may require ICT vendors to be certified as a guarantee of quality.

Contrarily, some companies are not interested in product-oriented qualifications because they consider them too expensive or too specific for their needs and are afraid of losing flexibility. In those cases, profile – oriented certifications for internal ICT professionals are more appreciated.

Product and profile oriented certifications can sometimes help identify experiences and competences inside the company and facilitate the internal mobility of professionals. In this case, the value of a certification is usually appreciated *a posteriori*, i.e., when people to be moved or promoted are identified on account of their titles.

With regard to the second trend (companies interested in internal qualification), end-user companies' motivations are specular. If ICT certifications can be considered too expensive or too specific, and can represent a threat to retaining trained people, qualification programmes and contents are often considered very important and relevant. Sometimes these initiatives can be

developed by external training providers, but often they are carried out by internal training centres too, even though such choices might not be cost efficient.

Currently, end-user companies seem to have not yet developed exhaustive shared and univocal frameworks for ICT competences and job profiles. This makes it difficult to compare certifications on a common and shared basis. Consequently, it is not easy to rationalize, enhance internal qualifications processes, clarify jobs requirements and help them give titles the correct importance. Moreover, their ICT career paths are usually not related to specific qualification programmes.

In addition to this, the lack of maturity of the demand leads to unclear requirements to the supply. Consequently, suppliers of certifications and qualifications have not always succeeded in fully understanding the real needs of end-user companies.

In general, it seems that at presents certifications are more interesting for individuals than companies if end-user business sectors are considered. The five main reasons and motivation for an individual in Europe to pursue e-skill certifications in decreasing order of importance are:

- increased credibility
- assessment of knowledge
- preparation for a new position
- increased personal productivity
- fulfilment of job requirements.

(Weiß et al., 2005, p.33)

The following section presents some interesting data on the certifications and qualification programmes adopted by the sample of companies analysed.

3.2   Empirical evidence on analysed companies

Our empirical analysis was carried out by a filed survey conducted on a sample of 35 large European countries belonging mainly to end-user sectors (Energy, Finance, Manufacturing, Public Administration, Retail, Services) and in some cases to ICT sector, too. However, ICT companies investigated were more engaged in managing ICT rather than developing it. All the figures and considerations in this section refer to the companies analysed only,

3.2.1   Scenario of adopted certfications and qualifications

Several end-user companies, i.e. companies for which IT is not core, adopt internal qualification programmes not followed by an acknowledge certification, as it will be discussed in Section 3.2.2. The most diffused **professional certifications** are issued by SAP, Oracle and Cisco, as these are the main ICT suppliers of the sample of considered companies. Microsoft certifications (MCSE, MCP) are quite widespread too, due to the wide diffusion of Microsoft applications.

With regards to independent certifications, ITIL is spreading, especially in Finance and Services; this can be explained by the increasing strategic importance accorded to IT Service Management. Moreover, AITTS has been recently adopted by some institutions in German Public Administration, and it is expected to widespread Europe-wide starting from 2006.

The ICT companies included in this survey were mainly telecommunications companies, so the main certifications adopted in all the countries considered are managed by Cisco (e.g., ATT, CCNA, CCDA, CCIE).

The scenario of **individual users certifications** is dominated by ECDL and MOS. The former is highly widespread especially in Public Administrations in Italy and in the United Kingdom, probably because of law requirements to accede to public competitions, and in Retail sector. The latter is widespread especially in Spain and in some British companies.

Several companies operating in Services and Manufacturing also adopt internal qualification programmes to train SAP users.

