

New Media Localisation

LINGLINK Report for the European Commission DGXIII

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January 1999



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1 Summary

1.1 Background

This study has been undertaken as part of the European Union (EU) funded LINGLINK project. LINGLINK has commissioned a total of four studies into areas which have been identified by the European Commission (EC) as being of particular importance for the future of Human Language Technologies (HLT), especially in the context of the EU's forthcoming Information Society Technologies (IST) Programme.

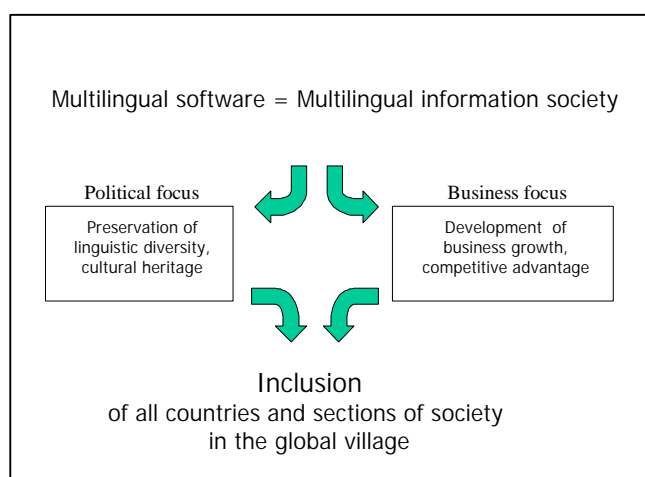
HLT is a key area within the IST Programme. Its aim is to facilitate working with different European languages with the use of telematics systems. Research and technology development work focuses on pilot projects that integrate language technologies into information and communications applications and services.

The object of this study is not to conduct a market survey but to provide a strategic assessment of the localisation industry, its needs and potential for HLT and the IST Programme. Digital content and multimedia localisation have been given particular attention.

To ensure the relevance of this study, prominent industry representatives have been interviewed. The structure of the report and its main themes are based on the issues raised, opinions given and analyses provided by those interviewed.

1.2 Setting the scene

The protection of Europe's rich linguistic and cultural heritage in the information age is a major challenge and a real opportunity for business and politics. For European citizens, it is a prerequisite for participation in the information society of the next millennium.



While European politicians want to make Information Society Technologies (IST) available and accessible in the language and locale of the people they represent, software publishers are already responding to the demands of their European customers by supporting a wide variety of local languages and cultures in their products.

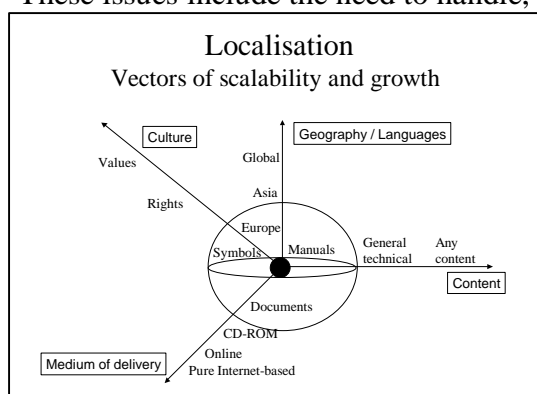
A dedicated, vibrant and young industry has taken on the task of responding to the requirements of business and politics. The localisation industry, initially seen as just one of many service suppliers to the general IT sector, has now established itself as a key player. It is the localisation industry that is translating the European challenge into new business opportunities. It is the localisation industry that will enable the open, pluralist, user-friendly and inclusive multilingual information society.

1.3 The localisation industry

The term localisation has been used until recently to describe the process of adapting a product to the requirements of a market other than that for which it was originally developed. The localisation industry was originally associated exclusively with software. However, over the past five years, after developments in vertical markets, global services and new technologies like the web, synergies have been created between the IT and other industry sectors that are dealing with issues similar to those encountered in the software localisation industry.

Among these are the aeronautics, automotive and traditional publishing industries. Because of the ever increasing role IT plays in the production cycles these industries, they are facing similar issues when developing their products for the global marketplace.

These issues include the need to handle, control and translate large amounts of text into a variety



of languages within a time limit, within a tight budget and according to strict quality guidelines as well as the need to adapt — not just translate — their products to the culture and locale of the target market.

IT provides the framework for the convergence of these activities. The localisation industry provides the framework for the convergence of the multilingual aspects of these activities. Localisation is becoming the catalyst for electronic multilingual production and

publishing.

On the background of these developments, the concept of localisation is being redefined as the provision of services and technologies for the management of multilinguality “across the global information flow”.

1.4 A tidal wave of change

The growth of the Internet and the world wide web, particularly over the past five years, has been one of the most remarkable developments in the history of mankind. According to Andy Grove of Intel: “The Internet is like a 20 foot wave coming, and we are in kayaks. We’re just a step away from the point when every computer is connected to every other computer, at least in the US, Japan and Europe.” The Internet’s arrival affects everybody — the computer industry, telecommunications, the media, chipmakers and the software world.

The businesses of computing (hardware, software and services), communications (telephony, cable and satellite), and content (publishing, entertainment, advertising) are converging to create the *new media industry*. New media publishing on the Internet combines computing, entertainment, broadcasting, music and video production.

Timely and cost effective delivery of high quality digital content to the global marketplace has become a major growth area for the localisation industry. It opened the relatively narrow software localisation industry to a wider range of players who are broadening traditional roles within the software localisation industry.

These include:

- tools developers (machine translation [MT], computer assisted translation [CAT] etc.);
- internet companies (content providers, application developers, service providers);
- consultants;
- government bodies;
- producers of IT enhanced products (telecommunications, automotive, medical, publishing etc.);
- film and music producers;
- publishing houses;
- games developers;
- cultural organisations (e.g. museums, libraries and cultural institutes).

1.5 Case studies

The developments described in this report are backed up by case studies illustrating its main argument: namely that the localisation industry, through the use of HLT, is the catalyst for the inclusive multilingual information society.

Each case study represents one of the following industry sectors:

- **Technology solution provider**
Lernout & Hauspie Speech Products is no longer just a language technology provider. The implementation of its policy of acquisitions, investment and licence agreements provides an almost perfect example of how the convergence between formerly distinct industries has dramatically accelerated since 1996.
- **Hardware manufacturer**
Compaq is joining forces with key independent software and hardware vendors to develop and deliver a wide range of solutions for today's media enterprises with HLT and to support the most advanced multilingual digital media applications.
- **Traditional publisher**
Bertelsmann is developing from a traditional publishing house into a new media company. It is building on its established businesses and sees this as a distinct advantage over its competitors. The company is now exploring a wide range of business opportunities through the use of HLT.
- **Software developer**
Netscape has expanded its business from software development to Internet business and its portal site has become one of the most successful sites on the Internet. In addition, it has launched the Universal Localisation Programme, which could redefine localisation as we know it.

1.6 Recommendations

The recommendations for the EC are based on the results of our analysis of the development requirements of the localisation industry for HLT. Many issues raised here have been pointed out to us directly by the industry representatives we interviewed.

1.6.1 Strategic issues

1.6.1.1 Challenges

The reasons for some of the perceived problems with EU funded collaborative research can be found to a large extent in the presentation of the funding programmes. Here are some of those problems:

Collaborative — i.e. some mission-critical and core technologies are not employed because the companies that own them don't want to share information and expertise with competitors.

Driven by the EC — i.e. an over-complex bureaucracy that cannot always respond adequately to the fast changing needs of emerging technologies like the Internet and the new media.

European R&D — i.e. heterogeneous consortia spend much time on achieving consensus, with extremely high overheads. It is sometimes thought that too much money goes to small, low-impact projects with relatively low budgets. Consequently, citizens have received few visible benefits.

This analysis makes it clear that if the EU wants to respond to the multilingual and multicultural requirements of the rapidly developing new media industry, changes in the presentation and direction of the programme are imperative.

1.6.1.2 Opportunities

Opportunities for HLT are prevalent in:

- supporting the further automation of localisation;
- addressing problems associated with the concept of “global computing” (e.g. the use of an English version of a word processor with a French keyboard in Germany);
- researching the implications of and solutions for cultural localisation issues;
- building a solid R&D infrastructure for HLT in Europe solidly anchored in, and strongly motivated by user oriented product research and development.

1.6.1.3 Projects

Fewer but higher impact projects should be funded, i.e. of longer duration, with stronger project management and with adequate financial resources.

The following areas provide opportunities for the establishment of projects regarded as being strategically important to the development of the industry surveyed:

European Language Resources Centre — to establish a central, accessible repository of European language resources strongly connected to and supported by the industry sectors that would, at least initially, gain most from their establishment (e.g. the call centre industry and the localisation industry).

European Localisation Institute — to provide a focal point, a central resource and a research centre supporting a much needed European localisation network.

Workflow models for the language industries — to develop up-to-date workflow models to help companies adapt to and survive in the constantly changing, highly competitive and globally operating localisation industry.

“Climatic” change — required to showcase the exciting side of HLT; to demonstrate the usefulness of HLT to business, politicians and citizens; to make HLT accessible.

Training and education — to address the skills requirements of the information society at third level, in the area of vocational education and in industrial training; to build on existing initiatives to introduce national and European certification systems.

1.6.2 Tactics

The following concrete proposals for EU action have emerged from this study to address practical challenges in the localisation of new media (including multimedia and digital content):

Cultural adaptation — detailed studies are required of the implications of cultural dominance, change and development, to assess the impact of the new media on European consumers.

Working globally — as people increasingly work within a global environment, it becomes necessary to produce software that adequately and transparently supports individual work habits, different cultures, languages and individual preferences — independent of location.

Tools — existing tools need to be adapted and new tools will have to be developed for new and emerging standards and development environments (e.g. Java, HTML [hypertext mark-up language], XML [extensible mark-up language], Unicode). Tools will also have to be provided to port existing data resources to emerging file and data formats (e.g. based on Unicode).

Linguistic resources — the creation of new and the management of existing linguistic resources should be initiated in a European project, especially (but not exclusively) focusing on minority languages. These resources should cover text (including parallel text and translation memory [TM]), audio and video resources as well as tools for the adequate processing of all European languages. The creation and management of these resources should be driven by demonstrated industry and consumer requirements.

Access to tools and resources — this issue should be addressed by the establishment of a European Localisation Institute.

Internationalisation — internationalisation guidelines for the new media should be compiled and published.

Multimedia localisation — attempts to reduce the high cost of multimedia localisation should be supported by the development of tools aimed at reducing the labour now required for multimedia localisation.

Multimedia localisation and cultural issues — cultural aspects in localisation are often mentioned but have never been really described comprehensively. In cooperation with similar initiatives, — for example, that coordinated by Kenneth Kenniston of MIT's Media Lab — a detailed study should be conducted into the cultural issues of multimedia localisation.

Standards and interchange formats — the increased use of translation technology will make the development and implementation of (interchange) standards indispensable, especially in areas such as:

- terminology database formats (e.g. OLIF);
- translation memory (e.g. TMX);
- text format for machine translation (e.g. OTEXT);
- character sets (e.g. Unicode);
- text tagging (e.g. OpenTag).

Language and translation technology (text and voice) — first experiments with real-time voice translation through the integration of dictation systems and translation technology have been very promising and should be further investigated.

Online automatic translation — online translation on the web is already being offered but will need further development to make it really useful for businesses and occasional users. Areas of improvement could be the extension of the language and lexical coverage, functionality and user interface/accessibility.

A new model for the use of MT — a new model for the use of Machine Translation (MT) and Computer Aided Translation (CAT) has been developed in discussions with localisation and translation technology experts during this study. It will address many requirements of consumers and professional business users alike. This model should be further investigated and a prototype developed.

1.7 Conclusion

As geographical barriers to the creation of the global society become increasingly insignificant because of the emergence of new technologies and the rapid growth of the Internet, language and cultural differences in the “global village” remain for many the last obstacle to their participation in the information society of the next millennium.

The new media industry, emerging from the decline of some traditional industries, will need to overcome this obstacle to achieve its potential as the global driving force in the inclusive multilingual information society.

The localisation industry, although relatively young, has already gained considerable experience in the linguistic and cultural adaptation of IT applications to the requirements of many countries and cultures. It is ideally positioned to help achieve the inclusive multilingual information society.

The scenarios and the data presented in this report show that Europe is the main Internet driver outside the US. Given the diversity of languages and cultures in Europe, web-based multimedia and contents localisation have now become major growth areas for the localisation and language industries and present the major opportunity for the development of HLT in Europe.

2 Introduction

This study has been undertaken as part of the European Union (EU) funded LINGLINK project. LINGLINK has commissioned a total of four studies into areas which have been identified by the European Commission (EC) as being of particular importance for the future of Human Language Technologies (HLT), especially in the context of the EU's forthcoming Information Society Technologies (IST) Programme.

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The other studies cover:

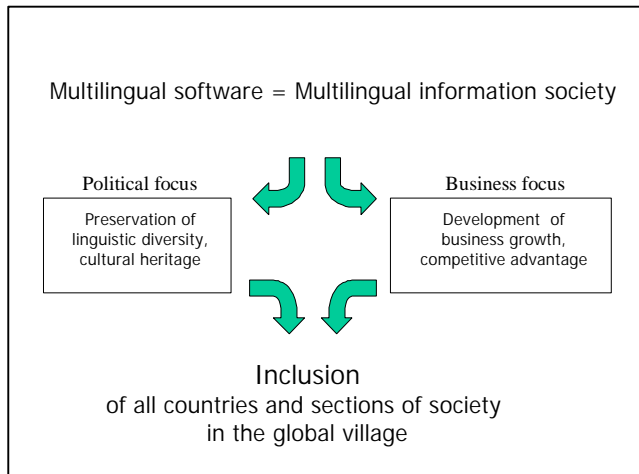
- Call Centres — Opportunities for Language Technologies;
- Telecommunication and Enterprise Innovative Applications and Demand;
- Enabling Electronic Commerce and Innovative Business Capabilities in the Financial Services Industry.

The object of this study is not to conduct a market survey but to provide a strategic assessment of the localisation industry, its needs and potential in HLT within the IST Programme. The localisation of digital content and multimedia applications has been given particular attention.

