POSITION PAPER TOWARDS A EUROPEAN SOFTWARE STRATEGY

Presented to commissioner Viviane Reding on 24 october 2008
in response to her address of 17 november 2007

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OCTOBRE 2008 • Collection ThémaTic - SOFTWARE - Numéro 22

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TOWARDS A EUROPEAN SOFTWARE STRATEGY

The strength of the European software industry is one of the world's best kept secrets.

Software is everywhere. This is one reason why the sector as a whole is not easy to be appreciated. **In Europe, software has recently gained recognition as being vital for innovation, competitiveness, sustainable growth, welfare and high quality jobs creation. This paper focuses on packaged software**[1] as opposed to custom software[2] that should be dealt with separately as a very different IT business. Moreover all participants to our working group represent this sector within the ICT industry (which is growing approximately three times as fast as the European economy), whereas only some of us represent end ICT users and manufacturers that sell products including embedded software.

The European software industry deserves strategic attention. In each of the 27 countries of the European Union, packaged software companies have been created and contribute a great deal to growth and job creation, both directly, and through innovation and increased productivity throughout all market sectors.

In her speech delivered 19 November 2007 ("Towards a European Software Strategy"), Ms. Viviane Reding, Commissioner of Information Society and Media, provided both recognition to this industry and demonstrated her willingness to discuss how to leverage its contribution to the Lisbon strategy. She rightly pointed out some strengths and weaknesses of the European Industry. **Despite an excellent level of skills and research, companies founded in Europe have rarely become large global leaders. Europe is a massive producer of in house software and embedded software, but remains a large net importer of packaged software despite substantial production figures.** Commissioner Reding explained that the shift towards Software as a Service (SaaS) opens up a "window of opportunity" that could lead to a European success story.

Ms. Reding also invited the industry to submit concrete ideas to help put together the above mentioned European Software Strategy. This has triggered **an effort jointly supported by NTAs (National Trade Associations) representing nine of the most dynamic national packaged software industries in Europe:** 81% of European packaged software companies ranked in the 2007 Truffle 100 Europe study come from these nine countries. These NTAs have worked together to produce **a position paper summarising their observations and proposing realistic and achievable measures.**

These NTAs are : AETIC (Spain), AGORIA (Belgium), ASSINFORM (Italy), BITKOM (Germany), ICT-OFFICE (The Netherlands), INTELLECT (United Kingdom), IVSZ (Hungary), SYNTEC INFORMATIQUE (France) and TEKNOLOGIATEOLLISUUS (Finland)

This joint effort relies on the commitment of our member companies, and other stakeholders of the European software ecosystem, including academics, software engineering experts and venture capitalists who have been interviewed during the process. It also uses data and analysis from two main European sources on the software market and sector: EITO (European Observatory of Information Technologies) and Truffle 100 Europe. Our NTAs are active partners in at least one of these two initiatives. We have also used studies and papers issued by the different NTAs at the national level.

This position paper aims to answer the following questions:

- **How software specific should our policies be?**
- **Why do we need them now?**
- **Where should we focus the effort?**
- **Which concrete measures could be implemented first?**

To avoid a 'wish list' of unrealistic suggestions, we decided to focus on **three issues where a strong impetus from the European institutions can make a real difference,** bearing in mind the willingness to present a limited number of recommendations. These three issues are:

1. **Addressing the skills challenge**
2. **Designing a suitable framework to unleash the creative energies of software companies**
3. **Better financing for innovation and development of software companies**

Encouraging innovation and not only research is the cornerstone of the whole approach.

1. The term « packaged software » is used to distinguish commercially available software from custom software (IDC)
2. "A custom software" is a tailor-made solution developed for a specific client.

FOREWORD

This part clearly states, with facts and figures, what "software" and the European software industry encompass (the value chain, business models, companies…). It also highlights two major trends:

- **The sector is beginning to experience its own "industrial revolution".** The development of Software as a Service (SaaS) in Europe will be a major contributor to this.
- **Consolidation is gaining ground, but the European industry will remain fragmented.**

The policy context within which the European software sector operates is also discussed, with an emphasis on the need to be software specific in EU policy making.

PART 1: ADDRESSING THE SKILLS CHALLENGE

The "lack of qualified resources" issue is not new and affects all ICT industries. The software industry is hit by the **lack of interest shown by young people in the scientific curriculum in all western countries.** This sector also suffers from the **insufficient attractiveness of often unclear ICT career paths** and the **weak image of software development jobs that have been unappreciated for years.**

As a result of this dual effect, the skills shortage is no longer just an issue or a potential threat. It has become a reality, and projections are getting even worse. **This shortage has a double negative impact: it limits growth which could have been even more dynamic and it provides a strong incentive to outsource software development.**
There are also specificities in software to be aware of. The skills challenge in the European software industry is mainly quantitative, but it is also qualitative.
In the software industry, **very different and specific skills are needed. It can be summarized as follows:**

- **Lack of software developers and engineers (by far the most quantitative one but also qualitative)**
- **Lack of marketing and sales resources**
- **Lack of managerial talents**

As explained in the paper, European policy targets should be aimed at:

1) **Improving quality and efficiency of the existing workforce** in an increasingly global market and a very fast changing technological environment. This must be done not only in software engineering but also in marketing and management.

We call on the EU to support the proposed **creation of a European Software Expertise Network (ESEN)** by NTAs and existing Software Expertise Centers (our recommendation 1). ESEN, being a light virtual organisation, would enable packaged software companies to share expertise and improve some of the most critical skills of the existing workforce in Europe: software engineering, go-to-market (notably cross-border) and management. It will also contribute to further enhance the quality of 'made-in-Europe' software.

2) **Raising the awareness of young people at school (especially girls) and students in higher education of the opportunities in this industry.**

Our recommendation 2 **"Help develop synergies in information and communication efforts to improve knowledge and image of IT and software careers"** addresses this issue. Continuing its efforts in this direction, the European Commission must further identify and promote the successful local actions of governments, industry and universities targeting schools and higher education. This has to be complemented by the launch of a pan-European campaign, targeting 14 to 20-year-olds and their parents to raise the profile of the software industry. We suggest that this campaign should notably include the launch of a bi-annual European Software Convention highlighting value creation, innovation and careers in the industry.

3) **Better leveraging of the high potential pool of talent in new member states where software development is much more attractive to young people.** It would be a huge waste if the brain drain of skilled software personnel towards the United States reached the same proportion in Central and Eastern Europe as it has in Western Europe.

Our recommendation 3 consists in **increasing the number and visibility of software engineering ERASMUS masters and placements to attract even more students from Central and Eastern European countries.** The number of students from these countries who have already chosen ERASMUS masters in these disciplines is really impressive and could certainly rise again. Such a measure will gain efficiency if coordinated with both the development of joint research between universities and European software companies and a rapid deregulation of the labour market within the entire European Union.

PART 2:
DESIGNING A SUITABLE FRAMEWORK TO UNLEASH CREATIVE ENERGIES OF PACKAGED SOFTWARE COMPANIES

As stated in the 2006 Aho report, **the lack of an innovation friendly environment for its businesses is the main barrier to investment in research and innovation and to competitiveness in Europe.** The Aho report pointed out that policy action should be taken in relation to regulation, standards, public procurement, intellectual property and fostering a culture which celebrates innovation. **The European Commission has done a lot in stimulating demand and removing barriers to adopting ICTs.** This effort must continue (including current standards policy orientations) as it is crucial for both European competitiveness and for driving the growth of European packaged software companies. **This demand side approach must be complemented with a software specific supply side strategy.**

The four main issues that need to be addressed are:

1) **Fragmented market** that led to a fragmented industry
2) **Insufficient recognition** of European packaged software players
3) **Innovation as the critical weakness** of European packaged software **companies (despite excellent R&D)**
4) Too high level of **illegal use of software** in Europe

The fragmentation of national markets and the lack of economies of scale when expanding in Europe **have led to the fragmentation of the software industry.** A software entrepreneur in the EU starts with two challenges: his national market is much smaller than the US market and **the European market is extremely complex to address** (languages, regulations, cultural and business habits…). The harmonisation of the overall European market is underway and does help. But it takes time. In the meantime, **measures and initiatives to reduce the costs to cope with this complexity are more than welcome.**

The establishment of a European Software Expertise Network (ESEN) will contribute to reach this objective **as well as the proposed creation in part 3 of the European Software Innovation Programme (EUROSOFT)**

Fragmentation of the software industry and few impressive success stories have led to an insufficient recognition of the European packaged software companies. Due to the value creation and the potential of the software industry, there is an urgent need for a European Software Strategy that will reward successful entrepreneurs for their achievements, thus unleashing their creative energies.

The main problem suffered by European software is business related: **how to turn excellent research into successful innovation and profitable business? Due to the lack of marketing and managerial skills, the trap many packaged software companies fall into is an insufficient anticipation of go-to-market and industrialisation phases** (product marketing, packaging, setting up a customer support service etc). In this industry excellent R&D has often proved to be very counterproductive if not combined with excellent development strategy, marketing and a channel policy. **Good policy should target and encourage companies that invest in the complete value chain of innovation:** idea, concept, development (including translation and documentation), validation-pilot, go-to-market (product marketing, business development…). Hence the **need for a single definition of "innovative enterprises"** (recommendation 4) **that should be "innovation-centric"** (not only R&D centric as most existing definitions are) and should also **include medium size enterprises.** In fact each stage of a software company's growth is highly critical, from seed to early stage, domestic development and international expansion. Europe should encourage investment in innovative companies with special attention to high-growth companies (the so-called "gazelles"). **This will provide us with a large legal basis to accelerate the adoption of software specific measures by Member states.** The European Union should **set ambitious objectives and guidelines within the framework of the European Software Strategy in order to boost innovation and growth, define "key performance indicators", benchmark successful policies and monitor progress** (Recommendation 5).

To complement this framework and to protect creativity, our Recommendation 6 covers **tackling the issue of illegal use of software.** Piracy rates are much higher in Europe than in the United States. Growth and recognition of the industry are at stake. We expect **a volontarist policy combining research, education, legislation and best practice sharing.**

PART 3:
BETTER FINANCING OF INNOVATION AND DEVELOPMENT OF PACKAGED SOFTWARE COMPANIES

Few people perceive the software industry as capital intensive. Yet access to capital is one of the major critical success factors. **When it comes to speed of delivery, factors such as packaging and go-to-market require much investment. Even if the early stage is the most critical, capital is even more needed during the development stage** for international expansion and acquisitions.

One first has to bear in mind that venture capital in Europe is a scarce resource. Given that venture capital is needed to start businesses, **the European software industry is very badly impacted by this deep structural crisis of European venture capital.**

Traditionally, **the software industry also suffers from a lack of understanding regarding the intangible assets and misperceptions due to its resemblance to value add services industries.**

Above all, the European software industry suffers from a **systematic comparison with the US software industry. There are few success stories and serial entrepreneurs. This notably leads to a lack of visibility and attractiveness** (which is very negative in a generally risk averse environment), **a lack of management skills, which is a matter of concern for investors and a lack of marketing skills that results in lower performance** when turning solutions into industrial products

The Commission works to bridge the gap between capital markets and innovative SMEs. Member states acknowledged that "Community financing has a role to play in leveraging support and providing complementary funding in order to tackle situations of market failure" and launched actions. **The European Commission initiative for a strategic use of precommercial R&D public procurement should also be encouraged** provided it is based on fair and open competition with pricing at market conditions. But, until now, no specific measure has been taken to address the software industry as a specific and strategic sector.

Urgent action is needed more than ever.

First of all, some of the rare European software success stories have already been taken over.

Secondly, the current "credit crunch" has made capital increasingly scarce.

Thirdly, as Commissioner Reding said, Europe has "a window of opportunity to develop a leadership position in software. But this window is small and it will soon be closed of we don't act." The era of computer hardware manufacturing has consolidated into the hands of a few companies and now the Internet is predominant. Europe failed to take a right approach to computers a few decades ago, but has now invested in networks and on line services research. Software as a Service will probably be a major contributor to the industrial revolution that has just begun. It may enable today's European challengers to gain position and become top leaders in tomorrow's software market. But one has to bear in mind that **European software companies are traditionally technology and R&D centric solution providers. Many of them have already added the SaaS delivery model to their offering, but it will require them heavy investment to compete with more business- and process-oriented global players once the market booms. From now on, software players need more cash than ever to be "SaaS ready".**

Within the framework of the European Software Strategy, there is a strong need to **benchmark and promote the best examples of national public-private funding schemes specific or adapted to the software sector** (Recommendation 7).