3.2.2 Diffusion of certifications and qualifications within analysed companies

Qualifications for **professionals** are obviously widespread in companies for which ICT is fundamental (qualifications/ ICT professionals ratio is about 27%, reaching up to 52% in telecom companies), but the ratio of penetration becomes significant in end-user companies such as Finance (more than 7%), Energy and Retail (about 4%). Contrarily, qualifications for professionals are rarely adopted by Public Administration (less than 2%) which prefers certifications for individual users (e.g., ECDL). This evidence is in line with the preliminary consideration done in Section **Errore. L'origine riferimento non è stata trovata.**: IT is not yet considered fundamentally strategic by Public Administrations, so the focus is on individual user qualifications which addressing basic competences.
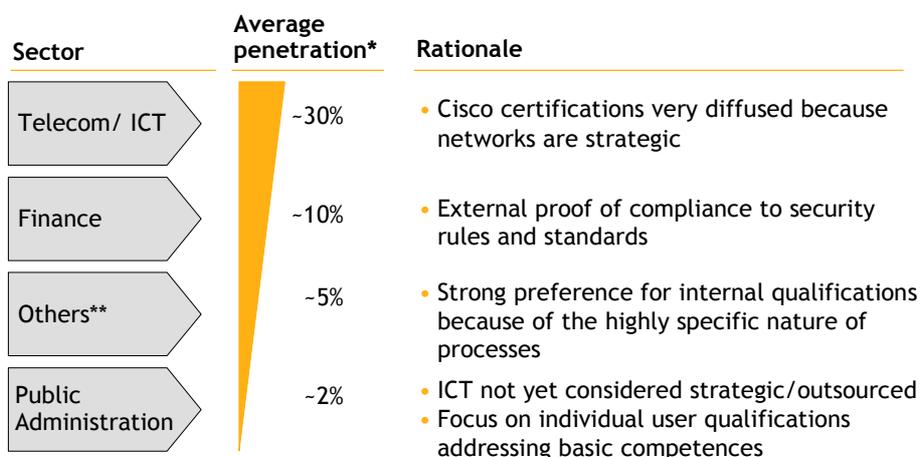
With regards to geographical distribution, professional qualifications are widespread in Scandinavian countries (where the ratio of qualifications to ICT is more than 37%), Spain, Germany and UK (from 5% to 10%); however they are still not significant in France, Italy and Eastern countries (ranging from 1% to 4%). As stated previously, this situation reflects the deeply ICT-oriented culture of Northern countries which, on the whole, is in stark contrast to the Mediterranean area. However, qualifications are growing rapidly in these countries too (see Section 2.1.4).

Box 8: ICT Professionals Certifications diffusion

The European Certifications and Qualification Programmes Market in the ICT user sector   **13**

Certifications and qualifications for professionals are mostly diffused in Telecom and Finance

Sector	Average penetration*	Rationale
Telecom/ ICT	~30%	• Cisco certifications very diffused because networks are strategic
Finance	~10%	• External proof of compliance to security rules and standards
Others**	~5%	• Strong preference for internal qualifications because of the highly specific nature of processes
Public Administration	~2%	• ICT not yet considered strategic/outsourced • Focus on individual user qualifications addressing basic competences

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* Certifications and qualifications / ICT professionals for the institutions analyzed
** Energy, Manufacturing, Retail, Services

The scenario with regards to certifications for **individual users** is quite different: Public Administration is the sector with the highest ratio of penetration (more than 10%), while Services, Manufacturing, ICT and Finance companies seem not interested. This is due to the fact that user competencies are taken for granted and companies are not interested in assessing them. Many companies simply do no track individual user certifications and are not able to provide figures. However, the fact that tracked user certifications are very few does not means that people are not interested in qualifications. On the contrary, certifications for users are spreading (see Section 2.1.2) and constitute an interesting social phenomenon, but end-user companies thus far have failed to acknowledge their importance.

Box 9: Diffusion of ICT certifications for Users

The European Certifications and Qualification Programmes Market in the ICT user sector   **14**

Certifications and qualifications for individual users are mostly diffused in Public Administration

Sector	Average penetration*	Rationale
Public Administration	~10%	• Focus on basic competence enhancement • Certifications required for competitive examinations in some countries
Other sectors	Very low	• User competences taken for granted