To ensure the relevance of this study, prominent industry representatives have been interviewed. The structure of the report and its main themes are based on the issues raised, opinions given and analyses provided by those interviewed.

3 Setting the scene

Europe's 371 million citizens speak more than 45 national and regional languages. The protection of this rich linguistic and cultural heritage in the information age is a major challenge and a real opportunity for business and politics. For European citizens, it is a prerequisite for participation in the information society in the next millennium.



While European politicians want to ensure such participation through the Information Society Technologies (IST) programme, in the language and locale of the people they represent, software publishers are already responding to the demands of their European customers by supporting many local languages and cultures in their products.

The backbone of the communications infrastructure for the inclusive multilingual information society must be computer

software and hardware, adapted to the linguistic and cultural needs of users.

A dedicated, vibrant and young industry has taken on the task of responding to the requirements both of business and of politics. The localisation industry, initially seen as one of many service suppliers to the general IT sector, has now established itself as a major player; as the industry that is translating the European challenge into new business opportunities and as the industry that will enable the inclusive multilingual information society.

4 Clarification of concepts

At the beginning of this study we would like to clarify our use of some important terminology: internationalisation, localisation and globalisation. These terms are often confused and used almost as synonyms — although they express distinct concepts.

In their generic meaning these terms describe similar concepts used in different industries, such as aeronautics, the automobile industry and publishing. For this study, we will use these terms as they are defined in the software industry.

4.1 Internationalisation (I18N)

If one day software applications were truly internationalised, localisation could be reduced to a simple, straightforward translation job.

Pat O'Sullivan, Senior Engineer, Lotus Development (1998)

The term *internationalisation* describes the process of designing (or modifying) software to isolate the linguistically and culturally dependent parts of an application. The concept as defined here assumes that the process code will remain unchanged after localisation — an assumption that might not hold if cultural adaptation is carried beyond the relatively simple symbolic level. Internationalisation supports the localisation process, making it faster and more cost effective.

Internationalisation includes:

- separation of translatable text from the code of an application so that it can be easily accessed by translators without requiring recompilation of the code and subsequent extensive testing;
- separation of locale-dependent functionality from the core functionality of an application, including that referring to character sets, keyboard layout, data input and display conventions and collating sequences.

Ideally, a fully internationalised application would only need to be translated to meet the requirements of a foreign market: that is, localisation would become equivalent to translation. However, given the current state of the art, it seems unlikely that developers will soon meet this target.

When developers designed products with the domestic market only in mind, software was generally not internationalised — localisation or the adaptation of the application to the requirements of foreign markets required extensive redevelopment and not just translation of the application.

For example, when Lotus Development first targeted markets outside the US with its spreadsheet application 1-2-3, the company had to completely redesign and internationalise the original application to prepare it for localisation. During this time, the company lost valuable market share to its main competitor, Multiplan. This loss could have been avoided had the company designed its application with the international market in mind in the first place.

With the globalisation of markets and the growing need to sell their products outside their traditional constituencies, software publishers quickly learned that internationalisation is a key factor in reducing the localisation costs, particularly in the areas of re-engineering and testing. According to Allied Business Intelligence (ABI), localisation of a software product for a

particular market makes commercial sense only if the cost of localising that product is less than 3 per cent of the expected sales revenue from that market. This figure, however, has been questioned by some software publishers and is — without knowledge of the underlying business model — almost impossible to verify.

Experienced developers know that the effort invested in the internationalisation of a product during its design and development is more than justified by the savings made during localisation. Some software publishers maintain that developing internationalised products is no more expensive than ordinary development — if done by international-aware programmers. The only extra cost for international program development, i.e. appropriate training, arises in the case of staff with no international programming experience.

4.2 Localisation (L10N)

Localisation fixes problems.

Anna Brady, Development Manager, Symantec (1998)

The term *localisation* describes the process of adapting a product to the requirements of a market other than that for which it was originally developed. The adaptation of the product is usually limited to linguistic and cultural requirements. The basic functionality of the product is, at least in the case of most Western European markets, not altered.¹

Localising a product generally covers more than just the translation of the user interface, the online documentation/help and the printed documentation.

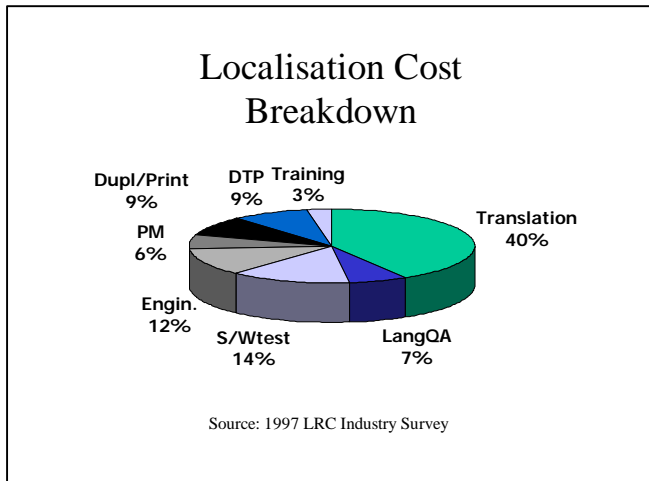
Adaptation to local market requirements also means that the product works in accordance with local regulations and standards, as in the case of technical drawing applications or financial packages.

For example, financial applications developed in the US always have to be localised even for the British or other English-speaking markets — not for linguistic reasons but to comply with the corresponding finance laws and regulations like tax rates and financial years.

Product localisation covers a wide range of activities, including:

- evaluating the original product (what will have to be localised, how can it be localised), testing for internationalisation;
- establishing requirements and standards in target markets;
- adapting and re-engineering software according to the requirements of European and world markets;
- software testing (quality assurance [QA]) of localised products;
- translating the user interface, online and printed documentation;
- porting multimedia products into other languages and cultures, involving among others actors for voice-overs and graphic artists for the adaptation of the visual contents;
- printing documentation;
- duplicating floppy disks and CD-ROMs;
- distributing the localised products.

¹ When localising IT products for Asian or Middle Eastern markets, however, the functionality of both hardware and software usually has to be adapted.



The most expensive activity in localisation is translation, followed by testing (language QA and software testing). It is therefore not surprising that software publishers and localisation service providers have been among the early adopters of emerging translation technology applications.

For example, in 1994 Softrans-Berlitz (now Berlitz International) embarked on its first large-scale translation projects using TM technology. The company translated around a million words into more than 10 languages using a TM system — at a time when this

technology was known only to a tiny minority of general translation service providers outside the localisation industry.

The innovative drive of early adopters in the localisation industry has largely brought new translation technologies closer to the market and proved their usefulness to potential users in other industries.

4.3 Globalisation (G11N)

When we are talking about globalisation, we look at a world in which, effectively, markets, distribution and production are integrated so that you can produce part of an item in one part of the globe and transport it somewhere else, have it put together there, and then market it from a third location. It can be owned, controlled and managed from a fourth.

Dr Ellen Hazelkorn, Director, Faculty of Applied Arts, Dublin Institute of Technology (1997)

The term *globalisation* describes a business strategy for taking a product to the global market, rather than an activity, as in the case of internationalisation and localisation. This requires worldwide marketing, sales and support.

Globalisation is not new. American multinationals are not the first to trade their products globally. Phoenicians, Romans, Greeks, Arabs and Celts, among others, travelled the globe more than 2,000 years ago looking for new markets. In the 15th, 16th and 17th centuries Spanish, Dutch, Portuguese and English traders dominated world trade with Asia and South America and within Europe.

What has changed are the conditions for the successful implementation of this strategy. Never before was it possible to fully work through a truly global economy. The Spanish galleons were able to transport goods to the Americas and silver to Europe. But their journey took weeks and was extremely dangerous because of the risk of bad weather and attacks by pirates. A key factor for the breathtaking success of globalisation at the end of this millennium is modern technology, especially worldwide communications networks providing instant, location-independent connections between customers and clients. Technology has shrunk time and space.

State-of-the-art fibre optic systems can now transmit the equivalent of 80,000 simultaneous telephone conversations over a single optical fibre and will soon carry 320,000 conversations over a fibre pair.

Today modern technology allows traders like Dell Computers to sell products to anybody anywhere in the world at the click of a button. In January 1997 Dell's web site sold \$1 million a day, by June it was \$2 million, by October \$3 million and at the end of 1997 it sold \$6 million a day. Electronic sales in Dell are expected to account for 50 per cent of the company's business by the year 2000. According to initial forecasts by IDC on a global level, e-commerce will grow from \$8 billion in 1997 to \$333 billion in 2002. This forecast has been revised upwards. According to the *Financial Times* (7 October 1998), it is now predicted to grow to \$700 billion.

The effects of globalisation are topical and often controversial. While supporters say globalisation will not just increase the profits of global traders but also raise living standards and promote equality among the world's peoples, critics say it will lead to greater inequalities in the distribution of wealth and opportunities. There is, however, a consensus among experts that it will lead to growing oligopoly as competitors go out of business or are merged into existing operations. For example, there are only two companies in the world manufacturing large airplanes and just one company supplying 80 per cent of the world's computers with operating systems.

5 The localisation industry

5.1 *Origins*

The localisation industry emerged in the mid-eighties in response to the need of the US computer industry to translate (or localise) its products. The domestic market in the US was slowing down and the industry had to increase its presence outside the US to continue the phenomenal growth it had experienced since the late seventies.

Realising that international markets offered enormous potential for growth, North American software publishers decided to establish their first manufacturing sites in Europe. A few years later, they also set up development teams to adapt the original US English product to the requirements of European users. These European manufacturing and development sites were soon supported by a growing service industry initially offering translation and desktop publishing (DTP) services and, later on, complete turnkey solutions. The whole of this new industry became known as the localisation industry.

As this industry developed at the intersection of language and advanced computer technology it attracted players from a variety of backgrounds. Companies with a computing background arrived on the scene and acquired language and product internationalisation expertise, and companies with a traditional language and translation background developed the necessary technical expertise to join this new, highly dynamic industry.

5.2 *The main players*

The players in this emerging industry could be divided into three main categories:

- software publishers;
- hardware manufacturers;
- localisation service vendors.

This division has been relatively stable over the past years and is reflected, for example, within the Localisation Industry Standards Association (LISA)².

However, as will be discussed in more detail later in this chapter, recent developments inside and outside the industry will soon require a re-evaluation of this structure.

5.2.1 *Software publishers*

Software publishers localising their products used to be mainly large, US companies that wanted to supply and market their products outside of their domestic market, initially in Western Europe and later in Eastern Europe, the Middle East and Asia. They now also include smaller developers, and developers outside the US.

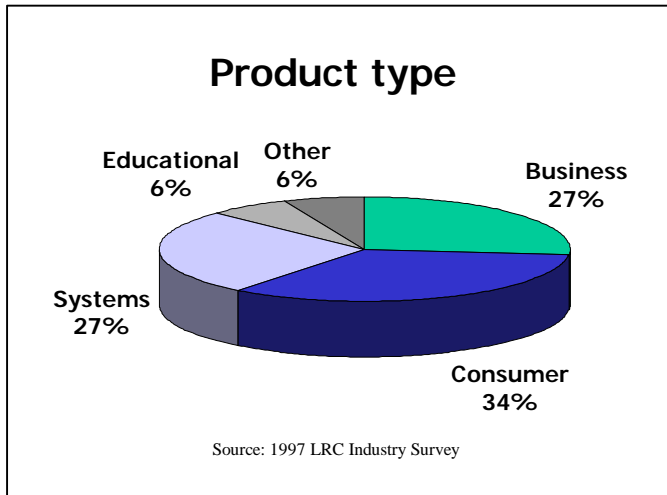
Important players in this category include Microsoft, Apple, Autodesk, Corel, Lotus/IBM, Netscape, Novell, Oracle, SAP, and Symantec.

² In its membership categories, LISA does not formally distinguish between software publishers and hardware manufacturers.

In recent years, these companies have been joined by large European software developers, most notably Europe's largest software publisher, SAP.

Some members of the European Union, for example Ireland, have initiated support schemes for smaller publishers to localise their products and allow them to target markets outside their language community.

Until recently the type of software being localised was quite uniform. Mainly systems, office productivity and related software products were localised.



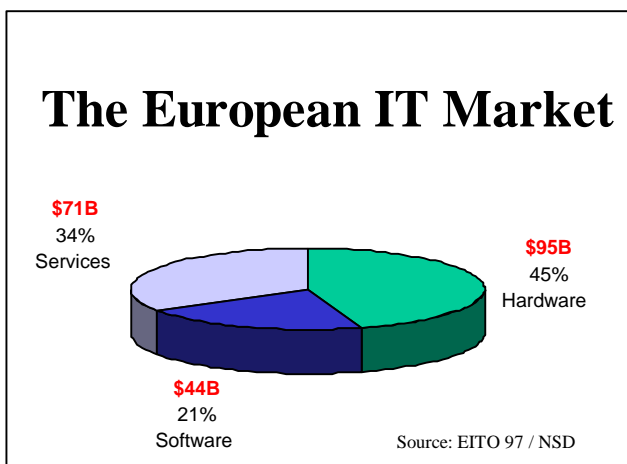
It is interesting that while business applications are still among the most important titles in the localisation business, consumer applications have overtaken competitors. This could be interpreted in two ways: (1) more business applications have moved into the consumer category (for instance can the products marketed as office suites still be regarded as business applications, or have they become consumer products?) and (2) more consumer applications are being localised (for instance games and infotainment and edutainment software).

In any case — and this is supported by figures evaluating developments in the software industry — the consumer is rapidly overtaking the business user as the most important customer for localised products. Software is no longer confined to business applications; it is becoming a consumer product that needs to be made available in the local language.

5.2.2 Hardware manufacturers

Again, it used to be mostly large US companies that targeted non-US markets with potentially high growth rates, such as Europe, the Middle East and Asia.

Among the large hardware manufacturers localising their products are Apple, Compaq, Creative Labs, Dell, Gateway 2000, IBM, and Sony.