Additionally, we suggest that a **"European Software Fund" should be created within "the High Growth and Innovative SMEs Facility", the new and promising Competitiveness and Innovation Framework Programme run by the European Investment Fund** (Recommendation 8). This would increase visibility of this instrument and would consist in funding venture funds investing in innovative SMEs. This is much needed as packaged software companies are now facing a severe credit crunch.

Our last recommendation addresses the **need to adapt European R&D funding schemes to packaged software companies.** Packaged software companies experience the same problem of accessing R&D funding schemes as SMEs in general. They also have software specific difficulties. The most important **is that the innovation cycle in software does not match the pace of traditional European R&D projects.** Very often, packaged software companies have already developed the technology and need to focus on pilots, demonstrators and go-to-market. Bottom-up projects that do not correspond to Strategic Research Agenda should be given a chance as they meet consumer demand and can generate rapid growth and jobs.

Our Recommendation 9 proposes to test (on a small scale) **a new ambitious programme called EUROSOFT, which would fund projects focussing on innovation rather than only on R&D and award a label to companies for meeting a series of criteria (such as usability of products in different European languages and cultures)**

CALL TO ACTION

We need action now. We believe that the Open Method of Coordination is the appropriate instrument to implement our nine recommendations as part of the European Software Strategy within the framework of the revised Lisbon Strategy. We also suggest potential next steps for moving forward.

NINE RECOMMENDATIONS TOWARDS A EUROPEAN SOFTWARE STRATEGY

ADDRESSING THE SKILLS CHALLENGE

1) Support the creation of a European Software Expertise Network (ESEN) by NTAs and existing Software Expertise Centers

This will enable packaged software companies to share expertise and improve the most critical skills of the existing workforce in Europe: software engineering, go-to-market and management. This will also contribute to further enhance the quality of made in Europe software.

2) Help develop synergies in information and communication efforts to improve the knowledge and image of IT and software careers

- Further identify and promote local successful actions taken by governments, industry and universities targeting schools and higher education that could be rolled out across Member states
- Launch a pan European campaign targeting 14 to 20-year-olds and their parents (especially girls) to raise the media profile of the software industry
- Launch of a bi-annual European software convention highlighting value creation, innovation and careers in the industry, increased visibility and expansion at the EU level of initiatives such as ICT Night or the young high tech female engineers "Excellencia" awards (including a better emphasis on software skills).

3) Better leveraging the high potential pool of talents in new member states where attractiveness for software development is much higher among young people.

- Increase the number and visibility of software engineering ERASMUS masters and placements to attract even more students from Central and Eastern European countries who are already the most enthusiastic within these disciplines.

DESIGNING A SUITABLE FRAMEWORK TO UNLEASH CREATIVITY OF PACKAGED SOFTWARE PLAYERS

4) A single European definition for "Innovative enterprises" and "gazelles" that should be Innovation centric (not only R&D)

- This will send a strong signal in favour of innovation, both for high growth small enterprises and also for high-potential medium size companies
- This will also provide EU and Member states with a large legal basis enabling them to take measures for packaged software companies

5) European Institutions to develop the European Software Strategy into ambitious objectives and guidelines to boost innovation and growth in the software industry

- Benchmark and promote successful policies to accelerate the adoption of software specific measures by Member states (such as fiscal incentives)

6) Tackling the issue of illegal use of software

- Encouraging Member states to develop education on IPR at school
- Simplifying and unifying the legal environment.
- Investing to develop protection platforms for all kinds of licensed software

BETTER FINANCING OF INNOVATION AND DEVELOPMENT OF PACKAGED SOFTWARE PLAYERS

7) Benchmark and promote large scale national public-private innovation funding mechanisms adapted or specific to software

8) Create a European Software Fund within the existing instrument run by the European Investment Fund that encourages venture funds to invest in High Growth and Innovative SMEs

9) Adapt European R&D funding schemes to software

- Experimentation of a new programme called EUROSOFT dedicated to packaged software companies that includes:
  - a focus on innovation and delivery of new products/services
  - two-step approach in the evaluation process (as proposed in the recent Aho report)
  - a label to be awarded to companies and products meeting such criteria as usability in different languages and cultures

FOREWORD

1. SOFTWARE IS EVERYWHERE

Software is everywhere. It is in the car you drive. It is in your personal computer when you write emails or make calculations. It is in the mobile phone you use to call a friend or a business partner. It is in the game console that your children are playing with when you arrive home in the evening. It can save your life thanks to very sophisticated e-health applications and it keeps you fit when it analyses your heart rhythm and pace while you are running or cycling.

The software and IT services sector has grown very fast in the past twenty years. It has become one of the largest sectors in the world. Despite the slowdown of the European economy in 2008, the European Information Technologies Observatory (EITO) still expects software revenues to rise by 5% in Western Europe.[3]

Software creates value. The annual revenue per employee in the software vendors' industry is over €100,000 per employee, which is among highest rates in the whole economy. For example, it was €110,000 in the Finnish product software industry in 2007.[4] In France, between 2000 and 2005, the value creation per employee in the software vendors' industry increased three times as fast as the national average.[5] In 2005, the revenue per employee in the packaged software industry in France was twice as high as the average in the French Economy.

Software is **one of the key drivers of productivity growth in almost all European economic sectors** and is therefore **an important engine of economic growth that creates a great deal of new highly qualified jobs**. Software defines the attributes and functionalities of many products and services such as those surveyed within the framework of ITEA 2[6] (automotive, aerospace, medical equipment & automation, telecoms equipment & consumer electronics). Total growth in software R&D from 2002 to 2015 for these key sectors is forecast to grow by 128% to €133 billion, which would almost double the growth rate for their total R&D (74%).

Because software is everywhere, one cannot always easily identify the importance of the software sector as a whole. In the next few pages, we will describe four ways to look at the software industry and estimate the importance of this sector in the global and European economy. The policy context in which the European software sector is acting will also be discussed.

2. SETTING THE SCENE: FOUR WAYS TO TAKE A LOOK AT SOFTWARE

1) Value chain of software: what are the workers or the company doing in the creation of software?

There are different aspects in the creation of software:

- architecture (consulting, analysis, concepts)
- developing (programming)
- testing
- implementation, marketing & distribution
- maintenance (e.g. software update management)
- helpdesk and training & education

2) Utility: what is the purpose/function of the software?

EITO[7] distinguishes three major sub-segments:

- **System infrastructure software:** proprietary as well as open operating system and system-level software; network, system, storage, and security management software for all types of hardware (from mainframe to PC).
- **Tools:** collaboration and content tools; database engines; business intelligence infrastructure; development tools; integration platforms.
- **Application software:** office automation, business applications and other applications. The office automation software market includes, for example, software for word-processing, data spreadsheet, and presentation software. Business applications are process-oriented applications that include horizontal applications such as financials, Human Resources Management (HRM), Customer Relationship Management (CRM), Supply Chain Management (SCM) as well as industry-specific solutions such as billing (telecom, utilities), core banking systems, etc. Other applications include graphical software, embedded systems, and other technical software.

3. Updated EITO figures to be puslished at the very end of October 2008 (www.eito.org)
4. "Finnish National Software Industry Survey 2008" : http://www.sbl.tkk.fi/oskari/
5. « Etude économique sur le secteur des éditeurs de logiciels en France », OPIIEC, septembre 2006
6. « Blue book 2005 European leadership in software-intensive systems – the case for ITEA 2»
7. http://www.eito.com/definitionsICT.htm#Software

"Application software products can be either out-of-the-box solutions, such as most productivity software products and business applications for the small office/ home office market, or more complex/ process-oriented solutions that require implementation and customising services, such as business applications for the mid-market and for large enterprises."[8]

Game and leisure software are application software products, but are not taken into account by EITO because they are seen as pure B2C products and as artistic creations rather than as packaged software (which is mainly B2B). However, this could change in the future, as our working group acknowledges the fact that they share similar challenges and most of the value chain with packaged software (albeit with their own specific characteristics).

3) Software specialisation: which types of companies are parts of the software sector?

The software sector as a whole includes extremely different players:

- Independent Software Vendors (called in this paper "Packaged Software companies")
These companies are producers and vendors of **commercially available** "packaged software"[9] We use the term "packaged software" in this paper **as opposed to "custom software".**[10]
"Packaged software" is defined by IDC "as programs or codesets of any type commercially available through sale, lease, or rental, or "as a service". Packaged software revenue typically includes fees for initial and continued right-to-use packaged software licenses. These fees may include, as part of the license contract, access to product support and/or other services that are inseparable from the right-to-use license fee structure, or this support may be priced separately. Upgrades may be included in the continuing right of use or may be priced separately."

- IT Services companies
A major part of their business consists in developing custom software applications that are turnkey solutions for a specific client. This is a very different business, even if many small companies in Europe sell both custom software and packaged software.

- Manufacturers of all sorts of products that include embedded software in an increasing number of very different sectors such as electronic components, mechatronics, consumer electronics, automobile, aerospace, defence, health, network & telecom equipment.

Embedded software is computer software or firmware which plays an integral role in the electronics it is supplied with. The principle role of embedded software is not Information Technology but rather the interaction with the physical world. It is written for machines that are not, first and foremost, computers. Embedded software is built into the electronics in cars, telephones, audio equipment, robots, appliances, toys, security systems, television and digital watches for example. This software can become very sophisticated in applications like aircrafts, missiles, process control systems, and so on. Embedded software has no specific user interface to interact with.
It has to be stressed that **European big manufacturers all together probably hold today the strongest position in the world** in the field of embedded systems and software. Embedded software already accounts for a significant part of development and production costs. In many sectors, moreover, embedded software will be driving all major product innovations in the years ahead.

4) Business model: how can the software developer create value?

- Licensing software
The software company develops a software program and sells copies of the program via its sales force, distribution partners, systems integrators, stores and/or the Internet. **This business model leads software companies to grow as fast as possible ("speed to scale") to be able to recover their initial fixed costs (e.g. R&D), create de facto standards and then increase profits by benefiting from economies of scale with both a leadership position and with limited software development and reproduction costs.**

- Software as a Service
A software company develops and owns a software that is then delivered and managed remotely by itself or by an Application Service Provider (ASP). As defined by Gartner, this software is "based on a single set of common code and data definitions that are consumed in a one-to-many model by all contracted customers anytime, on a pay-for-use basis, or as a subscription based on use metrics". As specified by IDC, ASPs that do not own the software code are not software vendors, but channels for software vendors.

- Subcontracting & outsourcing
A specialized company develops or tests a (part of a) software programme as a subcontractor. By outsourcing aspects of the software-development process, the software-vendor tries to reduce its time-to-market and/or be more cost efficient or more innovative.

8. http://www.eito.com/definitionsICT.htm#Software
9. IDC uses the term "packaged software" to distinguish commercially available software from custom software
10. A custom software" is a tailor-made solution developed for a specific client.

- Open source software
The software company develops software programmes and makes the source code "public". The public can improve the software or adapt it to its needs. Companies all over the world are allowed to develop value added for their clients by offering implementation and maintenance services. **Open source businesses thus generate revenue from services such as systems integration, support, tutorials and documentation (generally through subscription models). Open Source software can also be sold as "as a service" by ASPs or as a component of a packaged software by Independent software vendors.**

According to 2002 EU figures based on an OECD study, 59% of the software produced in Europe is developed internally (by user organisations), 24% is spent on packaged software and 16% on outside subcontractors[11]. This paper focuses on packaged software[12] as opposed to custom software[13] that should be dealt with separately as a very different IT business. Moreover all participants to our group represent this growing packaged software sector within the ICT industry (roughly three times as fast as the European economy), whereas only some of us represent ICT end-users and manufacturers selling products including embedded software.