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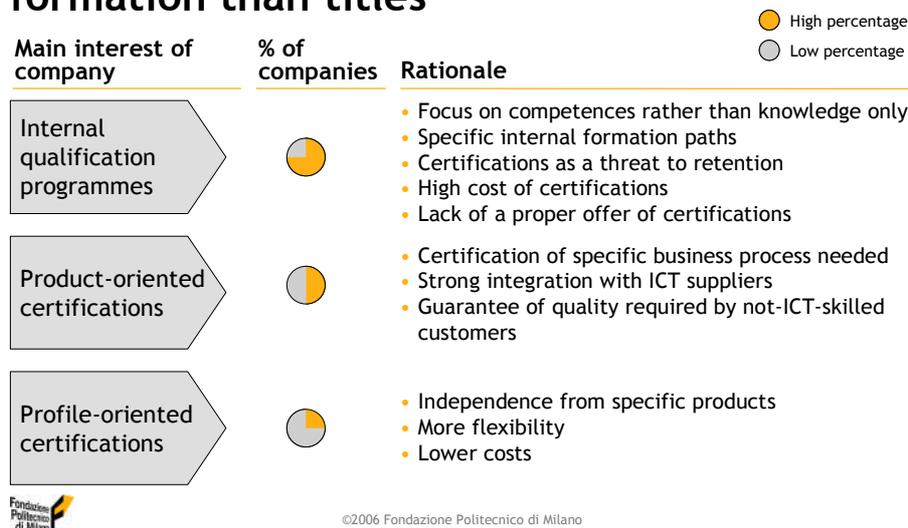* Certifications and qualifications / ICT professionals for the institutions analyzed

A significant part of the qualifications adopted by analysed companies (**43%** for both ICT professionals and individual users) are actually only **internal qualification programmes** or **internal assessments**, i.e. they do not lead to any certification externally acknowledged. This indicates that *certifications* (i.e., processes which lead to a title acknowledged by the market, usually issued by an independent third part) market for end-user companies is still at an early development stage and that many companies base training on internal processes, methods and resources.

Box 10: Companies trends

Several companies are more interested in formation than titles

○ High percentage
○ Low percentage

Main interest of company	% of companies	Rationale
Internal qualification programmes		• Focus on competences rather than knowledge only • Specific internal formation paths • Certifications as a threat to retention • High cost of certifications • Lack of a proper offer of certifications
Product-oriented certifications		• Certification of specific business process needed • Strong integration with ICT suppliers • Guarantee of quality required by not-ICT-skilled customers
Profile-oriented certifications		• Independence from specific products • More flexibility • Lower costs

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With regards to sectors, Retail companies have a strong preference for internal qualifications on account of the highly specific nature of their processes; Financial Institutes often need acknowledged certifications as external proof of their compliancy to security rules and standards.

The scenario for individual users qualifications is very similar, apart from the fact that Public Administration tend to prefer acknowledged certifications (ECDL above all) to internal programmes, especially in Italy and the United Kingdom. ICT companies focus on qualifications for professionals and when user training is not taken for granted it is mainly addressed internally.

3.2.3 Description of qualification demand according to relevant aspects

With respect to *qualifications targets*, qualifications are more widespread in the areas where ICT plays a more central role, such as IT service support, Development, Implementation and Operational Management. The fact that the percentage of qualifications targeted at Sales and Marketing is low also indicates a substantial lack of specific qualifications programmes and certifications for that particular sector Qualifications cover mainly software and services areas, while their diffusion for hardware and telecom is still at an early stage.

About *objectives*, qualifications and certifications can be categorized according to three main types of objectives:

- the candidate should acquire and demonstrate the **competences** needed for a specific role (e.g., to effectively manage a database);
- the candidate should learn and demonstrate to perform a specific **task** (e.g., to create a pivot table), which is by far more definite and limited than a role;
- the candidate should acquire and demonstrate to have **knowledge** on a specific subject (e.g., to know how databases work and all the possible related issues).

Competence oriented qualifications are by far the most widespread because companies need their employees to be able to perform specific job functions, i.e. to have the right set of competences.

Simple tasks fulfilment and knowledge are not enough in today's society. According to this, companies consider external certifications appropriate to demonstrate knowledge but not competences. In their opinion, certifications don't guarantee that people are really able to perform well at work.

Nonetheless, with regard to *learning,* currently, the vast majority (78%) of qualifications adopted are based upon traditional classroom training, while only a minor part accounts for workplace learning. But this is in contrast with their declared need of competences and may even affect the effectiveness of qualifications. Consequently, this situation confirms that end-user companies on average have not yet reached maturity concerning this issue and it is still more important to make them understand potentialities of some certifications and qualification programmes

Concerning the *duration* of analysed qualification processes, it ranges from half a week to one month, and one average is about 1.5 week. British and Italian companies generally allow longer period for qualification processes, whilst French and Spain companies allow the shortest periods. With regards to sector, the longest qualification processes are to be found amongst Retail, ICT and Energy companies.