Although computer hardware represents the most important sector for revenue and growth in the general IT area, market surveys analysing the localisation industry have generally focused on the software sector. These include recently published surveys like that by ABI (1998), periodical surveys like the annual LISA Industry Survey, or others like the OVUM Report on Globalisation (1995).

The general issues of localising computer hardware are, of course, similar to those in software localisation. However, there are also

specific issues related to the localisation of hardware that do require specific knowledge, skill

and equipment — such as standards for communications hardware, layout and functionality of input and output devices, and functionality of other hardware components and peripherals.

5.2.3 Localisation vendors

Localisation vendors or service providers supply localisation services to software publishers and hardware manufacturers, and more recently also to what we will describe later as the new media industry. In many cases, their knowledge of internationalisation and localisation issues in relation to a particular product is far more advanced than that of the original developer of the product. Although technical advances, tools development and standardisation efforts, such as ISO 10646 in the area of multilingual character sets, are generally driven by the publishers, it is up to the localisation vendors to work with them. They are the true localisation companies.

Initially these companies were located in the country targeted by their clients. They offered a single-language localisation service. But by the mid-eighties this model was supplemented by the arrival of multi-language vendors.

Among the larger localisation vendors are Alpnet, Berlitz, Bowne International Communications, International Translation and Publishing (ITP), International Language Engineering, ILT Solutions — Lucent Technologies, Language Management International, LioNBRIDGE, L&H Mendez, SDL, Sykes/McQueen and VistaTEC.

Although there are a number of localisation centres in Europe, for example in France, Belgium, the UK and the Netherlands, Ireland has become the European centre of the localisation industry. While some of the translation work and some testing is performed in-country, most localised products are now shipped into Europe from Ireland. The following statistics illustrate this dominance:

- 43 per cent of all European PC software is produced in Ireland;
- Ireland is the second largest exporter of software after the US;
- Ireland is the leading country in Europe for inward investment in the software and electronic sectors;
- seven of the top 10 independent international software companies are located in Ireland and exported \$5 billion worth of software in 1997;
- the top five PC manufacturers are located in Ireland.

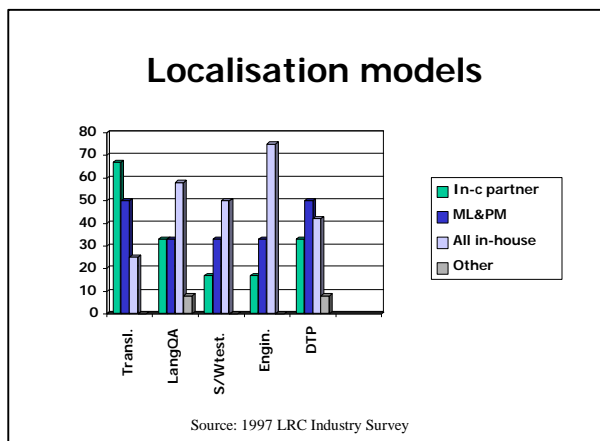
Source: National Software Directorate (Ireland)

5.3 Localisation: models and trends

How the different tasks in the localisation process should be organised and divided between the different players is a frequent topic of discussion among industry experts, especially in the light of dramatic change and increased pressure on localisation enterprises to adapt rapidly and effectively to ever-changing requirements.

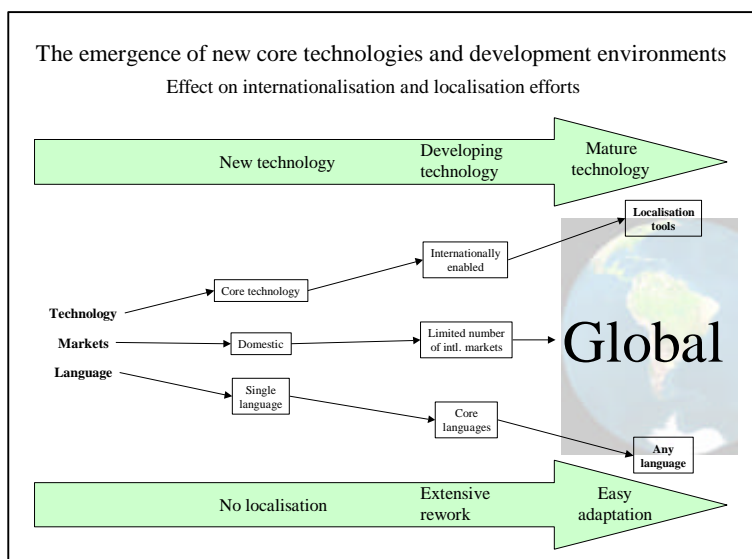
5.3.1 Models

The main question being discussed is the extent to which publishers and manufacturers should outsource localisation tasks to external service providers.



Survey results suggest that outsourcing to in-country vendors is preferred for translation and, to a lesser degree, for language QA and desktop publishing. A similar trend can be observed in outsourcing to multilingual vendors who also take care of project management. Not surprisingly, few publishers outsource engineering work.

Whether this pattern will remain stable is questionable. New applications coming on stream contain a high degree of complex multimedia elements. New technologies and development environments do not generally come straight away with easy-to-use localisation tools, although at least in some cases they are designed from the outset with internationalisation in mind. These localisation tools are usually developed in a secondary effort, once the core technology is in place. For example, some industry experts feel that with the advent of development environments like Java, localisation technology is again where it started off 10 years ago.



From a localiser's point of view, working with Java is like stepping back 10 years in time.
Walter L Smith, ILE (1998)

As the complexity of software to be localised increases, many service providers see their engineering expertise as one of their main assets. In their view, publishers will not be able to handle highly technical and complex localisation projects in-house and will therefore be looking for a vendor with a sound engineering background.

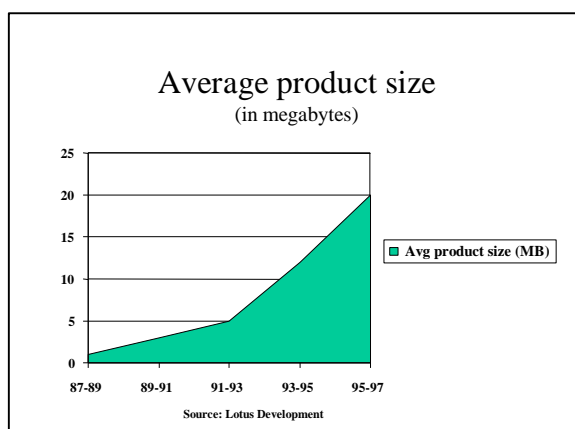
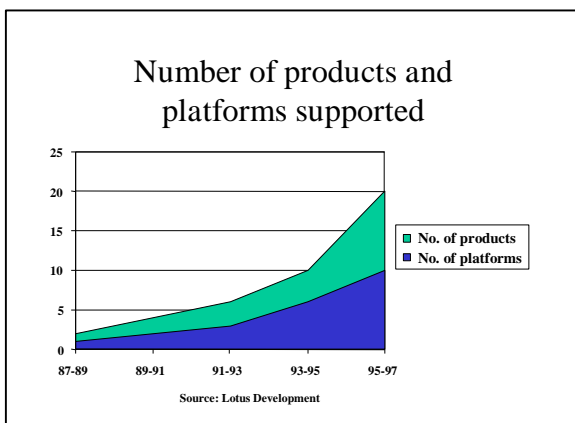
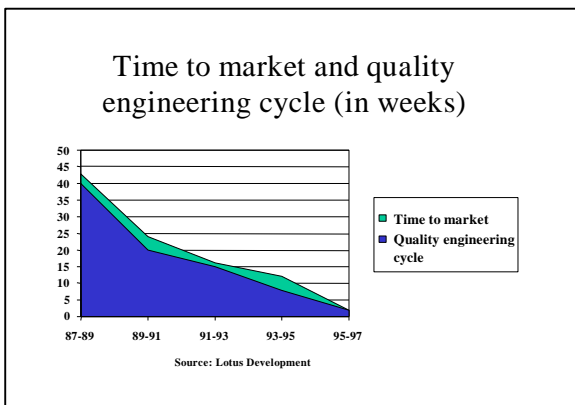
5.3.2 Trends

In analysing the short history of the localisation industry, a number of trends can be observed:

- the number of languages for which localisation is required is increasing continuously;
- product life cycles are contracting;
- time to market for localised products is getting close to zero (simultaneous shipment, or SimShip);

- the number of products being localised has dramatically increased;
- the number of platforms supported has increased;
- the average size of the product has increased.

As an example of the first trend, Microsoft is localising its products into 46 languages. It is likely that this figure will increase to 80 by the year 2005.



Figures for product life cycles, time to market and engineering cycles are equally dramatic. While in 1987 the time to market for localised products aimed for by software publishers was basically “as soon as possible”, in 1999 most publishers aim to ship their localised products within a few days or even on the same day as the original version — at least for the main languages.

Within the same period, the number of products that were localised and the number of platforms supported by these products also increased substantially. In 1987 the number of products being localised even by large software publishers and even for the larger language markets was restricted to a few core products. In 1997 the same publisher might have localised more than 20 products. Platform support in 1987 was limited, for packaged software, to MS-DOS. In 1997, core applications by major publishers supported more than 10 platforms.

The pressure on localisation operations to streamline their operations and handle more languages and products for an increasing number of platforms in less time while reducing cost and improving quality is increased by the ever-growing size of the individual products. In 1987, products were shipped on 5 ¼ inch floppy disks with a capacity of a few hundred kilobytes. In 1997, the average size of products has increased to 20 megabytes and they are shipped on CD-ROMs that hold several hundred megabytes.

Even established industries have to cope with dramatic changes in production and adapt to changed market requirements. But few industries need to handle change to the extent described above. It is not surprising that people in the software localisation industry see themselves as

prototype innovators, working in an industry where “change is the only constant” (Teddy Bengston, Oracle).

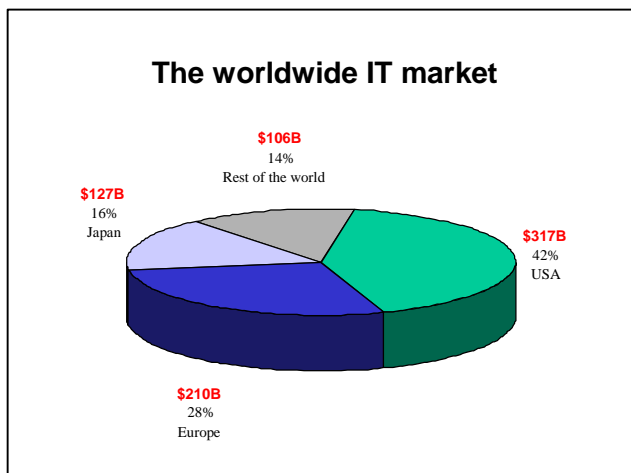
5.4 Why localise?

Microsoft localises its products, in short, because we develop information tools. Wherever you find industry, commerce or any community of people — they are going to use information tools. That has been the case for the last 20 years. That's why we are in Europe. There is a huge demand for that.

Marc Keane, HR Manager Microsoft, WPGI (1997)

5.4.1 The European IT market and localisation

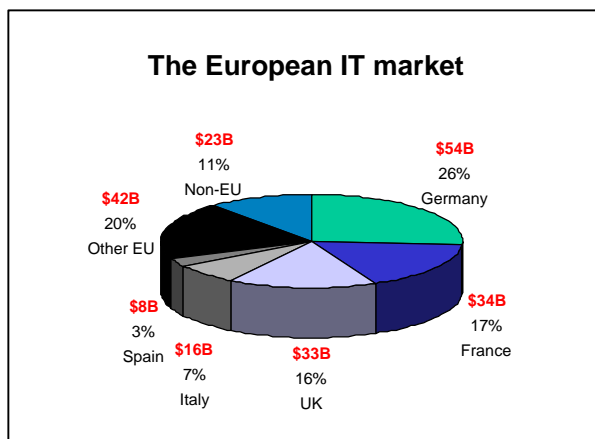
Europe represents one of the largest markets for IT products in the world, behind the US and ahead of Asia.



Most large multinational software companies get a minimum of 50 per cent of their revenue from international markets. Software localisation not only substantially increases the revenue of these companies and makes them more independent from domestic market fluctuations, but has also substantially contributed to the overall development of these companies.

The cost for the localisation of a particular product is usually around 5 per cent of the overall R&D cost, and should not be higher than 3 per cent of the expected revenue from that particular language market.³

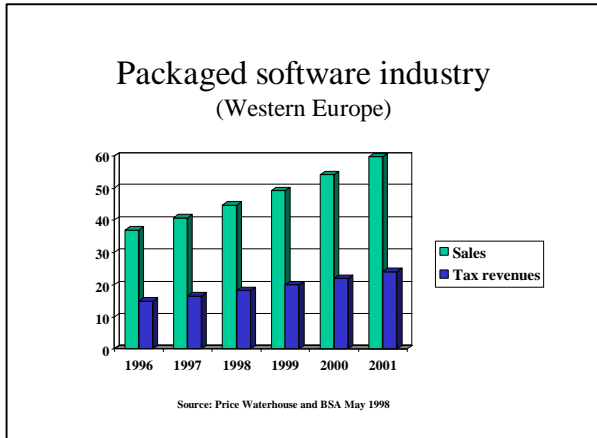
The languages for which a product is localised and the extent to which they are localised depend entirely on revenue projections. For example, software publishers like Microsoft, Lotus or Oracle would localise all versions of all products into German — this being Europe's largest market for IT products — whereas only major updates of core products would be localised for smaller language markets like Greek. Minority language markets such as Catalan, Irish, Icelandic or Finnish would be catered for only if substantial government funding was made available.



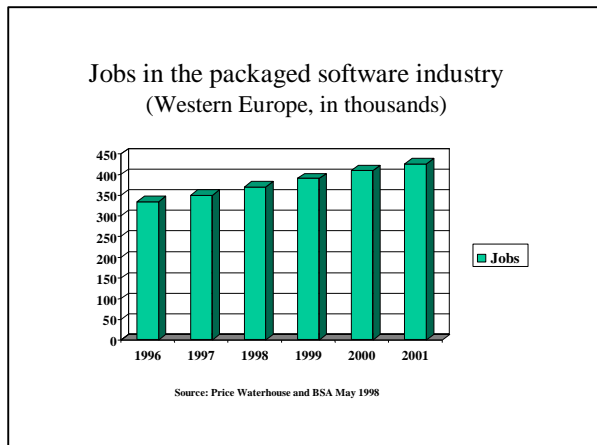
Although companies like Microsoft are spending more than \$300 million annually on localisation of their products into 46 languages, they estimate that only 8 per cent of the material that could be translated is now being translated.