3. THE LARGEST PACKAGED SOFTWARE COMPANIES IN THE WORLD ARE NOT EUROPEAN

Pure software companies are rare. Software is in most cases integrated in IT-services companies and IT-consultants. On the website www.softwaretop100.org, one can find the 100 largest software-companies in the world. The companies are ranked according to US-dollar "software revenues"[14]. Revenues from support activities (also called 'maintenance') and subscription are included. Revenues from service activities such as consultancy, installation, offshore and custom software development and system integration activities are excluded as economists and analysts usually do.

Most companies in this global software list are US-based and have a global presence.

The following list[15] shows the 10 largest software companies in the world in 2007. Only two companies out of the top 10 and five out of the top 25 obtain 100% of their revenues from software. One is well known for its on-line sales. The other belongs to the specific game software industry.

Rank	Software company	Software revenues (Million $)	Total revenues (Million $)	%
1	Microsoft	37337	45494	82%
2	IBM	18204	91424	20%
3	Oracle	13099	16489	79%
4	SAP	8717	12408	70%
5	HP	4115	93103	4%
6	Symantec	3879	3879	100%
7	Computer Associates	3514	3887	90%
8	Electronic Arts	3216	3216	100%
9	Adobe	2484	2577	96%
10	Nintendo	2418	7253	33%

Eleven companies in this top 100 global list are European based:
SAP (4), Dassault Systèmes (20), Sage (36), Misys (37), Business Objects (40), SoftwareAG (47), Philips (49), Cegedim Dendrite (57), Unit4Agresso (64), Exact (71) and Visma (79).

The 100 largest software companies in Europe can be found in the Truffle 100 study.[16]
At the top of the Truffle 100, we can find the same companies as mentioned above.

11. Internal Reflection Group on Software Technologies, Embedded Systems and Distributed Systems (under Jacques Bus, Head of Unit, DG INFSO, 2002)
12. The term "packaged software" is used to distinguish commercially available software from custom software
13. "A custom software" is a tailor-made solution developed for a specific client. .
14. The term "Software revenues" used by EITO and market intelligence analysts means "packaged software" revenues.
15. http://www.softwaretop100.org/list.php?page=1
16. http://www.truffle100.com/europe/downloads/2007/Truffle100_2007.pdf

4. … AND EUROPE IS A LARGE NET IMPORTER OF PACKAGED SOFTWARE DESPITE SUBSTANTIAL PRODUCTION FIGURES

There are two ways to assess the importance of software in a region.

1) The European software market
The European software market is defined as the value of the packaged software bought in the market by companies, citizens, governments and organisations. (Packaged) Software spending figures include only spending on licenses and maintenance/support. All related spending from implementation services (consulting, implementation/customisation, and training) is not counted in the following figures.

The global software market was expected by EITO[17] at the end of 2007 to equal in 2008 238,5 billion euro.

U.S.A.:	105,6 billion euro
Europe:	85,9 billion euro
Japan:	24,5 billion euro
Rest of the world:	22,5 billion euro

The European software market therefore represents roughly 36% of the world software market.

2) The European software sector

The European software sector is defined as the aggregated sales figure (licenses and maintenance) of packaged software by all the software creating companies. It includes exports.

Until now, the importance of the European software sector has rarely been described by international sector analysts. As explained by the OECD, "Tracking imports and exports of software in trade statistics is fraught with measurement problems".[18]

Eurostat published figures on the total turnover of software publishing in 2004 in 15 European countries. According to Eurostat and EITO sources, the ratio software turnover / software market in 2004 in these 15 European countries was 29%.

We have used this ratio to make an estimate of the European software sector in 2008. A turnover of 25 billion euro in 2008 is our rough estimate for sales figure of the European packaged software sector. The Truffle 100 estimates the software sales figures of the 100 largest European software companies at 22 billion euro in 2007. Both estimates are consistent with one another.
This means that **a large part of the packaged software sold in Europe is produced outside of Europe.** Europe is therefore a net importer of packaged software, although there are differences between countries. Another OECD source shows that, some European countries like Germany and the Netherlands are net exporters.[19] In addition, according to the 2008 11th National Software Industry Survey in Finland, international revenues of Finnish product software companies (including products developed by foreign subsidiaries provided that R&D is Finland-based) grew by 12% in 2007 and reached 45% of the industry's total revenues.[20]

The Truffle 100 ranking also pointed out that the European packaged Software companies (Headquarters and R&D management based in Europe) in the top 100 have a collective workforce of 175,000 people, of which 38,000 are employed in research & development.[21] Using the same definition, IDC estimates that there were in 2005 around 207,000 people working in the whole European packaged software industry. European figures have been rare so far. We can though try to estimate the European employment growth in the packaged software industry (European and Foreign companies put together). Taking into account sales growth figures and employment growth figures in countries where studies have been conducted recently, we can estimate that the constant annual Western European employment growth in the packaged software industry has probably been around 4,5 % per year. In Finland, where the Finnish packaged software industry has been surveyed for 11 years, employment in the sector has grown by 7,7% per year (+ 9,4% in 2007).[22] **The packaged software industry is therefore a major provider of jobs in Europe. Most of these jobs are highly qualified.**

17. European Information Technology Observatory, 2007
18. " Measuring electronic commerce : international trade of software", OECD : http://www.oecd.org/dataoecd/32/52/2094340.pdf
19. "Big opportunities for a small country : Software as a product", p 4-5, ICT Office, June 2008
20. "Finnish National Software Industry Survey 2008" : http://www.sbl.tkk.fi/oskari/
21. http://www.truffle100.com/europe/downloads/2007/Truffle100_2007.pdf
22. "Finnish National Software Industry Survey 2008" : http://www.sbl.tkk.fi/oskari/

5. THE "INDUSTRIAL REVOLUTION" OF THE SECTOR HAS STARTED

In 2008, EITO identified **four major trends affecting the software market, which is experiencing its "industrial revolution":**

1) **Commoditisation** - where software markets are opening and thus providing users with more value for their money and enabling new competitors to enter the fray.
2) **Intermediation** - where software is independent from its hardware platform and where it can be composed as needed
3) **Collaboration and mutualisation** – where IT systems become increasingly more shared and software investments become more re-used
4) **Business and IT alignment** – where IT systems need to be well aligned to business objectives and to give control to the business users"

This "industrial revolution", which is enabled by technologies and innovations such as virtualisation and Software Oriented Architectures mainly results in enabling software to be increasingly sold as a service.

New business models (Open Source, SaaS, advertising-based web applications…) and newcomers have appeared on the market. Top leaders on the software market have all taken this wave into account in their strategy.

As previously seen, **there are several open source business models.** Open source sales are usually measured as a percentage of IT Services sales. According to PAC figures[23], **volumes were low in 2007 despite dynamic growth**, especially in France: less than 1% of IT Services in Germany and in the United Kingdom, 2,4% in France.

These figures are consistent with a recent Forrester[24] study that shows **higher open source adoption rates in France than in other countries including the United States as well as a different attitude in Europe compared to North America:** whereas North Americans surveyed are worried about security issues (71%), the priority of Europeans is the quality of support (51%).

Software as a Service (SaaS) volumes also remain limited in Europe. According to IDC, global SaaS spending in the world amounted to $5,7m in 2007. The European market covers approximately 10% of this market. **But growth is impressive: the constant annual growth rate between 2007 and 2011 in Europe is expected to be over 50%, twice as much as the global growth rate.**

In a recent survey, Forrester Research[25] found that the adoption of SaaS in large enterprises worldwide in 2008 is now at 16%, up 33% from the previous year's 12%. The utilisation rate of European firms is approximately half that of North American companies. **Main drivers are shorter deployment times, faster return over investment, and pay-as-you-go pricing.**

In its January 2008 worldwide study, "SaaS Gathers Momentum and Impact", Gartner predicted that:

- By 2009, 100% of Tier 1 consulting firms will have a SaaS practice.
- By 2010, 85% of SaaS vendors will offer uptime service levels of 99.5% or beyond in standard contracts, as well as performance SLAs.
- By 2010, 15% of large companies will have started projects to replace their ERP backbone (financials, human capital management and procurement) with new service oriented architecture (SOA) and SaaS-based solutions.
- By 2012, more than 33% of Independent Software Vendors will offer some of their applications optionally or exclusively as SaaS.

Should Software as a Service (SaaS) become more mainstream in the years to come, it would require **a major change in the way packaged software companies are managed. Shifting to a pure "SaaS" business model implies a complete change to revenue recognition and a strong investment in new skills to move from a product oriented company to a service oriented company.** As an example, they would increasingly need to re-craft their sales proposition and retool their sales approaches to deal with the increasing number of technical queries.

It seems that SaaS will play an active role in the industrial revolution of the sector. Europe with its strong asset in term of networks and talent should not miss it.

23. "Scan report on Open Source software 2008", PAC, 2008
24. Open Source Adoption: Notes From The Field, Adoption Moves Up The Stack, But Concerns Vary By Region by Jeffrey S. Hammond, Diego Lo Giudice with Mike Gilpin, David D'Silva, Forrester Research, July 2008
25. Competing In the Fast-Growing SaaS Market by Liz Herbert with Eric G. Brown, Sean Galvin, Forrester Research, March 2008

6. CONSOLIDATION IS GAINING GROUND IN EUROPE, BUT THE EUROPEAN INDUSTRY REMAINS FRAGMENTED

Consolidation is moving up a gear, but the European market is still very fragmented and the European sector is continuously regenerated by new young players on emerging segments.

EITO figures show that the Top 10 share of the market in Western Europe amounts to 46%. The Top four, consisting of the four biggest players in the world, reaches 37%. These consolidation rates are not impressive compared to other sectors. In fact, the sector is still very fragmented. According to IDC figures, there were in 2005 roughly 18,000 European packaged software companies. Most of these European software companies have less than 15 employees and €1 million in revenues.
Nonetheless, this share of the Top 10 has experienced a rise in recent years as consolidation has accelerated at the top of the market. Several top European software vendors have been acquired, mostly by US companies.

The main driver of consolidation in this market is the "speed to scale". Acquiring another software company can also be the best way to expand beyond national borders, to enlarge one's customer base and to implement diversification strategies.

It should be noted that **the degree of consolidation depends very much on the maturity of a given market segment.** Every year, new technologies and innovative software are produced by young companies that are quickly able to become leaders in these new markets. Once the market has developed, one can observe consolidation among them and, very often, one can see them being acquired by one of the top software vendors in the world. **But in this fast evolving environment, the top players of today will not necessarily be the top players of tomorrow. And Europe, therefore, can have the opportunity to establish top positions.**

7. SOFTWARE IN EU POLICY MAKING: TIME TO BE SOFTWARE SPECIFIC

Much has been done for ICT in the last decade and software has benefited from this. In the Internet and telecommunications fields, deregulation and vigorous policy making have boosted the ICT sector, including software. The ICT Task Force was one of several initiatives taken under the Commission's industrial policy, which aims to help create a more favourable environment for business in the EU and was designed to complement the Commission's main ICT-related initiative, i2010.

The European software industry participated in this effort. The three key suggestions of the ICT Task Force[26] were:

- Europe urgently needs to increase the employability skills of millions of low-skilled people.
- Legislation should support enterprises and organisations to perform changes.

Demand for public service side demand is also a key driver of innovation in ICT.

The i2010 initiative[27] introduced four work fields:

- Single European Information Space
- Innovation and investment in ICT research
- Inclusion, better public services and quality of life
- Flagship initiatives to bring qualitative improvements to the areas of intelligent transport (Intelligent Car), preservation of cultural heritage (Digital Libraries), ageing (Ageing well in the information society), and sustainable growth.

The most impressive effort of the EU in the field of software is the priority given to embedded software that has led to heavy investment in the industry-led ARTEMIS initiative; it is not a packaged software oriented effort. However a number of high potential European packaged software companies benefit from this policy. Built on a vertical model of segregated sectors (aviation, automotive, defence, telecommunications, etc.), this emerging industry is rapidly moving towards cross-functional solutions in such areas as development tools, operating systems, databases, middleware, etc. Studies conducted by some of the NTAs involved in this paper show that manufacturers should progressively use more and more packaged solutions at different stages of embedded software value chain. This trend will gather volume and pace once standardisation encompasses the entire execution platform, particularly the software.

The European packaged software industry endorses all the above mentioned EU priorities. Nonetheless, it also faces very specific challenges such as a need for a rare mix of skills, atypical innovation and sales cycles, and piracy of software. This paper will highlight them and will try to demonstrate why the EU's demand side approach has to be complemented by a software specific supply side strategy.