All the qualification programmes and certifications analysed are fully paid by companies/ institutions, apart two cases, both of which are ECDL, which are paid for either entirely or partially by the employees,

Finally, concerning *motivation and strategic role* of qualifications, qualifications and certifications tracked by companies are mostly considered mandatory (nearly 45%) and employees are required to take them. When qualifications are not required, they are usually strongly recommended whilst in only 30% of cases they are totally optional. However, companies do not track all the certifications possessed by employees, especially those for individual users, so it is very likely that within the companies analysed the figures may not be precise because many of the certifications may have been acquired voluntary.

The main strategic role which the companies analysed associate with qualifications and certifications is basic training and only in few cases (less than 25%) qualifications are seen as a means of benchmarking, career promotion or internal job change.

Box 11: ICT Certifications /Qualificatiosn features

Main characteristic of certifications/ qualification adopted by institutions

Evidence emerged from interviewed institutions

- Mostly oriented on **competences** rather than tasks or knowledge

- Based upon **traditional classroom training** (~80%)

- **Mandatory** (~50%) or **strongly recommended** (~20%)

- Aimed at **basic training** (~75%) rather than benchmarking or career promotion

4. Conclusions

This study has shown that:

- The penetration of the professionals certifications analysed up to 2004, if the figures by Petersen et al. (CEDEFOP, 2004) regarding the number of ICT practitioners in Europe are taken as reference, is extremely high (about 20%). Actually, the above census look heavily underestimated (probably by a factor 3 or 5) and, in this case, Europe is behind the other leading markets, USA and Japan.
- ICT certifications for users are growing in this last period, too. In 2004 the applicants for ECDL certification were about 17% and the certifications issued about 22% of total ECDL issued certifications and applicants.
- The number of certifications is not distributed homogenously among European countries and this situation may depend on local policies, economy and culture.
- A significant part of the qualifications adopted by analysed companies (43% for both ICT professionals and individual users) are actually only internal qualification programmes or internal assessments

These surveys pointed out that at an individual level there is an interest in certifications because they represent a formal acknowledgment of experiences and know-how. They contribute to build a profession identity within the ICT practitioner communities and also ICT users feel better qualified with a certification proving that they have a basic knowledge of PC applications, such as ECDL.

Contrarily, with regard to end-user companies, it seems that they have not yet found a satisfactory answer to their needs from the market. Many end-user companies affirm they do not need formal acknowledgments, but rather ways of making their personnel grow and develop competences to be used at work. At present, indeed, ICT qualification programmes and certifications are more focused on knowledge acquisition and demonstration rather than on competences enhancement and evaluation, apart from a number of new vendor-neutral ICT certifications. Nonetheless, end-user companies themselves prefer traditional training courses to new ways of learning at the workplace. Consequently, this situation still denotes a lack of maturity of end-user companies about the real potentialities and opportunities offered by some certifications and composite qualification programmes. Moreover, with regard to the strength and continuity of the spread of ICT, end-user companies cannot help but exploit new technologies in their business processes. ICT will be more and more embedded in all work processes of any business sector. In this scenario, knowledge, skills and competences on ICT will become more and more strategic within end-user companies and in some work processes it will be even more difficult to clearly separate practitioners from individual users.

Consequently, for ICT certifications suppliers and end-user companies it should be strategic to define together relevant qualification areas, managerial and technical ICT contents, certification paths, and make them very close to learning and competence enhancement. For this reason, it is also very important that ICT skills and competences frameworks are univocally developed and shared in order to become a common language between supply and demand in defining job profiles, certifications and qualification programmes.

Box 12: ICT Certifications as a startegic opportunity

ICT certifications can be a strategic opportunity for companies and ICT professionals…

Key advantages

- Creation of professionals identity within ICT practitioners communities
- Fulfilment of ICT skills gap
- Formal quality control of acquired skills and competences acknowledged by the market
- Common language among players
- Diffusion of the principles of information society for all

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Box 13: ICT Certifications for the future

…but what is the future of ICT certifications?

- **Are certifications really known by end-user companies?**
- **Is the dialogue between certification issuers and companies/ users really effective?**
- **Are there tools, ICT competences and job profiles commonly shared by certification issuers and companies/ users?**
- **Could a European e-competences framework be an enhancer for the effective deployment of ICT certifications?**

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