As has been shown, Europe is an important market for the IT industry. But the IT industry is also one of the main revenue providers for the exchequer in many European countries.

³ This figure was quoted in the 1998 industry survey published by Allied Business International without the provision of the underlying business model used to arrive at this figure. It can therefore be used only as a rough indicator.



According to a study by Price Waterhouse commissioned by the Business Software Alliance (May 1998), the packaged software industry makes a significant contribution to the economies of Western Europe not only by creating jobs and generating tax revenues, but also by increasing productivity, capability and competitiveness in nearly all areas of Western European economic activity.



The authors of this report estimate that the packaged software industry generated \$37 billion in sales, 333,181 jobs and \$15 billion in tax revenues throughout Western Europe in 1996. With average market growth projections of 10 per cent a year, this segment of the IT industry alone should produce 426,464 jobs, fiscal revenues of \$21.8 billion and an overall market of \$59.8 billion by 2001.

5.4.2 Localisation market forecasts

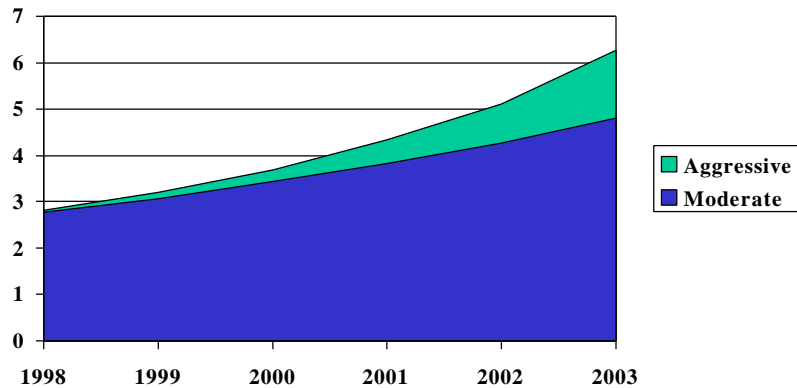
It's estimated to grow at 35 per cent annually between now and the year 2000. At that stage it will be a \$6 billion business. So there is good room for growth.

Wendy Hamilton, VP of Strategic Development (Northern Europe), Bowne Global Solutions (1997)

Several studies have been carried out in an attempt to provide the industry with a reliable forecast for its potential growth. The following are the figures presented by the latest of these reports, published in 1998 by ABI. In its report, ABI uses two approaches, moderate and aggressive, to estimate the market value for the localisation industry up to the year 2003.

The software localisation market

(worldwide, in billions of US\$)



Software localisation (Moderate forecast in \$ billions)	1998	1999	2000	2001	2002	2003
US localisation for Asia	0.85	0.96	1.09	1.25	1.42	1.62
US localisation for Western Europe	1.08	1.17	1.26	1.36	1.47	1.59
US localisation for other	0.29	0.34	0.40	0.47	0.54	0.63
Total localisation, US	2.22	2.47	2.75	3.07	3.43	3.84
Total localisation, rest of the world	0.54	0.61	0.68	0.76	0.85	0.95
Total localisation, world	2.76	3.08	3.43	3.83	4.28	4.80

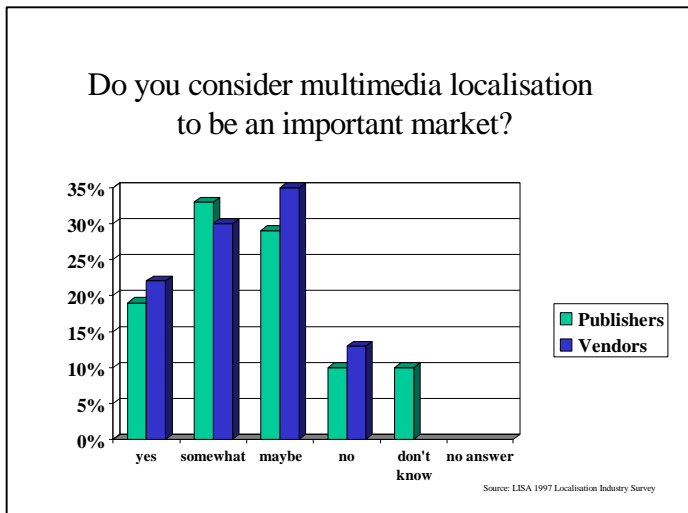
Source: Allied Business Intelligence, 1998

Software localisation (Aggressive forecast in \$ billions)	1998	1999	2000	2001	2002	2003
US localisation for Asia	0.87	1.02	1.20	1.44	1.77	2.24
US localisation for Western Europe	1.09	1.20	1.32	1.46	1.63	1.84
US localisation for other	0.31	0.37	0.45	0.56	0.70	0.92
Total localisation, US	2.27	2.58	2.96	3.46	4.10	5.01
Total localisation, rest of the world	0.55	0.64	0.74	0.87	1.03	1.27
Total Localisation, World	2.82	3.21	3.70	4.33	5.12	6.28

Source: Allied Business Intelligence, 1998

5.4.3 Multimedia and digital content localisation

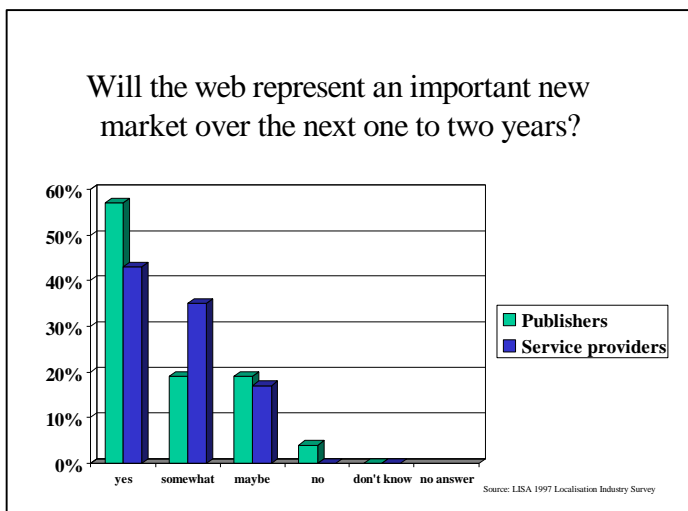
The LISA 1997 Industry Survey, published in 1998, provides some interesting statistics, which indicate that most publishers and a very high percentage of service providers believe that multimedia and web localisation is one of the biggest growth areas within their industry.



Asked whether they considered multimedia an important market, 19 per cent of publishers and 22 per cent of vendors answered "yes", 33 per cent of publishers and 30 per cent of vendors felt that this was true to some extent.

This points to a significant reduction in euphoria amongst service providers in comparison to 1996 — as the authors point out — when 41 per cent responded "yes" and 45 per cent "somewhat" to the same question. In contrast, the publisher replies were almost unchanged.

At the same time, there is a continuing, overwhelming consensus amongst publishers (57%) and



vendors (43%) about the development of the web as an important new market for the industry. (The 5-7 per cent drop in enthusiasm for web localisation in comparison to the previous year can safely be attributed to statistical variances.)

Given that it is now widely accepted that the web delivers multimedia content, these results need to be interpreted. Otherwise, the decreasing enthusiasm for multimedia localisation and the continuing believe in high growth rates in the web market could

not be explained. One likely explanation is that, when considering their answers to the first question, respondents must have referred to what could be called traditional multimedia content delivered on CDs and excluded web-based multimedia content — generally expected to be one of the highest growth areas.

5.4.4 *Voices from the industry*

Individual industry representatives have given the following reasons for their localisation efforts:

Anthony O’Dowd, General Manager, Corel Ireland (1997) :

If I was to look at Corel, say five years ago, we only did four or five languages worldwide . Now we are doing 22 different languages worldwide and it is purely to enhance our sales.

Finbarr Power, CEO, International Translation and Publishing (1997) :

The cost of developing a software product today is so great that where you used to get return on investment just in the US market, now you find that you have to go outside the US market. Since the PC has become a consumer product, localised versions of software are no longer a “nice-to-have”; they are a must.

James Grealis, Director of Localisation, Symantec Ireland (1997):

Localisation is not just the last component of a chain . It’s got to be kind of a loop right back to the design of the original product.

Franz Rau, Director, Tools Development, Microsoft (1998):

Microsoft is one of the biggest software companies worldwide. It could not survive without translated products. Microsoft is in a global market which depends heavily on the speedy availability of products. This can only be achieved with tools and technology.

5.5 *Redefining localisation*

Everyone is localising nowadays — a simple translation is not good enough anymore. Pictograms and textual representations are coming more to the fore. Software companies are the pioneers, but everyone will have to come this way eventually.

Geoffrey Kingscott, Praetorius (1998)

5.5.1 *New kids on the block — a new role for the industry*

The localisation industry has until recently been associated with software. However, over the past five years — after developments in vertical markets, global services and new technologies like the web — synergies have been created between the IT sector and other industry sectors, which are dealing with issues similar to those in the software localisation industry.

Among these are the traditional media publishers and the documentation divisions of the aeronautics and automotive industries. Because of the ever increasing role IT plays in the production cycles of these industries, they are facing, at least in some areas, similar issues when developing their products for the global market place.

These issues include the need to handle, control and translate large amounts of text into several languages in a short time, within a tight budget and according to strict quality guidelines along with the need to adapt — not just translate — their products to the culture and locale of the target market.

The framework for the convergence of these activities is provided by IT; the framework for the convergence of the multilingual aspects of these activities is provided by the localisation industry.

The localisation industry has become the catalyst for electronic multilingual production and publishing.

5.5.2 Industry consolidation

Until the mid-nineties, the localisation industry was highly segmented, mainly driven by the enthusiasm and vision of entrepreneurs. Then, around 1995, consolidation became the most discussed development in the industry. As the industry matures, companies like AlpNet, Berlitz and Stream have consolidated their business: that is, they have identified and acquired strategic partners across the globe to offer their clients global solutions.

In 1994, only two localisation companies had passed the \$30 million threshold. At the end of the 1990s, six localisation companies are now worth more than \$50 million each. And the trend is continuing.

The localisation industry, originally built on the drive, vision and enthusiasm of entrepreneurs, is going global by merging small enterprises into large corporations.

Consolidation is also adding new capacity and innovative drive to the industry by bringing players from many backgrounds together.

One of the world's largest printing companies, Bowne, recently established Bowne Global Solutions by acquiring a number of leading localisation service providers, which now allows it to offer localisation services to software publishers, e-commerce and web-based digital content providers.

Hardware manufacturers like Compaq added significant localisation and multi lingual/multicultural web publishing expertise to their portfolio by acquiring Digital in one of the largest acquisitions in the history of the IT industry. Book publishers like Bertelsmann and Hachette/Grolier are investing heavily in multimedia development, web-based e-commerce and content provision in a multi lingual and multi cultural framework by acquiring supplementary businesses and expanding their existing divisions in this area.

Initially seen as part of the standard IT sector, which localises software applications and IT hardware only, the industry's wealth of knowledge and experience of multi lingual and multicultural challenges has effectively made it the catalyst for the multi lingual and multicultural information society. In addition to software applications, the industry is now applying similar techniques to the localisation of

- multimedia applications ;
- digital, web-based content ;
- e-commerce applications ;
- on-line digital information services .

The boundaries of what more than a decade ago began to emerge as the localisation industry have been re defined — driven by Internet-related technological advances and by economic and political developments leading to the globalisation of the economy. *Fast access to information, entertainment, (distance) education and electronically traded goods is now possible for most*

European citizens without restrictions imposed by location or technology — the only restriction remaining being the language barrier.

This language barrier can be removed by the implementation of a coherent localisation strategy.

While European corporations have a head start in web localisation and strongly believe in its return on investment, European web localisation is often not based on new thinking, but rather on importing off-line strategies to the web.

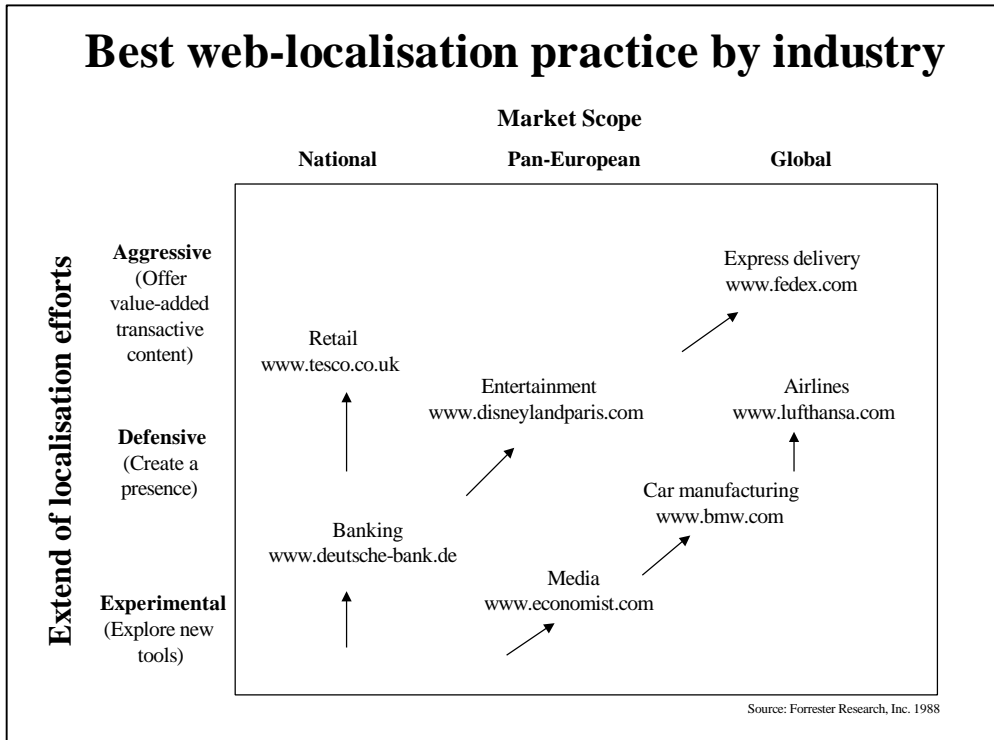
In the era of the web, the lack of a clearly defined web localisation strategy is a barrier to the international growth of European SMEs and start-ups competing with (mainly US based) global players.