26. http://ec.europa.eu/enterprise/ict/policy/taskforce/reports/icttf_report.pdf
27. http://ec.europa.eu/information_society/eeurope/i2010/i2010_actions/index_en.htm

ADDRESSING THE SKILLS CHALLENGE

The "lack of qualified resources" issue is not new and affects all ICT industries. **The European software industry suffers from little enthusiasm from young people for the scientific curriculum in all western countries. It also suffers from the insufficient attractiveness of often unknown ICT careers and the weak image of software development jobs that have been unappreciated for years.**

As a result of this double trend, skills shortage is no longer an issue or a potential threat but a reality. The challenge is that projections from across Europe show an increasing gap between supply and demand for software professionals. The shortages are not limited to one area or skill or to one industry but across all disciplines and throughout the industry and its customers. The shortage does not just impact the industry or their customers but has an impact much further afield and throughout the European economy.

This shortage has a double negative effect: it limits growth which could have been even more dynamic and it provides a strong incentive to outsource offshore software development.

There are also specificities in software to be aware of. **The skills challenge in the European software industry is mainly quantitative: needs can be summarized as follows:**

- **lack of software developers and engineers**
- **lack of marketing and sales resources**
- **lack of managerial talents**

For software developers and engineers, the lack is above all quantitative, but not only. For other resource, it is equally quantitative and qualitative.

These needed skills are not easy to find: software development is a very specific job that you can also find in IT Services or IT departments in big companies. On the contrary support and training positions are very specific to this industry. Managing a software company is unique as this business mixes characteristics of manufacturing, intangible business and IT services. Besides serial entrepreneurs and top managers are rare in Europe. Marketing and sales jobs represent a much higher share of total jobs in the packaged software industry than in IT Services and require very different go-to market and sales approaches.

Europe has also ensure that it continues to improve the quality and efficiency of delivery of its existing workforce during this increasingly global and fast changing market.

The European Commission is very much aware of this skills challenge and has launched several initiatives. In this paper, **we would like to contribute to the EU medium and long term effort and also to draw attention on some software specific issues that can be dealt with in a shorter term.**

1. CURRENT ENVIRONMENT AND MAIN CHALLENGES

Although there are no European wide numbers looking at the software industry it can be closely estimated using national data projections. **Figures for the whole of the European ICT labour market, which include all ICT jobs in the whole economy (from those in the ICT sector, business, government, services to administration) can be estimated at five million professionals of which one million are software professionals.** Open profiles, or the number of jobs being advertised, can also be compared across all 27 countries. **Figures of open profiles show 500,000 for the ICT market and 75,000 for the software specialists.**
In the sole packaged Software Industry in Europe, there were in 2005 around 65,000 software developers according to IDC figures. 99% of these people work in the European packaged software industry[28]. This represents approximately one third of the population working and needed in the European packaged software industry.

Software is more and more critical to all economies across Europe and yet it is still seen as an undervalued service, profession and application. It is a challenge for all western countries, especially European nations, with emerging countries such as India and China training an impressive number of engineers and the United States draining top brains and skills from the global pool of talent (Asia and Europe in particular).

However, as the image of the software industry has diminished in Western Europe, the demand for increasingly complex software applications, products and services has increased, whether it be for published software, embedded software or enabling increased back office information. The continuingly complex use of software across so many industry sectors has boosted the demand for these skilled professionals.

With markets that are becoming increasingly global, the demand for high quality qualified software professionals is continuing to increase. More and more software companies are struggling to deliver existing contracts (let alone take on new contracts).

Although some analysts believe the market will naturally balance the shortage, the impact that this long term shortage will have on both industry's and government's ability to deliver products and services as well as on the economy are very negative. It will impact our economy's ability to innovate, remain competitive and hamper productivity.

We believe there are four important areas which must be addressed.

1.1. ATTRACT MORE PEOPLE TO THE SOFTWARE INDUSTRY TO SUSTAIN GROWTH AND KEEP AN IMPORTANT PROPORTION OF THE WORKFORCE IN EUROPE

The talent pool shortage is not just in entry level jobs but across all areas, from systems analysts and testers to systems architects. However, the shortage is not just about quantity but also about the rounded quality of the professional. Softer skills such as business development, project management, marketing and sales skills are also required to ensure that Europe remains at the higher end of the talent chain. At present, most European countries are managing to remain at the knowledge economy end of the talent pool. However, with emerging economies increasing demand for these skills as well as the software professional skills, this position in the chain will not be kept unless we invest in reducing the gap between demand and supply. All in all, **there is a need to figure out what the global picture of the skills gap looks like and will look like for the 27 countries in the EU. Our group of NTAs can come up with a common methodology to use across Western Europe to paint a complete picture.**

Although there is a deepening use and need of software to deliver services to business, the public service and consumers for their everyday use, the software-related higher education disciplines are still not attractive or highly valued by students or those looking for a change in career. There is a real need to inject enthusiasm for technology throughout education with students, teachers and parents.

28. Truffle 100 Europe definition: headquarters and R&D management based in Europe
29. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0637:FIN:EN:HTML

Software skills are not just important for the software industry but play a large part in the attractiveness of a location for a global company. As the skills shortage is not just an issue in Europe, the need for quality talent for global companies is a constant requirement. These skills provide an incentive to encourage inward investment whether it is R&D, design or testing. With companies facing a skills shortage the attractiveness of moving operations offshore is increasing. Immigration policies do help (like in the UK), even if they can only be a limited part of the solution. We therefore hail the European Commission's proposal for a Council Directive on the conditions of entry and residence of third-country nationals for the purposes of highly qualified employment, the so called Blue Card.[29]

One of the major problems hindering the supply lies with the image of the software industry. It is either unrecognised as an industry or seen as part of the 'geek' industry, which remains unattractive to a number of important demographics including women, young professionals and those looking to retrain. It also struggles from the perception that there are no opportunities in Europe in this industry as all the jobs are being offshored to emerging markets or that all software occupations need computer science or pure STEM (Science, Technology, Engineering and Maths) subject qualifications.

This false perception means that a low number of students or those looking to change careers believe the software industry can provide an interesting, varied or long-term career. Because of this false sense of perception it is essential that the European software industry raises awareness of the opportunities in our industry both to those who have STEM qualifications and to those with equally valuable skills such as project management and analysis.

Professors in universities very often have a limited knowledge of the wide range of jobs offered by the software industry. Students and younger people need to know there are plenty of second-tier packaged software companies and start-ups in Europe that offer highly technical jobs with attractive positions. Hence the need of initiatives such as Pasc@line[30] in France that gathers the industry and almost 60 universities and engineering schools to maintain a constant dialog about the evolution of IT jobs and the adaptability that educational programs require. **There are many positive initiatives in Europe, notably conducted by our NTAs together with universities. The European Commission has emphasised the need to be both more coordinated and medium and long term oriented. We are aware of this necessity and ready to work together with the European Commission in that perspective.**

1.2. BETTER LEVERAGING THE HIGH POTENTIAL POOL OF TALENTS IN NEW MEMBER STATES WHERE ATTRACTIVENESS FOR SOFTWARE DEVELOPMENT IS MUCH HIGHER AMONG YOUNG PEOPLE.

The enlargement of the European Union is an opportunity for the European software industry. Member companies with subsidiaries in the new member states have found highly skilled workers (both in terms of software but also in terms of language and personal skills). Enthusiasm for technology and software development tasks is striking. In 2008, downloads of software on the net have come mostly from Asia and North America, followed by Central and Eastern Europe. Younger people seem to show the same interest. Figures from the European Commission on ERASMUS student mobility in 2006/2007[31] show that 23% of those who chose ERASMUS in Mathematics/IT masters came from five of the biggest new member states (Czech Republic, Hungary, Poland, Romania and Bulgaria). Generally speaking, the proportion of ERASMUS students coming from these is much lower: 15%, but the proportion of students that chose these disciplines is very high: Bulgaria (11%), Romania (7%), and Poland (6%). In the three biggest western countries (which are by far the first three European packaged software markets), the figures are much lower: UK (1%), France (3%), Germany (4%). Figures are similar in most other Western European countries: the Netherlands (1%), Belgium (2%), Italy (2%). This number of central and eastern European students could certainly rise again if the right incentives were in place.

All ideals and initiatives to stimulate the number of software engineers trained in Europe are welcome. Central and Eastern Europe is probably the place where this objective can be achieved rapidly. We see this as a real opportunity and a challenge for Europe. It would be a massive waste if the brain drain of skilled software personnel towards the United States reached the same proportion in Central and Eastern Europe as it has in Western Europe.

30. http://www.assopascaline.fr/
31. http://ec.europa.eu/education/programmes/llp/erasmus/statisti/table207.pdf

1.3. PREPARING UNDERGRADUATES WITH MIXED IT AND BUSINESS SKILLS

With the ever increasing use and reliance on technology and constant development of software applications across the wider society, an understanding of software, rather than just computer 'literacy', will be widely required in all areas of business and industry. In the whole economy, **business managers will be expected to have a clear understanding of IT as the backbone of the organisation and as a catalyst for productivity and competitiveness in their company.** The ability of technical staff to also understand the important Return on Investment that a piece of software could deliver a company or how improved use of software could increase the companies competitiveness is increasingly vital.

We have to ensure that those qualifying with STEM related qualifications have the mix of technical and business skills required if Europe is to offer a knowledge based economy talent pool. These business, marketing, sales and project management skills are just as important to the health, growth and competitiveness of the European software industry.
It must be done across the technical disciplines but **also across the more business focused skills.**

In medium size and big packaged software companies, it is vital to rely on mixed technical and business skills in such departments as strategy, marketing, sales and professional services. Good product managers and architects are for example almost impossible to find.

In the UK there are a number of initiatives which emphasise using software and other technologies to address business needs. These include the IT Management for Business Degree[32], which currently is in its third year with 300 students graduating in 2008 and 1,000 applicants for the 2008 autumn programme, and the new IT diploma for 14-19 year olds which is starting in September 2008 across around 300 schools. **Such existing degrees should be rolled out across Europe.**

1.4. IMPROVE QUALITY AND EFFICIENCY OF THE EXISTING WORKFORCE IN AN INCREASINGLY GLOBAL ENVIRONMENT

Producing software is not only a matter of smart R&D. Mainly due to the small size of its companies, the European packaged software industry is from some point of view closer to a "high tech craft" than to an engineering based industrial business sector. They do not have the answer to such decisive questions as how to develop good product/market combinations and how to reach the market with a software product (i.e. how to build a successful software company and how smart changes can lead to new products). These processes involve more than just smart technology; good marketing and effective training programmes for users are also essential.

The globalization of the software industry impacts all functions: engineers working within pan-European or global development centres, sales and marketing executives addressing corporations and consumers in all European countries, and managers leading the company through its expansion in Europe. With an ever increasing global market place, advice around starting new operations in a different country will become an increasingly needed service. Companies will need more than just developers to successfully translate the legislation and regulations into software. This requires support from lawyers, tax experts, accountants and, for example, if you're dealing with medical software, doctors. Few people are ready for all this.

Organizations such as Belgium (Sirris Software Engineering)[33] and the Netherlands (Software~VOC -professor Brinkkemper[34] - University Utrecht) have been successful in dealing with these matters in a coordinated way. They have found that software companies are all in the middle of a trade-off between three challenges:
1) variability: the ability to offer customers different variants of a software product
2) flexible development: the ability to respond quickly to new market needs and customer requests
3) risk management of failure: the ability to fully exploit software in products without compromising safety, security, or robustness of mission-critical applications.

If these challenges were mastered efficiently in the same time, it could lead to a significant advantage.

32. http://www.e-skills.com/cgi-bin/go.pl/itmb/itmb.html
33. http://www.sirris.be/
34. "Big opportunities for a small country : Software as a product", p 4-5, ICT Office, June 2008

2. RECOMMENDATIONS

The following three recommendations address both the qualitative and quantitative needs.

The first recommendation addresses the "improve existing workforce" issue and is focused on the short term. To address the skills shortage challenges, solutions are more medium and long term oriented.

There are a number of successful initiatives throughout the European Union. Unfortunately, very few of them are joined up or shared between Member states. We believe that the only way to narrow the gap between demand for software skills and the diminishing supply is to both share and build on best practice and joined up activities. This is our second recommendation.

Our third recommendation consists in increasing the number and visibility of software engineering ERASMUS masters and placements to better leverage the high potential pool of talents in new member states. This is an intermediate term approach which we believe could make a difference.

RECOMMENDATION 1: A European Software Expertise Network (ESEN) to improve the existing workforce in software engineering and management/go-to-market

Europe needs more coordination to disseminate expertise required to reinforce the skills the existing workforce with regards to product software development as well as running and expanding a product software company. ESEN will be created by NTAs and existing Software Expertise Centres (academic and private organisations) such as Sirris Software Engineering in Belgium, Software~VOC -professor Brinkkemper - University Utrecht in the Netherlands or the European Software Institute[35] launched by the European Commission with the support of the Basque Government in Spain. **ESEN will act as a hub networking all existing players and facilitating cooperation between them.**
It will enable packaged software companies to share expertise and improve some of the most critical skills of the existing workforce in Europe: software engineering, go-to-market (notably cross-border) and management. It will notably contribute to further enhance the quality of made in Europe software capitalising on European research and best practice in methods and tools heavily relying on process maturity and systematic reuse. We hope to receive strong support from the European Commission for this project.

This network of NTAs and software expertise centres will act as a light virtual organisation. There is no need for a heavy organisational structure. The different members will meet regularly to define the projects in which collaboration and/or expertise sharing could be very fruitful. The definition of these projects will be based on the analysis of the needs of software companies, members of the different NTAs, and on the availability of competencies in the different software expertise centres all over Europe.

The objective of this network is not to change the action programmes of the individual software expertise centres, but rather to stimulate collaboration between them. As a network, ESEN will also help software companies to recruit the expertise needed It would also favour experience sharing between software companies on a given item: for example, "how to access local distribution partners in a given country".

In the long term, the activities of this network can lead to specialisation and to collaboration agreements between the different NTAs and the software expertise centres.
The budget of this network will be divided between organisation, coordination and project management. ESEN will seek funding and support from the European Union.

RECOMMENDATION 2: Further help to develop synergies in information and communication efforts to improve the knowledge and image of IT and software careers among young people (especially girls)

This recommendation has to be understood as a part of the on-going effort of the European Commission. **Our NTAs can help identify and promote all local and cross-national successful initiatives across industry, governments and academic institutions that are adapted or specific to the software industry. Raising the profile of these initiatives will not only promote the good work of these projects but it will also show a joined up environment across Europe and a desire to develop its software industry and the skills involved within it.**

35. http://www.esi.es/

It is also essential that we raise the profile, excitement and stature of the STEM curriculum, especially amongst female students. Again, a lot has to do with the false or misplaced perception of the scientific careers, the opportunities it can provide or the position that women can fill. **There have been a number of relatively successful campaigns but without sufficient funding these continually fail to reverse the current trend. We therefore recommend, to compliment the numerous national initiatives, a pan European campaign targeting 14-20 year olds, their parents and teachers promoting the software industry and its careers.**

The goal would be to have **one major campaign over-arching all local campaigns that can spread best practice and raise the media profile of the software industry.** As part of this campaign, it is suggested that the European Commission would explore the creation of a TV series with a female hero showcasing all positive aspects of working in the software industry as well as the launch of a bi-annual European Software Convention highlighting value creation, innovation and careers in the industry. This effort would also include an expansion at the EU level of initiatives such as ICT Night and the Young High Tech female engineers "Excellencia"[36] awards (including a better emphasis on software skills).

RECOMMENDATION 3: Increase the number and visibility of software engineering ERASMUS masters and placements to better leverage the potentially large pool of talent in the new member states

We propose to increase the number and visibility of software engineering ERASMUS masters and placements to attract more students from Central and Eastern European countries, who are already the most enthusiastic with these disciplines.

If we linked ERASMUS courses to the increased work experience opportunities around Europe we would be able to offer add value to students and provide some short term skilled labour.

As part of this programme we would also develop a series of work placements to ensure that students not only developed their software skills but acquired a better business understanding and cultural awareness which is essential in the global market place.

Such a measure will gain efficiency if coordinated with both the development of joint research between universities and European software companies and a rapid deregulation of the labour market within the entire European Union.

36. www.excellencia.eu

DESIGNING A SUITABLE FRAMEWORK TO UNLEASH CREATIVE ENERGIES OF SOFTWARE COMPANIES

As a value creating sector, this industry deserves much more recognition and support than in the past. Some of the challenges this industry faces are software specific. Others are challenges for all "innovative enterprises". The 2006 Aho report[37] stated that the lack of a European innovation friendly market for its businesses is the main barrier to investment in research and innovation and to competitiveness in Europe. This is even truer for the European software industry. It is all the more crucial to unleash the energies of its entrepreneurs in order to turn the current challenge of the complexity of the European market into a competitive advantage.

1. CURRENT ENVIRONMENT AND MAIN CHALLENGES

1.1. A less innovation driven environment in Europe leading to a slower adoption of software

Analysts[38] and the i2010 reports[39] of the European Commission show that enterprises, especially SMEs, in Europe are much slower to adopt ICT than their American competitors. One of the main reasons for this is that IT is much less frequently seen as a key differentiator to be more competitive. In the United States, companies will hesitate less to rethink and change their organisation if they see a competitive advantage through ICT.

There is also more in-house software in Europe, and a lower degree of propensity to acquire packaged software offered by software vendors, especially from European vendors that are often too small.

Although there are important differences between countries, the general innovation ecosystem is weaker (less clustering between companies, research labs, venture capitalists and business angels, less massively funded universities, no strategic use of public procurement to boost innovative SMEs). **Furthermore, small European software companies suffer from a widespread "risk averse" mentality** (private and public customers, banks etc.)

The European Commission has done a lot to stimulate demand and remove the barriers to enable the successful adoption of ICT. The global European Union i2010 strategic framework , the Lead Market initiative[40] and the launch of the Competitiveness and Innovation Programme[41] are crucial steps in the right direction. But **there is still a long way to go. This demand side approach must** continue (including current standards policy orientations and increased visibility of the "Sectoral e-Business Watch"[42]). **But it has to be complemented with a software specific supply side approach.**

1.2. A fragmented market leading to a fragmented industry

The fragmentation of national markets and the lack of economies of scale when expanding in Europe has led to the fragmentation of the European software industry.

A software entrepreneur in the EU starts with two main challenges: his national market is much smaller than the US market and the European market is extremely complex to address. Entrepreneurs face too many barriers when expanding in Europe beyond their national borders. They face different languages, social regulations, corporate laws, intellectual property regulations, business habits, request for references on the targeted market, distribution strategies and industry specific regulations (as in the case of a software vendor addressing the needs of a specific industry). This challenge often seems overwhelming and, **as a result, many vendors choose to focus their energies on their domestic market. Many European packaged software companies remain small and very often increase the share of services in their revenues to "survive", which drives them apart from a pure software vendor business and its potential "economies of scale". This small size hampers their "pricing power" on its domestic market.** This can lead them to the end of the story when competing with global leaders that reached a sufficient size to address this market efficiently.

37. http://ec.europa.eu/invest-in-research/action/2006_ahogroup_en.htm
38. IT Scorecard, BSA and the Economist Intelligence Unit, September 2008
39. http://ec.europa.eu/information_society/eeurope/i2010/docs/annual_report/2007/070329_com_en.pdf
40. http://eur-lex.europa.eu/LexUriServ/site/en/com/2007/com2007_0860en01.pdf
41. http://ec.europa.eu/cip/index_en.htm
42. http://www.ebusiness-watch.org/

The harmonisation of the overall European Market is underway and this will improve the situation. The implementation of the directive on services in the Internal Market[43] will ease the establishment of software vendors in other member states. The new European Private Company Statute[44] proposed in the Small Business Act project[45] will enable software vendors to set up their business following the same company rules throughout the EU. The foreseen amendment in 2009 to the Directive 2000/35/EC on late payments[46] will also be a major improvement if it stipulates, as announced, that SMEs should be paid within 30 days in the European Union.

But this harmonisation takes time. Meanwhile, measures and initiatives to reduce the costs to cope with this complexity are more than welcome. We believe that two of our recommendations (the proposed European Software Expertise Network and European Software Innovation Program) can help a lot.

1.3. An insufficient recognition of European Software Players

Fragmentation of the software industry and few impressive success stories have contributed to a lack of recognition of the European software players. Yet, ICT is at the very heart of the Lisbon Growth and Jobs strategy.

And SMEs are also at the heart of the strategy, particularly since the European Commission submitted its European Small Business Act project on 25 June 2008. **According to IDC, more than 99% of the 18,000 European Packaged software companies are SMEs. Surprisingly, little has been done so far to boost their growth.**

Indeed, the SMEs that have grown in Europe have strong assets in international competition to address the local specificities in European countries, to understand the needs of European SMEs and package "prêt à porter" software. **Many young and very small European software companies are extremely innovative in emerging market segments through excellent R&D and can gain top positions. The top 100 European packaged software companies remain quite small, but they are fast growing, profitable and create lots of highly qualified jobs.**

Due to the value creation of the software industry, there is an urgent need for a European software strategy to reward successful entrepreneurs for what they are achieving. In this sector, each phase of a company's development is highly critical (seed, early stage, domestic development and international expansion). **Policy should not only target small enterprises but also medium sized enterprises. Europe should encourage such innovative companies that have demonstrated their ability to meet demand.**

1.4. European software R&D is excellent. The critical weakness is innovation.

European packaged software companies have produced excellent software. However, it is also clear that many have failed.

The major weakness of European packaged software companies today is much more innovation than R&D. **R&D is very important in the European software sector, and software engineers in Europe are excellent at it, but it is not as critical as in other hi-tech and ICT industries.** It does not require such a massive investment (no raw materials and very often no basic research) and the development cycles are much shorter.

Due to the lack of marketing and managerial skills, the trap many packaged software companies fall into is an insufficient anticipation of go-to-market and industrialisation phases (for example, product marketing, packaging and setting up a customer support service). In this industry, **excellent R&D has very often proved to be very counterproductive if it is not combined with an excellent development strategy, marketing and channel policy.** In Europe, software companies very often experience a "productization"[47] process. The Software Business Laboratory of the Helsinki University of Technology uses this concept that means "standardization of the firm offering so that the cost and effort of selling and serving an additional customer decreases". In other words, productization results in making the product easier to market sell and deploy. Studies in Finland have shown that Finnish companies that start to productize their offering usually go through a transformation process from technology companies to product companies, and then to marketing companies. According to one respected Finnish entrepreneur this is a disadvantage compared to US companies, since they are marketing organizations from the day one. One of these Finnish studies[48] demonstrated that innovations indeed have a statistically significant positive relationship with firm growth. However, we find this positive relationship only in the cases when firms have done both technological and non-technological innovations. Hence, without non-technological innovations, pure technological innovations or R&D activities do not seem to turn to firm growth.

43. http://europa.eu/scadplus/leg/fr/lvb/l33237.htm
44. http://ec.europa.eu/internal_market/company/docs/epc/proposal_en.pdf
45. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52008DC0394:FR:NOT
46. http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1003&type=HTML&aged=0&language=EN&guiLanguage=en
47. "Finnish National Software Industry Survey 2008" : http://www.sbl.tkk.fi/oskari/)
48. Ali-Yrkkö, Jyrki and Martikainen, Olli. THE IMPACT OF TECHNOLOGICAL AND NON-TECHNOLOGICAL INNOVATIONS ON FIRM GROWTH Helsinki, ETLA, The Research Institute of the Finnish Economy, 2008

Good policy should target and encourage companies that invest in the complete value chain of innovation: idea, concept, development (including translation and documentation), validation-pilot and go-to-market (product marketing, business development, etc). The 2005 third edition of OECD Oslo Manual[49] clearly states that marketing and training are technological product innovation activities "when it is required for the implementation of a technologically new or improved product to process". It also explains that "the development, acquisition and use of software pervade technological product innovation activities" and that "developing new and substantially improved software, either as a commercial product or for use as an in-house process involves research and experimental development and a range of post-R&D innovation activities". **The new "Competitiveness and Innovation Framework Programme"[50] refers to the OECD Oslo Manual and paves the way for an innovation-centric policy. But today policies still restrict innovative SMEs to being R&D intensive SMEs.** As a result, R&D Framework programmes, for example, do not attract or just exclude many packaged software companies because research and innovation funding rules are mainly R&D driven.