To face the challenges presented by the web explosion, Forrester recommend a new localisation strategy, just-in-time localisation (JIT localisation), that should build localisation into the corporate web planning process. Forrester also expect the pressure for fast turnaround in JIT localisation to create a demand for technological tools and services – all but one related to HLT.

	Function	Benefit
<i>Tax/currency calculation</i>	Calculates VAT by country and product category; converts currencies.	Automatically updates tax rates by country and product type or currency conversion rates.
<i>Content management</i>	Builds content catalogue and indexes and tracks edits.	Eases editing and updating of multilingual content.
<i>Multilingual search engine</i>	Searches across multilingual content.	Eases access to local content; strengthens global presence.
<i>Translation memory (TM)</i>	Corporate repository of previously translated words and phrases.	Speeds up human translation by 50% and ensures message consistency.
<i>Machine translation (MT)</i>	Automatically translates Web content, e-mail, and search results.	Gives users a rough understanding of foreign content at a fraction of human translation cost and time.

Source: Forrester Research, Inc. 1998

According to Forrester, companies will not survive unless they move at least into a defensive pan-European web strategy.

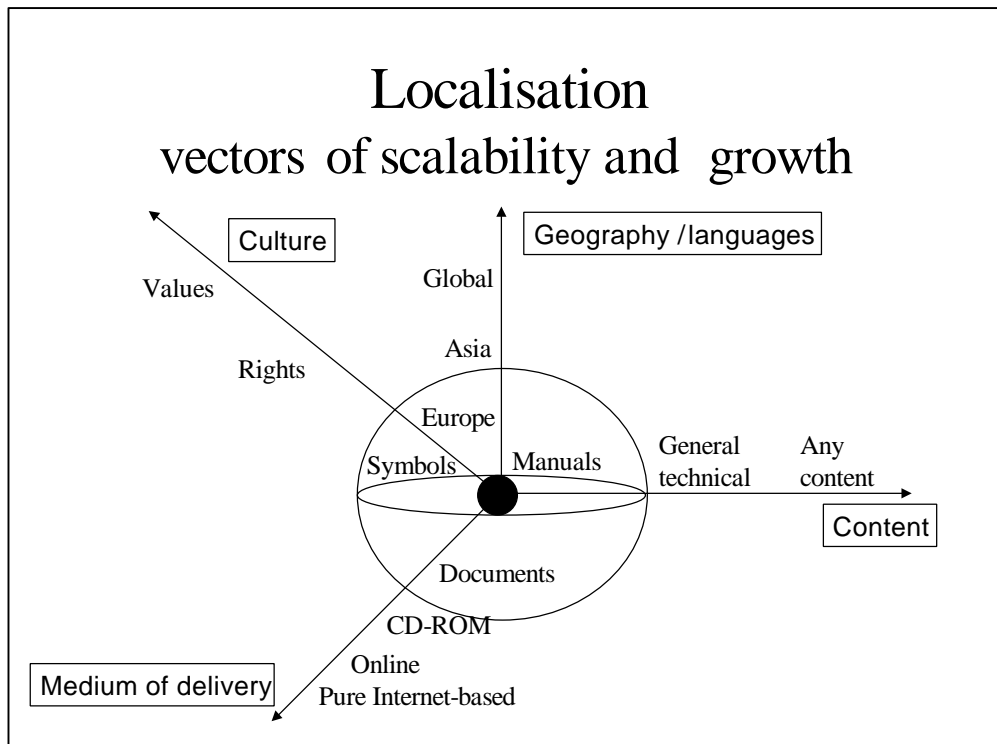


5.5.3 The new face of localisation

On the background of this analysis, Roger Jeanty, CEO and President of International Communications Inc. proposes the re- definition of localisation as

the provision of services and technologies for the management of multilinguality across the global information flow.

He proposed a three-dimensional representation to illustrate the principal vectors of expansion in the localisation industry: geography and languages, the medium of delivery and contents. Following a proposal by Claude Henri Pesquet, Director of Compaq Computers, a fourth dimension covering the cultural aspects of localisation was added.



With the advent of the web, timely and cost effective delivery of high quality digital content to the global market place has become a major growth area for the industry. This activity has also opened the relatively narrow software localisation industry to a wider range of players who are broadening roles in the software localisation industry.

These include

- tools developers (MT, CAT etc.);
- internet companies (content providers, application developers, service providers) ;
- producers of IT-enhanced products (telecommunications, automotive, medical, publishing etc.);
- film and music producers ;
- publishing houses ;
- games developers ;
- government bodies and cultural organisations (e.g. museums, libraries, archives and cultural institutes) ;
- consultants.

Every consumer will require the ability to communicate in the culture and through the process of his choice with anybody else from anywhere.

Claude Henri Pesquet, Compaq

6 A tidal wave of change

European corporations have pioneered web localisation. They now must rationalise their efforts to maximise return and prepare for the web's explosion.

Forrester Report, European New Media Strategies, JIT Web Localisation, July 1998

A Forrester Report on new media strategies (July 1998) says the localisation of each new web site costs an additional 10 per cent to 60 per cent of the original development price. Yet European corporations believe this is a worthwhile investment and expect to turn a quick profit because local content not only generates the most traffic but also cuts down on customer service costs and response time, ultimately leading to greater customer satisfaction and higher profits. Forrester quotes clients from different industry sectors providing the rationale for their localisation efforts, including cultural localisation:

Thanks to web localisation, we've increased our market share by 3 per cent in a declining market. (Food company)

Localisation is the natural trend in Europe. It is a basic tenet of European marketing strategy. (Consumer goods company)

European web sites take into account cultural difference — attitudes to gender, race and sex — that are often forgotten due to the US -centric nature of the web. (Interactive architect)

Current changes and transformations will present new opportunities for the localisation industry. If it responds adequately and in time to the challenge, the industry will become the true catalyst of the inclusive multilingual and global information society.

6.1 The Internet

The Internet is like a 20 foot tidal wave coming, and we are in kayaks. It's been coming across the Pacific for thousands of miles and gaining momentum, and it's going to lift you and drop you. We're just a step away from the point when every computer is connected to every other computer, at least in the US, Japan, and Europe. It affects everybody — the computer industry, telecommunications, the media, chipmakers and the software world.

Andy Grove, Intel

6.1.1 Impact

Indicators of the impact of the Internet on society and its potential for growth are user acceptance and market penetration :

- when the telephone was invented, it took 75 years to penetrate into 75 per cent of US households ;
- when the television was introduced, it took only six years to achieve the same level of market penetration (partially due to the fact that there was no need for a new infrastructure , as was the case with the telephone);
- as in the case of television, the infrastructure for the development of the Internet is basically in place (although it obviously will need to be upgraded as the number of users increase s). While the Internet has not yet achieved the same market penetration as the television, it has

grown at an approximate compounded rate of 80 per cent since 1990 and, according to forecasts by market observers, it is expected to grow even faster as we enter the next millennium.

6.1.2 Internet and business: intranet and extranet

Following the explosion of the web since 1995, many corporations established a presence on the Internet. In 1996, companies started to build intranets using the same technology inside their firewalls. Extranets connected corporate networks with their suppliers and partners.

The information flow between different departments during product design, production, distribution and service provision became almost instantaneous.

Customers also gained access to more information and better choice in the global market place. What Forrester called a “New Customer Connection” was established — the customer got access to a whole new range of services that are personalised, fast and reliable. The global customer was enabled to surf the web comparing information, searching for products and pricing structures globally.

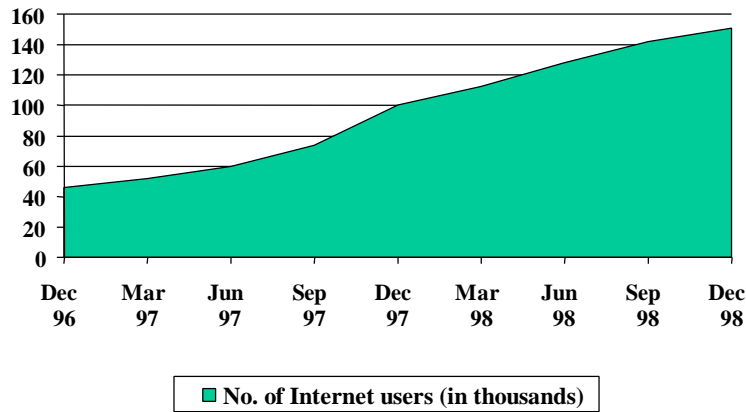
One of the most famous examples of this development is the case of Federal Express. In November 1994, it established a web site that allowed its customers to use the company’s package-tracking database: 12,000 customers took up this offer. This development not only saved the company some \$2 million a year previously spent on a telephone operator enquiry system, but it also prompted the company to implement an intranet system based on the same principle.

6.1.3 How many are on the Internet?

Estimating the number of users — attempted by many surveys using different measurements and parameters — is extremely difficult. It is generally accepted that the Nua Internet Surveys (www.nua.ie/surveys) provide reasonably accurate data.

According to these surveys, the number of users of the Internet worldwide has risen from 46 million people at the end of 1996 to 100 million at the end of 1997. Nua estimated that there would be at least 150 million users worldwide by the end of 1998, a figure that could rise to 200 million depending on a number of factors (e.g. whether the cheap PC/NC is taken up quickly, particularly outside the US).

How many are online?



Source: Nua

The vast majority of users are still in North America: 87 million , or 59 per cent , out of 147 million worldwide as of September 1998. Europe's 33.25 million Internet users represent 22.6 per cent of the world wide Internet population.

September 1998

World total	147,000,000
Africa	800,000
Asia/Pacific	22,000,000
Europe	33,250,000
Middle East	750,000
Canada and USA	87,000,000
South America	3,200,000

Source: Nua

6.1.4 Online in Europe

The following table provides more detail on the estimated number of people online in Europe (by country):

COUNTRY	DATE	NUMBER (in thousands)	% OF TOTAL POPULATION
Austria	August 1998	442.00	5.50
Belgium	August 1998	558.00	5.50
Czech Republic	September 1997	200.00	1.90
Denmark	May 1998	800.00	16.00
Estonia	July 1997	8.20	1.80
Finland	May 1998	1790.00	35.00
France	December 1997	3800.00	6.50
Germany	March 1998	6100.00	7.30
Great Britain	December 1997	7200.00	12.80
Greece	January 1998	111.00	1.00
Hungary	May 1998	200.00	2.00
Iceland	February 1998	121.00	45.00
Ireland	June 1998	180.00	5.10
Italy	January 1998	1380.00	2.20
Netherlands	April 1998	1390.00	8.30
Norway	November 1997	1400.00	32.50
Poland	November 1997	700.00	1.81
Portugal	January 1998	188.00	1.90
Russia	July 1998	1000.00	0.67
Slovakia	November 1997	190.00	5.00
Spain	June 1998	1850.00	4.70
Sweden	May 1998	2400.00	27.00
Switzerland	June 1998	870.00	9.40
Turkey	May 1997	600.00	1.00

Source: Nua

6.1.5 How much information can be accessed?

The amount of information on the Internet is also growing: 100 million documents were available on the Internet in 1997, a figure that could rise to 800 million by the year 2000, according to forecasts by different observers.

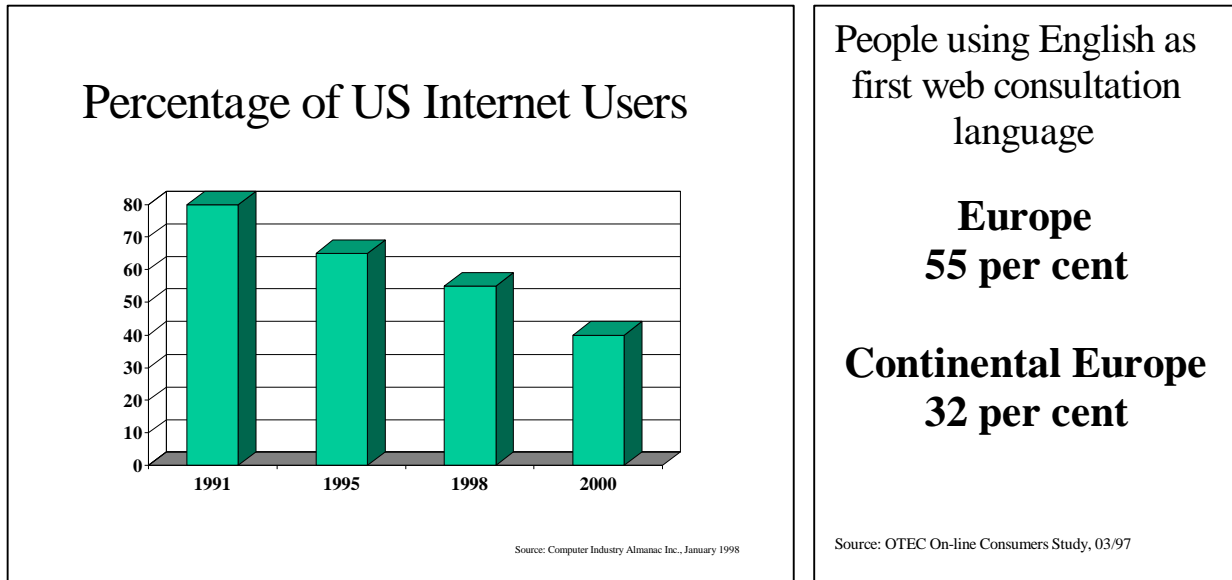
The number of online newspapers grew from 20 in 1993 to 100 at the end of 1994, to more than 800 at the start of 1996 and to more than 1,500 at the start of 1997.