1.5. A too high level of illegal use of software in Europe

Packaged software copied by end users and organisations without paying for the license is what we call "Illegal Software". According to the annual BSA and IDC Study[51], **piracy rates in the EU amounted at 35% in 2007 which is slightly below worldwide figure (38%) and much higher than in the United States.** Although most European countries have continued to experience a gradual decline, the difference remains huge. It decreases the expected returns for the investments in the development stage of European packaged software companies, especially those competing on Small Business and Business to Consumer markets. This further illustrates the insufficient recognition of software industry in Europe. The study shows that **a reduction of 10 perceptual points** in the so-called IS Indexes **could generate a substantial growth in the software industry, thousands of high-qualification new jobs** and a large amount of additional taxes for governments.

2. RECOMMENDATIONS

RECOMMENDATION 4: A single definition for "Innovative enterprises" and "gazelles" that is innovation centric (not only R&D)

Given that an overwhelming majority of software players are innovative SMEs, good policies favouring the development of Innovative Enterprises are highly desirable for the development of packaged software companies and should be strongly requested and supported.

European packaged software companies would above all benefit greatly from an "innovation-centric" single definition of innovative enterprises. Even though innovation is at the heart of the Lisbon Strategy, the European Union has not yet created a single definition of an innovative enterprise. Furthermore, the existing definitions are still too R&D centric and are not appropriate for packaged software companies.

The creation of such a definition would:
- **send a message to innovative enterprises that Europe strongly supports innovation**
- **create a status for these innovative enterprises that would enable both the EU and Member states to support companies (such as packaged software companies) fitting within the new definition.**

Creating a definition that includes all dimensions of innovation (technical and non technical according to the OECD Oslo Manual) will not be easy. The software industry is ready to work on it with other industries, Academics, OECD and the European Commission.

But not all innovative enterprises, especially the big groups, can be awarded such a new status. **A threshold will have to be established and "intermediate size companies" of up to a €100m should be eligible.**

Twenty software vendors of the Truffle 100 Europe ranking are over the EU SME definition threshold (€50m) and under €100m[52]. Despite their high growth rates, R&D workforce and profitability, they still remain small and are at a critical stage of their development. In the United States, a company can be eligible to the Small Business Innovation Research Program if it has less than 500 employees. In China, the threshold is up to 3,000 employees.

49. "Oslo Manual - The measurement of scientific ad technological activities – Proposed guidelines for collecting and interpreting technological innovation data, OECD, Eurostat, Third edition, 2005
50. As stated by the 2006 EU decision establishing the Competitiveness and Innovation Framework Programme : "in line with the OECD Oslo Manual, innovation should be understood as comprising the renewal and enlargement of a range of products and services and their associated markets; the establishment of new methods of design, production, supply and distribution; the introduction of changes in management, work organisation, and working conditions and skills of the workforce; and covers technological, non-technological and organisational innovation".
51. "Fifth annual Global Software Piracy Study", Business Software Alliance and IDC, May 2008
52. http://www.truffle100.com/europe/downloads/2007/Truffle100_2007.pdf

Inside this new class of "innovative enterprises", special attention should be paid to high potential growth and high growth companies often called gazelles. A 2006 study[53] carried out in France by IDC and CXP identified more than 150 "gazelles" in the French software industry (companies with a minimum 20% growth rate) among the 600 interviewed companies. This study showed that software "gazelles" create more jobs, are more profitable, expand faster abroad, have wider channels and adopt faster new business models (12% were SaaS "pure" players in 2006).

It can seem like a paradox that such companies should be offered more help than the others when it seems that they could need less. The broader social benefits they generate for the whole economy (job creations, dissemination of innovation) is one answer. But gazelles also engage in higher risk and their high potential is very fragile. Finally there are not enough new large European enterprises[54] and "gazelle" friendly policies can help to break through this "glass ceiling".

Sweden, the UK, Denmark and France created a "gazelle company" status to enhance the growth of high potential and high growth companies. But wide differences exist between different governments in how a "gazelle" is defined.

To reward innovation and to encourage risk, the DG Information Society and Media could promote the idea of the creation of a "gazelle" definition as a priority for the Lisbon Strategy. Many young promising European Packaged software companies would be among the first beneficiaries.

Both definitions would later apply to all appropriate community instruments: state aids, access to finance, access to markets, etc.

RECOMMENDATION 5: Set ambitious objectives and guidelines to accelerate the adoption of software specific measures by Member states, benchmark successful policies and monitor progress.

Launching a European Software Industry Strategy within the framework of the Lisbon Strategy would in itself be a strong signal from the Commission to promote the value of this sector.

The European Software Strategy would first consist in identifying and defining the objectives to be met by member states and the European Commission (number of "gazelles" in the industry, number of software engineers trained, number of packaged software companies involved in European R&D and CIP programmes, average growth rates of software companies involved in R&D funding schemes, magnitude of national public private funding mechanisms etc.).

The Commission would benchmark successful policies that have been implemented both inside and outside the European Union and invite member states to share best practice. Member states would then cooperate to enable the European Commission to assess the impact of efficient measures, which the Commission could promote to guarantee a level playing field between competitors (no competition distortion through fiscal or social dumping). Below are two examples of measures that could be promoted.

Firstly, as salaries and social costs represent the vast majority of the cost of a software vendor, member states could enable all packaged software companies fitting in the new definition of "innovative enterprises" to defer social costs for any kind of employee during its first few years. Such a measure should be made possible thanks to the General Block Exemption Regulation on State Aids to come.

Secondly, deferring taxes to packaged software companies fitting within the "gazelles" definition as soon as they export beyond EU borders could be an efficient policy to reward fast growing companies that take on the challenge to expand their business outside the EU.

In this sense, India adopted an interesting policy enabling small software exporters with minimum exports of $2.5m to import computer hardware for testing and development purposes without paying custom duties.

53. "Analyse et cartographie des éditeurs français", Ministère des PME et Syntec informatique, juin 2006
54. Since 1980, Europe has generated 7 times fewer new world-class players than the U.S. have. (source : European Federation of High Tech SMEs)

Measuring instruments (statistics, indicators) should be established to benchmark performances in each member state.

An EU funded European Software Convention should be co-organised every two years with trade associations to measure progress and further raise awareness.

This would be the ideal framework to:
- Publish this benchmark of best policies and studies to help define software industry friendly polices
- Publish examples of innovation to further raise awareness about the value creation of the sector
- Favour networking and better understanding between all stakeholders

RECOMMENDATION 6: Tackling the issue of illegal use of software

The draft Communication presented on July 16th by the Commission[55] on a new industry property directive strategy for Europe is a very positive step forward towards an effective enforcement on the ground against counterfeiting and piracy through an effective cooperation between Member states and rapid exchange on counterfeiting and pirated goods. A software-specific approach remains to be designed to complement this strategy and effectively tackle the issue of illegal use of software.

This will require the Commission to **explore measures to be undertaken in three main areas:**
- encouraging member states to develop education on IPR at school
- simplifying and unifying the legal environment
- investing to develop protection platforms for all kinds of licensed software

When designing this framework, we can use lessons learnt from various European experiences. In Spain, for instance, a team of IPR and Rights Management Companies have been piloting an education initiative called "Educar para Crear[56]" ("Education for Creation") and have developed IPR education content that could eventually be used as the basis for a Common European Content repository.

The proposed European Software Expertise Network (ESEN) could encourage software companies and software expertise centers to share results and best practice in the area of protection platforms. The EU could also stimulate basic R&D around next generation protection platforms.

55. http://ec.europa.eu/internal_market/indprop/docs/rights/communication_en.pdf
56. www.educarparacrear.org. Content (in Spanish) published in: http://web.educastur.princast.es/proyectos/proyecto_pi/

BETTER FINANCING OF INNOVATION AND DEVELOPMENT OF SOFTWARE PLAYERS

Few people perceive the software industry as capital intensive. Yet **access to capital is one of the major critical success factors. Software funding is also very specific and difficult, given that this industry is unique and complex to evaluate, with resemblances to traditional manufacturing, intangible goods manufacturing and value add services.** In Europe, observers and stakeholders agree that access to finance is even tougher.

The EU has already supported R&D in software showing some tangible results (European Technology Platforms for example). The selection of strategic areas such as embedded software, e-health or on line services is an excellent approach. Yet, few EU software projects did deliver successful products or new business models. In fact, **investing in R&D is not an objective in itself. In the software industry, especially the European one, post R&D phases are even more critical.** R&D is only a means to provide a competitive edge to the European industry. **Strong R&D programmes do not create value without a strong industry.**

A more global approach of innovation is needed bearing in mind that the designed policies should ensure that only innovative companies with good commercial prospects get financing.

1. CURRENT ENVIRONMENT AND MAIN CHALLENGES

1.1. Why software funding is specific

As in traditional manufacturing, this business consists of designing, producing and distributing products that are developed, maintained and improved thanks to the work of a large labour workforce over a number of years.

But, software is intangible. **Contrary to manufacturing tangible goods, the marginal cost of developing software is almost zero. Thus, even if the initial costs are high due to investment in R&D, the cost of the production work is insignificant.** The value chain of packaged software includes:

- on the one hand: R&D, translation, documentation and packaging (all of which takes place before the production stage in a traditional manufacturing company)
- and on the other hand: marketing & sales, professional services (consulting and implementation) and other services (tutorials, support etc.), which represent a growing share of the costs of a software vendor when it matures and becomes “industrialised”

Like in all high value add services businesses, the costs of highly qualified personnel are by far the largest. In the packaged software industry, they represent around 70% of the value add (which is close to the IT services ratio: around 80%). **Moreover, like in any services business with little intermediate consumption, this business requires a large working capital** fund because:

- on the one hand, on average customers pay within 60 days
- on the other hand, salaries and social security are paid monthly and make up the majority of a software vendor’s costs

As a result, the accounts payable do very often not offset the accounts receivables which represent a significant portion of the yearly revenue. Balance sheets are therefore very often unbalanced.

Finally, software vendors are faced, like all businesses in the world of intangibles, with the fact that **investors often underestimate their intangible assets (human capital in particular) and are struggling to understand the sometimes complex economic models relating to the so critical issues of intellectual property.** This complicates further the investment in software companies. Not long ago, software was not seen as being capital intensive due this intangible nature and its resemblance to the services business, where you do not need expensive raw materials or components to start companies given that human capital is the dominant expense. Investors that operate in this sector and know other sectors can easily explain that **this industry is characterized with short development cycles and little basic R&D on one side and with long and cash consuming go-to market cycles on the other side.**

1.2. At which stage of a software company development is capital needed?

All stages of development of software companies are critical: seed, early stage, development…
Early stage is the most visible, but the development stage is even more important. A young software entrepreneur can create a company with a limited amount of capital and may find sufficient funds with venture capitalists to develop the first generation of products.
It costs a lot of money to be competitive when it comes to packaging the offer and going to market. Too few European companies invest in time in marketing. Instead, they very often develop and sell custom software to fund further their packaged software development.

Once the Entrepreneur decides to develop his company he will need heavy access to capital. Without proper access to capital, how can he fund the next versions of his product? How can he fund his international expansion and face stiff price competition? How can he fund the acquisitions which will allow him to remain competitive in the market? **Access to capital will directly determine how rapidly one vendor might grow.** It is also critical to support the development **of medium-size players which need to finance international expansion or external acquisitions. Too many successful companies miss opportunities due to the lack of capital and are acquired by global leaders once they become stagnant above € 20m sales.**

1.3. Why do European software companies struggle to attract investment compared to the US?

As mentioned above, Europe is a less conducive place for innovation and risk than the United States. Even if some Northern European countries are much closer to the US model than the Latin countries, **ecosystem clusters are still smaller and less vibrant than in the United States where innovative SMEs, universities (with massive private and public funding), venture capitalists and Business Angels work together to turn research into innovation and successful products.**

Europe is also experiencing a deep structural crisis of venture capital. Here are some striking figures excerpted from the 29 September 2006 Communication of the European Commission "Implementing the Community Lisbon Programme: Financing SME growth Adding European Value"[57]. After a strong decrease from €4.2 billion in 2001 as a result of the bursting of the technology bubble, European venture capital investment in early stage firms has stagnated at around €2 billion. The 10-year return on overall venture capital investments was 6.3% in Europe compared with 26% in the US. Business angels investments in Europe are estimated to be less than 10% of those in the United States. Again, some countries do well (UK, Sweden, Denmark) but the average performance is very low and this is not at all compensated by bank loans.