While most of the information is still presented in English, the number of non-English sites inside and outside the US is growing.

6.1.6 Growth in multilingual web content

The figures provided earlier in this chapter relating to the number of people online can be interpreted as providing a strong economic rationale for multilinguality on the web:

- web users outside the US now outnumber US users;
- only a low percentage of web users in Europe speak English as their first language.



A striking analogy may be drawn between the current developments on the web and the early days of the IT industry.

As discussed earlier, IT companies with an initial focus on the US market made considerable investments in multilinguality when the potential and volume of export sales rose while the domestic market was slowing down. As a consequence, they created a whole new industry, the localisation industry, and have been so successful that many of them now derive more than 50 per cent of their revenue from the international market.

Current trends suggest to market leaders — many of whom were instrumental in the development of the original localisation industry — that the time and the conditions are now right for a similar investment in multilingual web content.

Lotus

Lotus' response to the development of the multilingual web is to provide a comprehensive range of tools to enable the localisation of web sites with active contents (i.e. forms, views, pages, image maps, etc.) and business content (i.e. the facilitation of the management of documents to be translated and the integration of MT). The company's strategy in this context is, and especially in relation to e-commerce, to lower the average percentage (48%) of orders currently turned away — many of them because of linguistic barriers. (Kevin Cavanaugh, VP, at the annual SLIG conference, 1998, in Dublin.)

Microsoft

Microsoft is now translating its web site, Microsoft.com, into 38 languages aiming at a turnaround time of between three to eight days. (Vincent Hyland, Manager responsible for the localisation of Microsoft.com, at the seminar "e-commerce and HLT", organised by Adapt Localisation Consultants Ltd., 18.12.99, Dublin.)

Netscape

Among our strategies to develop e-commerce further is the need to be culturally sensitive and to provide translation of web sites 'on-the-fly' with the help of HLT. (Jack Byrne, manager of Server Products Netscape Communications Ireland, at the seminar "e-commerce and HLT", organised by Adapt Localisation Consultants Ltd., 18.12.99, Dublin.)

International Communications

By the year 2000, the Internet will have an even larger impact affecting what we translate and what languages are needed. While only the larger and more forward-thinking companies are translating web sites now, by 2000 it will be much more common to have a multilingual web site. (Ellen Lutvak, International Communications, in: Multilingual Communications & Technology, Vol. 9, Issue 2)

Bowne Global Solutions

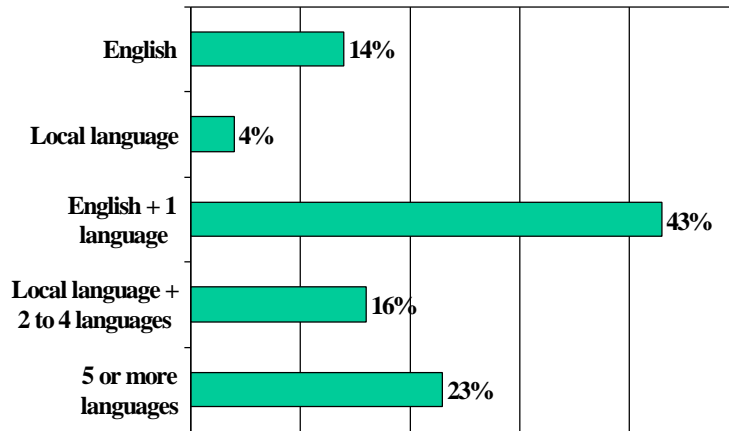
Bowne Global Solutions invested in Internet development and globalisation making a conscious effort to reinforce its core connections and to empower information, making it possible to deliver business information anywhere, anytime and in any language. (Donald J. Plumley, LISA meeting Madrid, 26 .- 28.08.98)

Lernout & Hauspie

In relation to the Web and MT, the challenge is becoming an opportunity. Context analysers can be used to index documents automatically. When information is found, a system driven by natural language technologies can summarise it and, eventually, will be able to personalise and filter it. Soon, summarisers will make searching much easier. Searches will also be multilingual – all the documents on a particular topic will be found and users will be able to get summaries back in English or whatever language they wish. (Jo Lernout, L&H, LISA meeting Madrid, 26 .- 28.08.98)

In a recent survey of major web sites Forrester found that already 82 per cent of the web sites offered content in a number of languages. The firm expects human web content translation to grow at 50% a year. It predicts that large European firms will have to be prepared to manage sites larger than 20,000 pages and in 12 different languages by the turn of the century.

The multilingual Web



Source: Forrester Research, Inc. 1998

6.2 The new media

The business of computing (hardware, software and services), communications (telephony, cable and satellite), and content (publishing, entertainment, advertising) are ... collapsing to create a new industry sector. This new media industry is the engine of the new economy and will be critical to leading a successful transition. The rise of this new sector and the transformation of corresponding markets is forcing every company to rethink its very existence ...

Don Tapscott, author and chair of Alliance for Converging Technologies

Traditionally, text publishing covered a variety of steps: those of writing, editing, graphic design, production and distribution. In a similar fashion, the production of film (video) and audio material involved a number of distinct production phases, from scripting through to distribution and publishing on television, on radio or in the cinema. To be a publisher meant to be in control of all of these processes. This in turn required significant amounts of funds and investment to pay staff and to cover capital expenses.

The technology and tools for the development of multimedia and interactive web sites have been available for some time and include development environments like Shockwave from Macromedia and Java from Sun Microsystems. Perhaps the most visible examples of Java software today are on the Internet. They're nimble, interactive programs called applets.

The challenge is to attract the audience to this new publication, which is where brand names will provide the competitive advantage. This is why established media companies such as CNN and CBS have gone live on the Internet.

One example of new media publishing is the popular music web site Addicted to Noise (<http://www.addictedtonoise.com>). This online magazine is updated 24 hours a day — updates that immediately reach the customer. It incorporates video and audio clips and live interviews. The video clip from the band interviewed by the magazine is just a mouse click away. So is the connection to a 24-hour popular music radio station. And to buy a CD, a video or any product advertised on this site, you just fill in the online order form.

New media publishing on the Internet combines computing, entertainment, broadcasting, music and video production. It is the convergence of industries that will be radically transformed in the coming millennium.

6.3 Implications for the localisation industry and HLT

The scenarios and the data presented in the previous chapters show that Europe is the main Internet driver outside the US. Given the diversity of languages and cultures in Europe, *web-based multimedia and contents localisation* has now become one of the major growth areas for the localisation and language industries and presents the major opportunity for the development of HLT in Europe.

Radically new methods of marketing and distribution facilitated by new development environments like Java and widely available communications networks like the Internet will challenge the way the industry currently works. HLT applications can assist the industry to respond to this challenge.

6.3.1 Localisation — a new approach

Current workflows and product cycles will soon be outdated and replaced by new paradigms. Standard localisation methods and tools are already being revised and adapted to enable the industry to cope with shorter (or instant online) update and release cycles and an ever-increasing demand for software specially adapted to linguistically and culturally different markets.

- Standard translation technology products now used by localisation companies, such as TM and MT, cannot cope with the requirements for the translation or adaptation of video, sophisticated graphics and voice. New methods and technologies have to be developed to make it easier for European developers to access markets outside their cultural and linguistic “catchment” area.
- Timely and adequate localisation of web content is becoming one of the major challenges for the localisation industry. New technologies are being developed and offered to developers and users to allow more efficient translation of web content — in some cases online. New technical and business models are being negotiated between publishers and service providers to eliminate delays caused by current methods.

Cultural localisation has become more important, especially in the context of e-commerce and the web in general. Symbols, for instance, can make a crucial difference to the acceptability of online communications.

Use of colour

For example, red is an alarming colour in many Western countries, white can indicate a pure or basic state, and black is sombre. This is different in Asian countries like China where red expresses joy, white indicates mourning and black is “the lucky colour”. Green is associated with lush growth and ecology in Western countries, while it is the holy colour of the prophet in the Islamic world, and should not be used in Arabic countries.

Sensitive pictures and images

For example, the national flag of a country is widely used to identify products aimed at specific markets and is, therefore, often printed on packaged software products. The Saudi Arabian flag contains holy symbols associated with the Koran, which Muslims are forbidden to destroy or bin. In one case, a large software buyer ended up with a large room full of empty boxes with the Saudi flag printed on the cover, which he could not dispose of for religious reasons.

Hand signals

Hand signals probably represent the most dangerous area of non-verbal communication. For example, a hand held up with the forefinger stretched out and the palm towards the viewer could be used to indicate “Danger!” or “Stop” in many countries — but in Greece it could cause serious offence. The “thumbs-up” sign, and “ok” sign (index finger and thumb forming a circle) used in many Western countries are regarded as sexual gestures in others.

Symbols

Icons not directly related to system components (disk, printer, monitor etc.) or application-determined elements (drawing, writing, opening files etc.) usually do not cause problems. However, symbols and icons that do not form part of the culture of the target country can cause serious problems for users in that

country. For example, the US-style mail box with the red flag that indicates the arrival of new mail is not generally known outside the US.

Sounds

Different cultures use sounds in different ways. For example, while a gong sound alerting a user that he made a mistake is perfectly acceptable in Western cultures, it should not be used in applications aimed at the Japanese market, where it would be seen as embarrassing the user in front of colleagues.

History

Historical items frequently dealt with in multimedia encyclopaedias can be especially contentious. For example, which European was first to land on the American continent: was it St. Brendan, was it the Vikings, was it Columbus or was it a representative of the Mormons?

Product names and acronyms

General Motors once launched a car in Spain that they called Nova. “No va” in Spanish means “it does not go”. The model had to be relaunched in Western Europe as the Corsa. Acronyms cannot be carried over into different languages and markets, even if they refer to international organisations. ‘NATO’ is ‘NATO’ in German, but OTAN in Spanish, for instance.

Other cultural differences can be identified at a deeper level in attitude and approach.

Geert Hofstede⁴ has carried out detailed studies of a group of IBM managers around the world. He identified four basic cultural dimensions whose implications in the context of localisation, and especially the localisation of multimedia and digital content, have not yet been investigated:

Individualism versus collectivism — the identity of persons as part of a social system in a collectivist society outweighs their value as individuals.

Small versus large power distance — cultures dominated by large power distance systems are more authoritarian.

Masculine versus feminine — cultures that Hofstede sees as “dominated” by males or “nurtured” by females.

Weak versus strong uncertainty avoidance — a measure of risk tolerance versus risk aversion.

Never before were people able to access multimedia material instantly anywhere in the world. Never before were publishers in a position to reach out to such a vast (potential) audience as represented by the users of the web. Detailed studies on the implications of cultural dominance, change and development are required to deal adequately with the impact of the new media on the European consumer.

Relevant training of translators is becoming ever more important to make them technically and culturally aware.

6.3.2 Human Language Technologies (HLT)

The localisation industry will not be in a position to cope with the amount and the complexity of the material that will come on stream over the next three to five years without the availability of user-friendly, efficient HLT designed for multimedia and web content localisation. Market

⁴ Geert Hofstede, *Cultures and Organisations*, McGraw-Hill, 1991.

leaders recognise that HLT must be an essential component in their response to the new challenges.

Major developers like Microsoft, Oracle, Lotus/IBM, Corel and SAP are already “power users” of translation technology applications. Most of these companies have also established their own HLT research and development groups.

Microsoft has a substantial natural language processing (NLP) research group at its headquarters in Redmond, Washington, and has recently bought a 20 per cent share in the German tools developer, TRADOS. In addition, the company has significant interest in other language technology companies, most notably Lernout & Hauspie.

Oracle has a dedicated tools group not only at its headquarters in the US but also at its European headquarters in Dublin.

Lotus/IBM was one of the first software publishers involved in localisation and has established one of the largest R&D groups in the industry at its European Product Development Centre.

The German software publisher SAP is one of the largest MT users in the industry and also highly active in translation technology research projects.

Small start-up companies are quickly filling the niche for specialised tools developers, launching localisation and internationalisation tools like HelpQA, HtmlQA, ToolProof or OneRealm that dramatically reduce time and resources needed to localise software products.

7 Beyond 2000

Leading software developers and providers of web content are now adapting their globalisation and localisation strategies to respond to the challenges of the new world of electronic publishing.

Software publishers like Microsoft and Oracle are entering strategic alliances with leading content providers like NBC (in the case of Microsoft) and CNN (in the case of Oracle) and cable network providers. Traditional industries, driven by technology and advances in the globalisation of the economy, are converging with the new media industry.

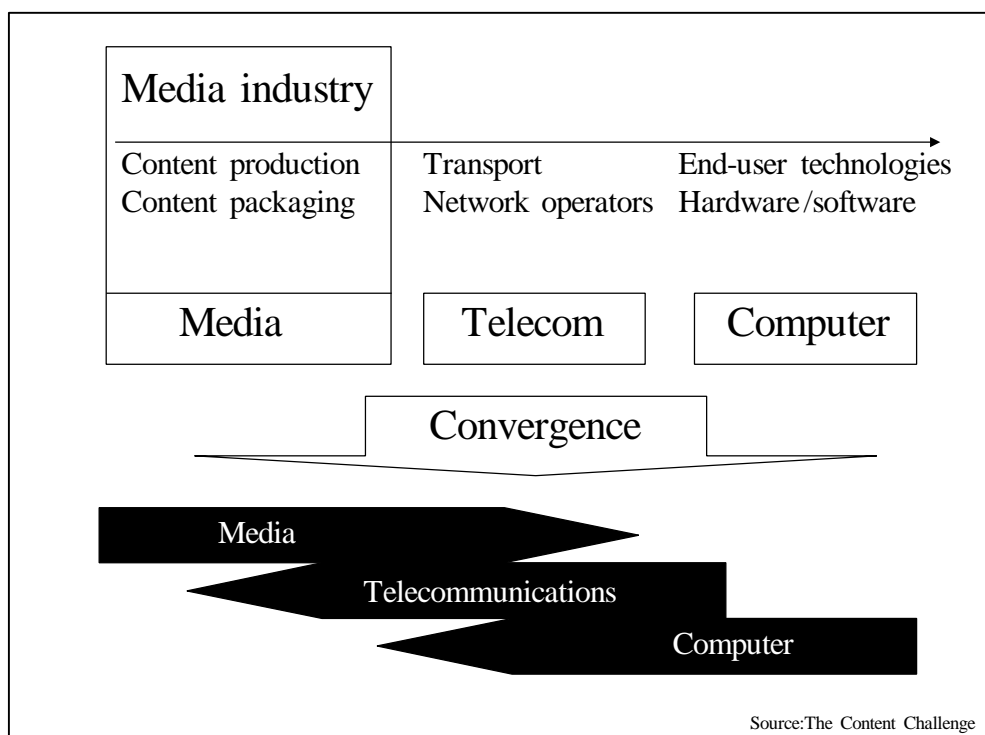
7.1 Converging industries

As a result, former software developers in alliance with traditional publishers become new media publishers and now market a wide range of applications, including authoring packages, graphics packages, editing suites and proprietary packages.