There are also **software specific reasons** for the weaker attractiveness of venture capital in this sector. As previously explained, the European packaged software market is quite consistent (even if there is more in house software in Europe) but the industry is very fragmented with few medium-sized enterprises, global players.
Success stories and serial entrepreneurs are rare, which leads to:

- **a lack of visibility and attractiveness (which is very negative in a generally risk averse environment)**
- **a lack of management skills, which is a matter of concern for investors. Investment readiness (how to present a business plan in the correct way) has to be improved.**
- **a lack of marketing skills, which results in low performance when turning solutions into industrial products.**

This insufficient anticipation and command of packaging and go to market phases generate a much less rapid return over investment than in the United States in an industry that is supposed to deliver a rapid pay back. Venture capitalists also believe that late adoption of new technologies and innovations by the European economy has led these to higher services revenues compared to the traditional mix of revenues (1/3 licenses, 1/3 maintenance, 1/3 services) they are used to with US companies.

One important segment has fewer difficulties to attract investors, and this is the application software segment. This segment is less exposed to global competition; it is seen as more in line with stable vertical markets and is integrated in a clear value chain. Technical software products (Infrastructure and tools software) are, on the contrary, exposed to global competition as soon as they are on the market. This is a very cash consuming business to be competitive.

57. http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0349en01.pdf

1.4. Public action is needed…

The market failure regarding access to capital for innovative SMEs has been identified by the Commission that called for action.[58] The European Investment Bank did the same during the 2008 Small Business Act Consultation[59]. **The decision in September 2006 to establish the Competitiveness and Innovation Framework Programme (2007-2013)[60] acknowledged that "Community financing has a role to play in leveraging support and providing complementary funding in order to tackle situations of market failure"**. As we will see a new promising instrument has been launched: the "High Growth and Innovative Facility". Generally speaking, objectives and instruments of the new Competitiveness and Innovation Framework Programme are complementary to European R&D funding schemes. But, it is of course too young to be evaluated.

European R&D funding schemes remain the main existing tool. But the share of research and innovation in European budgets are still weak despite recent progress. Moreover, as stated by the 2008 Aho report[61] our member and described by companies and venture capitalists surveyed is the general feeling **funding schemes are often "too far from the market" and miss the "high growth companies" (gazelles) target.**

The European Commission initiative for a strategic use of precommercial R&D public procurement[62] is also to be mentioned as it can be considered as an alternative way to bridge the gap in the funding of marketable research. In fact, despite the success of such programmes as STTR and SBIR[63] in the United States, "European public authorities do not fully utilise their considerable purchasing power to foster innovation through procurement of innovative services and technologies" as stated by the 2008 Aho report. As expressed by Venture Capitalists and the European Private Equity and Venture Capital Association (EVCA)[64] in its response to the European Commission consultation on a Small Business Act in Europe, we believe that "facilitating SME's access to public procurement is crucial to promote competitiveness, job creation and innovation (also benefiting public authorities). Public procurement can be an important driver for supporting R&D activities and encouraging innovation." The "precommercial R&D public procurement" initiative **should be encouraged provided it is based on fair and open competition with pricing at market conditions**

The Commission works to bridge the gap between capital markets and innovative SMEs through proposal. But so far, **no specific action has been launched to address the specificities of software as a strategic sector.**

1.5. …and it is needed now

Generally speaking, consensus has been built in recent years to "move up a gear" in Europe for innovation and access to capital.

In the software arena, a trend is raising awareness: **consolidation has accelerated at the top of the market and some of the rare worldwide European success stories in software are already over. As a result, fewer success stories are as likely to lead to a lower amount of venture capital invested in the sector.**

Of course, the current "credit crunch" is fragilising European software players even more, the overwhelming majority of which are SMEs.

The main reason why Europe should act now has been stated by Commissioner Reding in her speech "towards a European Software Strategy": there is a window of opportunity for European software. But, the window is small and it will soon be closed if we don't act." The era of computers is gradually scaling down and paving the way to the predominance of the network. Europe failed to take the right approach to computers a few decades ago. But it has invested in networks and on line services research to be competitive in this new era. As previously seen, Software as a Service will probably be a major contributor to the industrial revolution that has just begun. It may enable today's European challengers to gain position and become top leaders in tomorrow's software market. But one has to bear in mind that **European software companies are traditionally technology and R&D centric solution providers. Many of them have already added the SaaS delivery model to their offering, but it will require them heavy investment to compete with more business- and process-oriented global players once the market booms. Besides the potential establishment of an ongoing revenue stream attracts investors. But at the same time, SaaS subscription model also complicates the recognition of revenue and the valorisation of the created software. From now on, software players need more cash than ever to be "SaaS ready".**

58. http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0349en01.pdf
59. http://www.eib.org/attachments/strategies/sme-consultation-2007-2008-en.pdf
60. http://register.consilium.europa.eu/pdf/en/06/st03/st03622.en06.pdf
61. http://ec.europa.eu/dgs/information_society/evaluation/data/pdf/fp6_ict_expost/ist-fp6_panel_report.pdf, p 3
62. http://ec.europa.eu/information_society/tl/research/priv_invest/pcp/index_en.htm
63. http://www.sba.gov/SBIR/indexsbir-sttr.html
64. EVCA's response to the European Commission consultation on a Small Business Act for Europe, March 2008

2. RECOMMENDATIONS

The following recommendations are not all software specific but they can impact the software industry in a very positive way.

RECOMMENDATION 7: Benchmark and promote national public-private funding mechanisms adapted or specific to software within the framework of the European Software Strategy

It appears that joint initiatives between Government and private financial institutions (banks, insurance companies...) are the most efficient way to leverage public financing. At the European level, industry-led Joint Technology Initiatives pool public and private (at least 50%) investment in areas where existing funding mechanisms cannot deliver the scale and speed needed. However, **money can be more easily found and put together at the member states level.**

International benchmarking (both in Europe and outside Europe) **can provide the European Commission with examples of initiatives which have been successful and should be promoted across member states to boost public-private funding in strategic innovative sectors for Europe, such as software.**

In Scotland, several investment funds[65] have been established to help businesses at different stages of growth. For example, the Scottish Venture Fund (SVF) has been set up to invest £500,000 to £2 million, along side private sector partners, in company finance deals of between £2 million and £10 million. The SVF supports a broad range of industry sectors, typically high growth companies.

The France *Investissement* initiative[66] is another interesting example of supporting innovative companies through a combination of public (€2 billion between 2007 and 2012) and private funding (€1 billion within the same period). After the first year, more than €800 M had been invested by France Investissement: €537 M in 44 ventures and development capital funds to reduce the capital gap between innovative companies and capital markets and €350 M in 802 companies (almost 40% of them being ICT companies including software vendors). Inspired by the Israeli Yozma[67] programme model, the share of private funding is expected to rise until 2012 up to six times as high as the public share.

Due to the strategic importance of software and the specific difficulties to bridge the gap between finance and industry, the launch of national specific funds dedicated to the software industry should be contemplated. It could be one of the objectives of the European software strategy. Some of these funds could support key European strategic objectives, for instance embedded software or "Internet of things".

RECOMMENDATION 8: Create a European Software Fund within the existing instrument run by the European Investment Fund

The Competitiveness and Innovation Programme (CIP) has increased the focus on the urgent need to strengthen innovative SMEs in risk/venture capital. The whole programme is supposed to provide around one billion euros through its financial instruments, which are expected to leverage around 30 billion euros of new finance for SMEs. It added a new risk capital instrument to the existing instrument fostering SME start-ups. This non-grant-based instrument is aimed specifically at innovative and high-growth SMEs, which need capital at their crucial growth phase.

The new "High Growth and Innovative SMEs Facility" (GIF)[68] created within the CIP's Entrepreneurship and Innovation subprogramme consists notably in funding venture funds that in turn invest in innovative SMEs. It is run by the European Investment Fund and is too young to be evaluated. Yet, interviews conducted with venture capitalists and member companies demonstrate that there is still very little known and not enough targeted on strategic sectors such as software.

Due to the very high needs, it should be made a strong priority to quickly increase visibility and, later, budget of the GIF 1 and GIF 2 programmes. Critical mass is important to attract investors and increase visibility of this instrument. As the software sector is strategic for Europe and suffers from a bigger venture capital shortage, public policy should do a massive effort to correct the market failure. The way to do this is creating a specific programme for software. Furthermore, a targeted sub-programme will increase visibility of this instrument.

65. http://www.scottish-enterprise.com/funding-grants-venturefund
66. http://www.caissedesdepots.fr/IMG/pdf_02_presentation_FI_21_05_2008.pdf
67. http://www.yozma.com/home/
68. http://www.eif.org/venture/resources/european_commission/gif1_gif2/index.htm

This European Software Fund could also be, together with the proposed ESEN (European Software Expertise Network), the appropriate framework to favour a better understanding between venture capitalists and software entrepreneurs. We welcome the 2008 Aho report recommendation[69] to create such a platform between venture capitalist and all companies involved in FP7. As it appears that European software entrepreneurs very often lack management and business skills to present their project to potential investors in the most convincing way, **the European Software Fund should include "do's and don'ts" for entrepreneurs who decide to seek venture capital.** As it was suggested in a recent workshop organised by the Commission[70], professionally-run "investment readiness" programmes could also be part of this measure.

RECOMMENDATION 9: Adapt European R&D funding schemes to software companies

Software companies experience the same difficulties to access to R&D funding schemes as SMEs in general (lack of information, too much red tape generated by calls, submission process, negotiation process, project management and reporting rules…). The existing programmes are still too complex (although improved since 2007) and are still too often only accessible to the "happy few" companies that have the information and the know how to apply or to big companies that can afford relying on specialized fund raising cabinets. **In that perspective, we support the proposal of the two-step approach of the 2008 Aho report[71] consisting of giving a chance and a small amount of seed money to applicants passing an initial light evaluation.**

We would like to draw attention on difficulties that are more specific to software companies and propose a concrete programme to address them.

As previously seen, **the innovation cycle in software is faster with less massive R&D than in other high-tech sectors. It hardly matches the pace of traditional European R&D projects.** Very often, software companies already developed the technology and would like to focus on pilots, demonstrators and go-to-market. Furthermore, in the software industry, most of the early investments are not counted as "assets": personal skills and knowledge pieces of code, algorithms. **Experts and venture capitalists involved in the evaluation process often do not know the sector and are reluctant to fund companies with balance sheets that appear very weak.**

The top-down approach of the preparation of Strategic Research Agenda, which defines top EU research priorities, is a hurdle for software SMEs that can not be well represented in such a process. **One of the interesting things about software is that there can be ideas of innovative software applications on every area of the economy and society that do not necessarily imply new technologies. These projects should be given a chance as they very often meet demand and can generate rapid growth and jobs.**

IP issues are also particularly sensitive. When contemplating whether to enter into European projects, software SMEs do not see how they will have a satisfying return on projects, even in small and medium sized collaborative projects, as protective measures imply a full and complex process.

To tackle these issues, we propose to focus on the following "innovation oriented" priorities.

All companies fitting in the new definition of "Innovative enterprises" should be eligible to receive R&D funding.

Then, a new balance has to be found between R&D and innovation in the evaluation criteria and the eligible scope of expenses to be covered. Progress has already been made with the Eurostar programme that is more oriented around business issues. Unfortunately, it suffers from different rules and coverage rates in 31 countries.

Furthermore, access to the European market as a potential "second domestic" market should be one of the objectives of this policy. As previously seen, the costs to cope with the complexity of the European market are high. All measures reducing these costs are more than welcome. Software is in essence a complex product that includes "Friendliness", technical ability and multiple dimensions that can be summarized under the now widely used "User experience "term. In Europe, due to all the different languages and cultures, this "User experience" includes multiple translation and packaging issues that are a major investment to carry out and to learn how to carry out.

69. http://ec.europa.eu/dgs/information_society/evaluation/data/pdf/fp6_ict_expost/ist-fp6_panel_report.pdf, p 3
70. http://ec.europa.eu/enterprise/entrepreneurship/financing/docs/financing_smes_workshops_2006/workshops_main_findings.pdf
71. http://ec.europa.eu/dgs/information_society/evaluation/data/pdf/fp6_ict_expost/ist-fp6_panel_report.pdf, p 6

We suggest that the decisive later stages of the innovation cycle (validation-pilot, go-to-market both locally and beyond domestic borders within the EU) should be covered by grants. Once this is done, the weighting in the evaluation criteria of the "impact" of a project (dissemination and use of project results": standards, publications, recruiting distribution partners in other EU countries etc.) should be raised.

In a step-by-step approach, we propose that a new ambitious programme called "European Software Innovation Programme" (EUROSOFT) should be tested on a small scale for software "innovative enterprises" with:

- **a focus on delivery of new products or new services for existing software products that have proved to be locally successful**
- **grants to cover all later stages of the innovation cycle:** validation-pilot, go-to-market
- **a high rate of coverage for these non R&D expenses:** establishment of a business plan, translation costs, packaging and product marketing costs (cultural adjustment costs etc.)
- **100% coverage of IP costs**
- **a bottom-up approach** (no compliance to the Strategic Research Agenda and no guidelines on how to build the consortium, only an obligation to share the benefits)
- **a two-step approach in the evaluation process** (as proposed by the recent Aho report)
- **an involvement of successful entrepreneurs and managers (notably via NTAs) in the evaluation process** (at least one per evaluation) to balance the technical point of view of experts. Other hands-on stakeholders such as venture capitalists, Business Angels or national and regional innovation support agencies should also be involved
- **information and visibility provided by NTAs**
- **a "EUROSOFT" label to be awarded software companies participating to the program and meeting criterias such as usability of products in different European languages and cultures**
- **an incentive for venture capitalists to fund the "EUROSOFT" enterprises**

We do believe that such a programme and a label would help generate successes throughout Europe.

CALL TO ACTION

Nine NTAs have come together in this informal professional alliance to write this position paper in response to Commissioner Viviane Reding's speech in November 2007. It is the first time that a “software-specific” effort has been conducted at such a large scale in the European Union. As affirmed by Ms. Viviane Reding in her speech, we need this European Software Strategy now. To make our nine recommendations operational, we suggest the following next steps:

- **Review of the position paper by the European Commission with active participation of NTAs.**

- **Invite all the parties who have significantly contributed to the effort** "Towards a European software strategy" to take part in the process of adopting the most relevant recommendations and putting them into action.

- **Use the “Open Method of Coordination” instrument to implement the strategy.**
  As this strategy will be part of the revised Lisbon strategy and involve many member states’ areas of competence, Open Method of Coordination is probably the most adapted instrument:
  - Identifying and defining objectives to be achieved
  - Jointly established measuring instruments (statistics, indicators, guidelines)
  - Benchmarking Member states' performance, exchange of best practices and progress monitoring by the Commission (using the proposing European Software Convention as a useful tool)

- **Raise awareness of all stakeholders** (governments, trade unions, education systems, students, journalists, financial analysts, investors).
  - Annual research producing data on the European Software Industry: turnover, employment (broken down into software professionals’ categories), R&D, export... Our group of NTAs is able to come up with a common methodology (based on the joint work initiated with this position paper, existing cooperation within EITO and experience of studies conducted in our respective countries.)
  - A bi-annual European software convention (that could include Truffle 100 Europe study) gathering the whole European Software Ecosystem. This convention would be the right place to publish studies and organise workshops to help define software industry friendly polices, and also to value innovation and careers in the software industry.
  - Dissemination at local level of the European Software Strategy effort and software ecosystem animation by our NTAs in our respective countries.

LIST OF EXPERTS OR STAKEHOLDERS INTERVIEWED

A number of European software ecosystem stakeholders or experts were invited to share their vision on selected issues with our working group or the respective software committees in our National Trade Associations.

Jussi Autere, Helsinki University of Technology, Software Business Laboratory

Jean-Louis Bernaudin, Pasc@line

Stephane Bonneton, Iris Capital

Luisa Bordoni, IDC EMEA Consulting Group

Sjaak Brinkkemper, University of Utrecht

Eric Chreiki, Victoya

Wim Codenie, Sirris Brussel

Pierre-Yves Dargaux, Acces2Net

Jeroen Deleu, Sirris Brussel

Mikel Emaldi, European Software Institute

Martin Harvey, E-Skills UK

Matti Heikkonen, Finnish Software Enterpreneurs Association

Slinger Jansen, University of Utrecht

Marc Laporte, industry expert, former at Hewlett Packard, SFR-CEGETEL and IDC

Bernard Lechat, Invest Securities

Michel Moreau, Eurinov

Mikko Rönkkö, Helsinki University of Technology, Software Business Laboratory

Bernard-Louis Roques, Truffle Capital

Bruno Tourme, Bryan Garnier

Sacha Wunsch-Vincent, OECD

NINE ICT NATIONAL TRADE ASSOCIATIONS PRODUCED AND SUPPORT THIS POSITION PAPER

About AETIC
AETIC, the Spanish association of electronics, information technology and telecommunications companies, is the main point of reference in a sector which is one of the most dynamic in the Spanish economy and of unique importance for the future development of the country.

AETIC's aim is to defend the common interests of its members, and promote the development of the Spanish electronics, information technologies and telecommunications sector through the generation of added value, fostering industrial activity and providing services. Additionally, it aims to promote the development of the Information Society in Spain; extend the use of electronics and ICTs; support the business offerings of the areas it represents; foster demand for technologies, equipment, services, networks and infrastructures; promote the development of SMEs; increase investments in research and development and innovation; and to champion a stable regulatory framework for the sector so as to encourage investment.

AETIC is one of the most important and representative business organisations in Spain, with over 3,000 members, comprising individual members and business groups, shoes activities are related to the electronics, information technologies and telecommunications sector.

About Agoria ICT
The mission of Agoria ICT is to be, within the sectoral federation of the technological industry Agoria, the representative of the Belgian ICT-sector. Agoria ICT represents 400 companies of the Belgian ICT-sector. More than 45 000 people are working in these member-companies (60% of the employment in this sector). The main objective of Agoria is to improve the socio-economic context in which these enterprises are performing.

Agoria ICT creates value for its member in 4 ways: by lobbying for an ICT-friendly enterprise climate, by informing our members of new business and technological trends, by creating awareness about the role of ICT as an enabling technology for innovative and efficiency increasing projects and last but not least by organising network events between the members and potential partners.

About Assinform
With almost 500 members, Assinform is the Italian association of Information Technology companies operating in Italy.

The Association represents the Italian IT industry which counts over 400,000 employees and over 25,000 capital companies accounting for 20 billion Euro in revenue or 2% of national GDP. Assinform is the most important reference point for businesses of all sizes and specializations in the Italian IT industry: from software companies, to systems and equipment manufacturers, providers of applications, networks and services as well as Value Added Service and Information Technology related content providers.

A primary interlocutor for the main market players, Assinform has achieved a well established role in mediating instances between the main economic, political and institutional forces in Italy as regards objectives and critical issues concerning Italy's development through innovation and new technology. It upholds the industry's rights, raises awareness on their concerns and contributes to fostering debate which interests all those operating in the field of innovation – at the public and private levels – and who consider ICT the key instrument for social and economic development.

Assinform is affiliated to Confindustria Servizi Innovativi e Tecnologici, recently established through the merger of Federcomin and Fita, and is made up of over 46 industrial associations and 60 regional chapters, constituting one of the largest Federations of the Confindustria System.

About Bitkom
BITKOM is the voice of the information technology, telecommunications, and new media industry in Germany. BITKOM represents more than 1,200 companies, with 900 direct members, including practically all German global players as well as 600 key midsize companies. BITKOM's membership generates a sales volume of 135 billion euros annually, exporting 50 billion euros worth of high technology each year. BITKOM thus represents 90 percent of the German ICT market. BITKOM offers a wide-reaching, powerful network that brings together the best minds and top companies from the digital world. BITKOM organizes a permanent exchange between experts in the field and industry leaders, offering its membership forums to promote cooperation and platforms for contacting crucial clients.

Creating a good environment for doing business is BITKOM's highest priority. Education and the training of tomorrow's IT and telecommunications specialists, green ICT, e-government, e-health, economic policy, copyright and patent law, security and privacy issues, software technologies, consumer electronics, climate protection, and sustainability as well as a new legal framework for telecommunications and the media are the core of BITKOM's political agenda. With the coming digital convergence, BITKOM seeks to promote the collaboration of all those working in the realm of information technology and telecommunications.

About ICT-Office
ICT~Office unites over 530 companies in the Dutch IT, Telecom, Office and Internet sectors. With a turnover of €30 billion and well over 250.000 employees these companies represent more than 80% of the total IT, Telecom, Office and Internet market in the Netherlands. Its subsidiary Stichting ICT Milieu (ICT Environment Foundation) directs the ICT take-back system and the ICT cluster Packaging in the Netherlands. Its subsidiary Werkgeversvereniging ICT (Employers' Association ICT) is responsible for all subjects concerning the collective bargaining agreement (CAO) and the industry-level pension fund of the Dutch ICT sector.

About Intellect
Intellect is the trade association for the UK technology industry. Intellect provides a collective voice for its members and drives connections with government and business to create a commercial environment in which they can thrive. Intellect represents over 800 companies ranging from SMEs to multinationals. As the central hub for this networked community, Intellect is able to draw upon a wealth of experience and expertise to ensure that its members are best placed to tackle challenges now and in the future.
For further information visit www.intellectuk.org

About IVSZ
The Hungarian Association of IT Companies (IVSZ) is a strong and effective lobbying force as well as an intellectual think tank of the Hungarian IT and Telecom companies, through its more than 320 members representing more than 70% of the Hungarian ICT industry.

The main aim of IVSZ is to achieve such an internationally integrated innovative Hungarian infocommunications industry which can be highly competitive on the global market as well as able to be the priority sector of Hungarian economy.
IVSZ is a catalyst carrier of Hungarian IT industry, by its high professional as well as ethical standards contributes to strenghten a modern and competitive e-economy and society.

IVSZ besides being the consulting partner of local government and public administration has a widespread international connection which enables IVSZ to give an effective support of its members both locally and internationally within the Union.

About Syntec informatique
The National Trade Association of IT services companies, Independent Software Vendors and R&D services companies, Syntec Informatique represents almost 1,000 member groups and companies, i.e. more than 80% of industry sales and staff.

Headed since June 2003 by Jean Mounet, Syntec Informatique contributes to the growth of information and Communication Technologies and their applications, promotes the whole industry, and protects collective professional interests.

Syntec Informatique monitors and analyses the software & services sector, keeps the entire ecosystem of ICT players informed of industry figures and trends, and represents the industry vis-à-vis other organisations and Public authorities.

About Teknologiateollisuus
The Federation of Finnish Technology Industries represents the country's largest industrial sector and is responsible for about half of the total industrial production, personnel and exports. Technology is the common denominator for all our member companies. Of all industrial research and development investment, 75% are made by our members. The industry stands for 60 % of total Finnish exports. The Technology Industries of Finland has approximately 1500 member companies. They operate on four main lines of branches: electronics and electrotechnical industry, mechanical engineering, metals industry and information technology industries. The Branch associations and Branch Groups form a wide cooperation network of almost 800 companies.

Our mission is to ensure that the Finnish technology industries have what it takes to be competitive in the global marketplace. To achieve this we foster an innovative and internationally competitive business environment, activate business development and networking, negotiate internationally competitive labour market agreements, as well as enhance technology industry's and member companies' image and attractiveness.

We offer our member companies and partners a wide selection of services, analysed and refined information, training, tried and tested operation models, as well as various working groups and a wide network of leading experts. An important part of our activities focus on enhancing the operational conditions of SMEs. The Federation of Finnish Technology Industries is a forum that enables efficient co-operation and networking, also on regional and local levels.

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