They also publish content in a number of areas, e.g.:

- **Titles**
Edutainment, Infotainment, games, news, music
- **Education and training**
Computer-based training, web-based training
- **Communications**
Corporate business (sales, marketing)
Technical support

As stated earlier in this study, new media publishing on the Internet combines computing, entertainment, broadcasting, publishing, music and video production. This convergence of formerly distinct industries has also been observed by the authors of a study on “The Content Challenge”, published by the European Commission’s DGXIII/E in October 1997. While this report referred to the content industry, its findings can be applied equally to what we have described as the new media industry and the developments observed in the localisation industry.

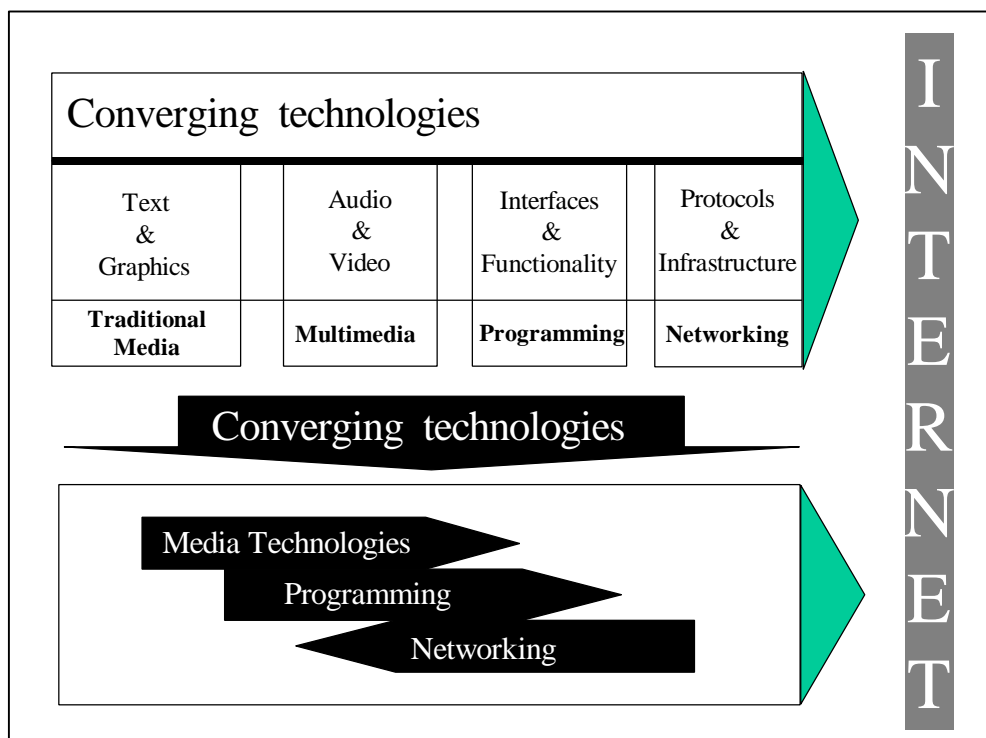


7.2 Converging technologies

In parallel to the convergence of formerly distinct industries, the technologies used to make the products originally associated with these industries are also converging.

- Traditional equipment, used to design and print brochures, newspapers and books, is rapidly being replaced by electronic DTP programs and digital printers.
- Traditional recording, broadcasting and receiving equipment is being replaced by digital equipment.
- Computer programs originally intended to calculate complicated algorithms and solve mathematical problems are now used to produce and publish pictures, audio and video.

With new technologies and formats, such as HTML and XML, extensively used on the Internet, the distinction between text and functionality is becoming increasingly blurred. For example, text usually conveys a meaning — in HTML or XML it can also be associated with program functionality by triggering some action.



7.3 Electronic publishers

As software developers become electronic new media publishers on the web, the localisation service industry is also adapting to the new framework. Conventional localisation methods, time scales, technologies and customer/client relationships, established to cope mainly with text and graphics based software localisation projects, are generally no longer appropriate.

Standard localisation methods are changing radically. The physical location of the localisation team is no longer a key factor. Where translators, testers, DTP specialists and project managers are actually located is becoming less and less important. For example, one of the largest localisation service providers, LionBRIDGE Technologies Inc., has just opened a new Test

Centre in Ballina, Co. Mayo, a small town in the West of Ireland, creating over 100 new jobs. With its new test centre LioNBRIDGE is introducing highly innovative methods of software testing. In its Ballina facility, the company will offer more than standard localisation testing. It will also offer browser testing, cosmetic testing, test script authoring and validation, internationalisation testing, functional testing, computer based training, system testing and test automation.

The time scales associated with the localisation of software and content are also changing dramatically. Content on the web is available the moment it is released by its publisher. There is no typesetting, no film -making, no printing, no distribution. Consequently, the time available to localisers to bring a product to market is minimal. Localised products have to become available almost at the same time as the original product. This is possible only if the localisation service providers are fully integrated into the publishing process. This, in turn, requires the development of long-term business relationships between publishers and service providers and direct, live communication lines between both. This model has already been implemented, to a certain degree, in the case of SAP AG and International Communications Europe.

8 The new media industry — case studies

The following section covers case studies describing the emergence of the new media industry following the convergence of traditional industry sectors, among them traditional publishing, software development, technology driven R&D, and hardware manufacturing.

The examples will underscore the points made in the first part of the study by showing what they mean in the real world. For this purpose, advanced, successful and trend-setting businesses have been targeted.

The main argument of this study is that the localisation industry enables the inclusive multilingual information society which is coming in on a tidal wave of change.

It will be illustrated in the following chapter by individual case studies, each representing one of the following industry sectors:

- Technology solution provider
- Hardware manufacturer
- Publisher
- Software developer

8.1 *Lernout & Hauspie*

The first company profiled is an example of an industry sector that originally focused exclusively on the provision of technological solutions for other industries, which, in turn integrated these technologies into their products targeted at the corporate and consumer markets. Through acquisitions, mergers and strategic partnerships, the company is now entering the consumer market offering products and services catering for the new media industry.

8.1.1 *Company background*

Founded in 1987, Lernout and Hauspie Speech Products (L&H) has become a technology leader in the field of advanced speech technologies and translation services. The company's world headquarters are located in Flanders (Belgium). The North American headquarters are located in Burlington (Boston), Massachusetts. L&H has around 500 employees world wide and access to a network of an additional 1,000 freelance professionals, the majority of them linguists, scientists and engineers. Together they make up one of the largest commercial speech and linguistics groups in the world.

L&H is divided into four divisions:

Core speech technologies — The core speech technologies division licenses leading-edge speech and voice products covering a variety of languages. Its customers develop products that recognise natural human speech, create speech from documents, respond to voice commands, and efficiently compress, store and replay speech and music.

Dictation software — This division is dedicated to building dictation engines for continuous speech applications. Already well established in vertical markets like pathology, emergency medicine and other medical specialities where this technology is used for filling out patient reports and medical records, L&H is now concentrating its efforts on bringing dictation software to the consumer market.

Multilingual Document Solutions Division (formerly translation division) — This division offers services and products for text-to-text and multimedia translation and localisation by human translators, machines and a combination of both. Its multinational operation, L&H/Mendez Translations, is one of the world's leading providers of translation services with offices in 12 countries, covering more than 20 languages and employing more than 1,000 language professionals.

Language technologies and Internet ventures — This division is the company's answer to the continued growth of the Internet and the web. Recognising that *around 80 per cent of the content found on the Internet is presented in English*⁵, while only around one third of its users are native English speakers, L&H has developed an automatic document translation service that can be accessed directly from within web browsers.

8.1.2 *Convergence indicators: acquisitions, investment, and licensing*

In less than three years, L&H has revolutionised the European language technology scene. With truly breathtaking speed — backed by an inspiring vision that was effectively translated into

⁵ From 3,239 home pages containing more than 500 characters, the most frequently found language on the Web is English (84.0%), according to the Internet Society's (ISOC) Web Language Hit Parade.

impressive and decisive actions — it successfully catapulted itself from a technology driven niche market of early adopters into the extremely competitive arena of professional and corporate users. It now seems to be preparing itself for the next stage, in which it will aim at the mass end-user market.

Following are some of the highlights of this development:

10 September 1996

Lernout & Hauspie acquires Mendez Translation

L&H announces the acquisition of Mendez, a privately owned company with headquarters in Belgium and subsidiaries in France, Germany, Spain and Italy, for \$16.9 million.

Combining Mendez' large translation databases with L&H' s natural language processing will assist us in developing full automatic translation applications such as multilingual Internet search engines, software for automatic translations for Internet documents and human translation services via email.

Jo Lernout, founder and president of L&H

27 May 1997

Lernout & Hauspie acquires GMS

L&H announces that it has acquired all the stock of Gesellschaft für Multilinguale Systeme (GMS), the Munich based MT service provider founded in 1993 with 11 employees, for approximately \$14.7 million. According to L&H, this will combine GMS's expertise in MT with its own multi lingual speech technology to accelerate its efforts to bring multilingual Internet translation services to market.

L&H and GMS are in a unique position to deliver quality machine translation over the Internet. With GMS, L&H acquired a group of 55 highly experienced machine translation engineers and linguists, as well as multilingual natural language processing technology. These skills, combined with Mendez' human translation expertise, will enable L&H to quickly build new machine translation databases that improve substantially the quality and efficiency of machine translation as a whole.

Gaston Bastiaens, President and CEO of L&H

This merger provides GMS with an excellent opportunity to further L&H's efforts dedicated to the Internet. We will be able to provide L&H with the necessary tools to quickly develop additional language pairs and market a product for Internet translation.

Peer van Driesten, president and CEO of GMS

11 September 1997

Microsoft and Lernout & Hauspie announce strategic alliance in support of voice-enabled computing

Microsoft announces that it will invest \$45 million in Lernout & Hauspie common stock (representing approximately 6 per cent of the company's outstanding stock at the time) taking a minority stake in L&H. As part of the strategic alliance, L&H and Microsoft also entered into a Patent License Agreement through which the companies grant each other certain patent licences. In addition, Microsoft was granted the right to nominate one of the directors of L&H.

For the past several years, Microsoft has made great progress toward a vision of the personal computer that can interact with users via spoken language. Through this alliance with Lernout & Hauspie, we are taking a big step forward in transforming that vision into a reality.

Nathan Myhrvold, Chief Technology Officer, Microsoft.

The two companies have also announced their intention of forming a joint venture in Europe to collect and analyse speech and linguistic data. According to their vision, such data is a necessary component in building future speech products for a variety of different languages.

20 July 1998

Lernout & Hauspie signs agreement to acquire Globalink; also acquires AILogic and NeocorTech to add Asian Languages

The all-stock deal is worth \$5.60 per share of Globalink's outstanding common stock with approximately 12.7 million shares outstanding. This deal was confirmed on 29 September 1998. The acquisition adds a range of translation products and services to L&H's Language Technology Division, particularly the L&H iTranslator search, summarisation and translation service for the Internet.

The Internet has become a fundamental tool in today's global economy, spurring the need for translation of its primarily English-language content into multiple languages. Machine translation tools are the most logical, efficient and effective means to begin Internet translations.

Gaston Bastiaens, President and CEO of Lernout & Hauspie

5 August 1998

Lernout & Hauspie announces that it has signed a definite agreement to acquire the Heitmann Group, a multilingual publisher in Germany, for approximately \$35 million.

The company says this acquisition will transform the L&H Translation Division into the Multilingual Document Solutions Division and bring aerospace, government and automotive customers into the fold. It will also diversify L&H's business by adding technical writing and web publishing expertise. L&H plans to use Heitmann's Internet and intranet design and development expertise to continue development of its multilingual web site service.

The persuasiveness of the web as a communications medium, coupled with an increasingly global economy, requires organisations to translate into a variety of languages information found in diverse media. The acquisition of Heitmann solely positions L&H with a complete solution.

Florita Mendez, President of L&H Multi-lingual Document Solutions Division

8.1.3 HLT — innovation drives success

This section will highlight some of the company's HLT related success stories:

- email retrieval by telephone, based on the company's speech recognition technology;
- Internet content translation services, based on iTranslator;
- machine translation for Europe's law enforcement agency, Europol.

Email is just a phone call away

On 19 January 1998, the US company Mail Call announced the official launch of email retrieval by telephone, an example of highly advanced speech technology finally reaching the consumer market. With a toll-free call from any touch-tone telephone worldwide, email users can have their email messages read to them in English or Spanish. Mail Call licensed L&H's text-to-speech technology to develop and offer this service. They chose L&H because of the multiplatform and multi lingual support of its technology.

After spending all day in front of a computer, one of the last things I want to do when I get home late at night is take the time to download my personal emails. Mail Call has solved that problem for me. Now, when I have a few minutes free, I just call Mail Call's toll free number and check my email. It's so simple! It lets me know whether I have any emails which demand my immediate attention and I can then respond accordingly.

Michael Singh, Acquisitions Director of Westmark Realty Advisors

Users can personalise their accounts by selecting between several reader voices. They can also supply a list of names of individuals and companies to prioritise their messages.

Multilingual Internet search summarisation and online document translation

On 28 January 1998, L&H announced a new service and a range of new products initially aimed at large businesses, academic institutions and researchers, and regular Internet users whose first language is not English. Some months later, on 6 October 1998, L&H announced pricing details and availability of these new products and services, now called iTranslator and aimed at corporate, government and professional markets.

In addition to automatic translation services (combined, if required, with online human translation services), the service can be used to summarise web documents found during a search into key sentences and translate this summary into the language used for the search. Documents that interest the user can then be submitted for full MT and, if required, for human post-editing.

Instant translation for Europol

On 4 August 1998, L&H announced that its MT system T1 Translator is being tested by Europe's law enforcement agency Europol with headquarters in The Hague. This trial is part of the multi million ECU European Language Engineering project called SENSUS, involving Europol and national police forces all over Europe. The project started on 1 June 1998 and focuses on providing technology for multilingual communication and multilingual analysis.

The T1 system is being tested by the Spanish Liaison Office of Europol. Information on drug trafficking in Spain is fed through T1, which translates the text into English. The Spanish office can then distribute the information to the Europol Drugs Unit network across Europe — all within a matter of seconds.

In addition to MT, L&H plans to integrate indexing, multi lingual search and information extraction technology to achieve fast and efficient multi-country information exchange.

L&H's TI has considerably enhanced the service Europol can offer its member states. In the fight against drugs, speed is often the key to a successful operation. We can now translate between English and Spanish and vice versa in seconds. This is a considerable benefit.

Klaus Schmidt, Senior IT Project Coordinator, Europol

8.1.4 Assessment: the future is the multilingual web

L&H has gone a long way since it started as a speech technology solutions provider. Through acquisitions, mergers, strategic alliances and licensing, it now offers a wide range of language, speech technology and Internet related products and services that make it one of the largest groups of its kind in the world .

The company plans to grow by responding to increasing market demands for non-English products and information via the Internet and other market channels, employing sophisticated HLT based localisation tools. In the words of Florita Mendez, President of L&H Multilingual Document Solutions Division: "The persuasiveness of the web as a communications medium, coupled with an increasingly global economy, requires organisations to translate into a variety of languages found in diverse media. "

8.2 Compaq

The company is best known as a manufacturer of computer hardware. Our study of some of the developments initiated by Compaq over the past few years is an example of a large computer manufacturer launching its business into the emerging new media markets. The common denominator for these markets is the Internet, for which Compaq now offers a complete solution, from hardware to software and consulting services — including HLT supported multilingual digital content design and localisation.

8.2.1 Company background

Compaq Computer Corporation, originally founded in 1982 as a PC manufacturer, is now a Fortune Global 100 company. With worldwide sales of \$24.6 billion in 1997, it is the second largest computer company and the largest supplier of personal computers, and sees itself as a global information technology company. Compaq products are sold in more than 100 countries through a network of authorised Compaq partners.

Compaq develops and markets hardware, software, solutions and services.

Compaq's manufacturing operations, covering mainly its core manufacturing business, are organised in three global product groups:

Enterprise Computing Group — servers, workstations, fault-tolerant business-critical solutions, enterprise options/solutions, Internet products and networking products.

PC Products Group — commercial desktops, portable options and small/medium business solutions.

Consumer Products Group — desktops, minitowers, portables and options.

Compaq's strategic investments over the past years are central to our study and underline its main findings.

- **Digital** is a leading supplier of high-performance web-based computing solutions that help enterprises compete in the global marketplace. Compaq acquired Digital in June 1997 for \$8.4 billion, reported to be the largest acquisition in the history of the computer industry. Digital's main business had already developed from manufacturing to development and services, providing IT support through call centres for some of the world's largest IT suppliers, web design and localisation, multilingual document management solutions etc. The acquisition was therefore a significant move by Compaq to diversify outside its core manufacturing business.
- **Tandem** is a company acquired by Compaq in 1997. It designs and delivers technology solutions relied on by enterprises running 24 hours a day. Tandem has been extremely successful in its core market. An amazing 90 per cent of the world's stock trades, 80 per cent of all cash machine transactions, and 66 per cent of all credit card transactions pass through a Tandem computer every day. With this acquisition Compaq positioned itself firmly in the growing e-commerce market.

Compaq's strategic aim is to lead the electronic business revolution by connecting people with the technology and information needed in the dynamic new online marketplace.

It is important to note that the company has identified both technology and information as the two components of the new online marketplace, decisively moving from traditional hardware manufacturing to multilingual content and multimedia provision.

8.2.2 Converging industries: strategic alliances and innovative technology

During 1998, Compaq continued to make strategic investments and introduced innovative technology solutions for the new media industry. The following examples give substance to the strategic statements made by Compaq's board that it will lead the electronic business revolution in the areas of technology and information.

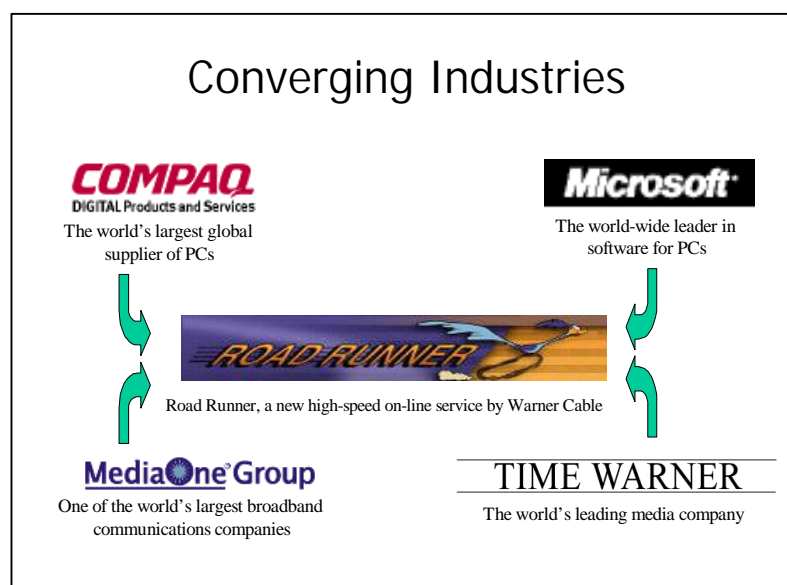
In April, Compaq showcased high-performance, standards-based, hybrid computing solutions to support the creation, distribution and consumption of digital content together with its digital media allies, including Adobe, Microsoft, Pinnacle Systems and Softimage.

In June, the company announced a multi-year agreement with America Online (AOL), the world leader in branded interactive services and content. AOL operates two worldwide Internet online services: AOL Interactive Services with more than 12 million members and CompuServe with approximately two million members.

Also in June, Compaq and Microsoft joined Time Warner Cable and Media One in a high-speed online venture marketed under the Roadrunner brand, with more than 90,000 customers and access to 27 million cable homes, the largest of its kind in the US. This development is part of an effort by these companies to accelerate the delivery of broadband services over cable modems to consumers and small businesses.

Microsoft is committed to helping enable high-speed data access and interactive content through the cable infrastructure. This venture brings the right combination of technology and Internet access to make high-speed Internet connectivity a reality for consumers.
Bill Gates, Chairman and CEO of Microsoft

This new venture enables us to take advantage of the converging technologies of the Internet, computers, and broadband services to deliver vastly improved data access and services to consumers.
Eckhard Pfeiffer, President and CEO, Compaq



The availability of cable access to the Internet will undoubtedly be one of the most significant developments for the Internet. The joint venture between two giants from the computing sector, Compaq and Microsoft, and two world leaders in the media and broadband communications industry is the beginning of what will soon affect the lives of millions of people across the globe.

Compaq also continued to develop user-friendly Internet access software and services mainly through the development of Digital's expertise and services. In October, AltaVista, an online search engine owned by Digital, unveiled a major update to its Internet guide providing, for the first time ever, a seamless combination of all natural methods of information searching, in addition to its multilingual search engine.

It uses NLP technology in combination with a human-engineered knowledge base of six million questions. Another highlight is its visual search capability, with AV Photo Finder, which provides access to more than 10 million distinct images. AltaVista also provides the web's first instant HLT capability.

8.2.3 Digital information design and localisation

Why is Microsoft translating Windows 95 in 28 languages and why is it translating Windows 98 in 48 languages? Probably because even the technical people in a given country when you want to use a client element of the software, feel at ease when they see all of the interaction and the dialog in their native language. And this will increase, and I believe the most important vector force behind increasing localisation is the Internet, which provides access for...non-exclusively business matters to a lot of people. And you can see already in certain geographies association being created, a consortium being created to make sure that information which can be accessed is localised.

Compaq sound bite (<http://ww1.digital.com/infodesign/audise04.htm>)

Compaq provides, among other services, translation in more than 30 languages for multimedia applications, web design, digital contents and software applications. These services make extensive use of HLT and include linguistics, cultural adaptation, engineering adjustments and testing.

The company defines localisation as the process by which all aspects of a software, hardware or web site product are customised to the local culture and characteristics of a particular geography target market. This involves elements of the translation service listed above.

Its understanding of localisation goes far beyond the traditional approach which focused on software products. For Compaq: "localisation is the process of translating and re-formatting text, forms and other content of software or information products for a particular language or culture".

Compaq knows from experience that addressing the technical difficulties of localisation is only one of the big challenges, especially when dealing with the Internet. Another challenge, which cannot be underestimated, will be to address its cultural implications.

The Internet underlines and exacerbates cultural differences. We are still living in the dark ages of cultural approaches.

Claude Henri Pesquet, Director, Compaq

8.2.4 Assessment: the comprehensive solution for digital content provision

Compaq aims to provide a comprehensive solution to support the creation, distribution and consumption of digital content. The company, one of the industrial giants of the outgoing twentieth century, has shown that it is well positioned to achieve this aim. It has demonstrated its strength by financing the industry 's largest acquisition to date. However, it has also realised that it needs to combine forces and form strategic alliances with partners providing complementary knowledge, expertise, finance and infrastructures.

Compaq is joining forces with key independent software and hardware vendors to develop and deliver a wide range of solutions that meet the flexibility, reliability, low maintenance and investment protection needs of today's media enterprises ...[and] that provide the power and performance to support the most advanced digital media applications.

Les Crudele, Vice President, Compaq (1998)

Through its acquisition of Digital, Compaq also acquired one of the most experienced localisation divisions in the IT industry. This division already provides translation in more than 30 languages for multimedia applications, web design, digital contents and software applications.

8.3 Bertelsmann AG

Bertelsmann started in 1835 as a publishing house in the small German town of Gütersloh and is one of the oldest and most traditional publishing houses in the world. The ethos, mission and sense of responsibility of the company's founder, Carl Bertelsmann, have to a large extent survived into our time. The internal structure of Bertelsmann, including its statutes and ownership, still reflect a high degree of social responsibility associated with old time publishers.

However, Bertelsmann is also the prime example of a traditional European publishing company that has managed to adapt its business to the emerging paradigm of the new media industry.

8.3.1 Company background

Bertelsmann AG is the world's third largest media company, with annual sales of more than \$16 billion. Its original success was mainly achieved through its book clubs. These clubs now have 25 million members and supply 700,000 volumes daily, making Bertelsmann easily the world's largest bookseller.

Today the company is a media enterprise with worldwide sales in the general information, education and entertainment sectors.

Bertelsmann AG has five business divisions:

Books — hardcover and paperbacks, book and record clubs, encyclopaedia publishing, professional and trade magazines /information services, how-to books /cartography;
Entertainment — Bertelsmann music group, CLT-UFA (television and radio);
Gruner and Jahr — magazines, newspapers, printing;
Industry — printing, paper production, distribution and services, special publishing;
Multimedia — online services, multimedia products, Internet solutions.

We are well positioned for continued success in our traditional markets and the new media arenas of Germany, Europe and the United States. By building promising businesses in regions including Asia and South America, we are demonstrating our determination to continue to evolve from being an international media company towards becoming a truly global player.

Dr Mark Wössner, Chairman and CEO of Bertelsmann AG

8.3.2 New opportunities in multimedia

In 1997 one of the five major business developments for Bertelsmann became its dramatically growing new media/online business, especially the services linked to AOL Bertelsmann Online and its Internet technology companies. The company is targeting this emerging industry to create opportunities for its publishing houses, with their roots and strength in printing. It aims to create opportunities for these more traditional businesses to grow into a new world in which information and entertainment is communicated interactively.

The Bertelsmann Multimedia group is structured into two subdivisions, each targeting specific market sectors and needs: Bertelsmann New Media and Bertelsmann mediaSystems

Global communication and worldwide electronic commerce: Yes! But some fear that in a global information society with common standards there will also emerge a homogenised and uniform culture. France criticises the dominance of the English language in the multimedia world and stands up for European content-rates in the media. I believe that the shaping of the information society forces all cultures to adapt - the German, the French and the American.

Dr. Thomas Middelhof, Member of the Executive Board of Bertelsmann AG (November 1997)

Bertelsmann New Media

AOL Germany — This is a joint venture of Bertelsmann (45%), America Online (45%) and Axel Springer Verlag (10%). AOL is the world's largest and most successful Internet online service. It is one of the premier portals to the Internet offering general information, a job exchange, news, and software downloads.

Game Channel — Officially launched in the autumn of 1998, the Game Channel is operated by Bertelsmann Interactive Studios. As a first in Europe, it offers multilayer games, which are played with several hundred participants over the Internet. In addition, users have access to news, chat rooms, forums, event announcements and an electronic shop selling computer hardware and software.

Sport 1 — A joint offering by Bertelsmann and Axel Springer Verlag, this is Germany's most important Internet site for information on soccer, motor racing and other sports. Access is also provided to video clips showing the highlights of the latest Bundesliga soccer matches.

Bertelsmann mediaSystems — This division is the internal IT service provider of the Bertelsmann group. Its external activities are channelled through its subsidiaries, Telemedia and mediaWays.

mediaWays — This is one of the largest TCP/IP network providers in Europe. The joint venture between Bertelsmann and debis Systemhaus, a subsidiary of Daimler Benz AG, implements customised network infrastructure solutions for its clients.

Pixelpark — Germany's leading multimedia agency provides digital concept and brand realisation services to its corporate customers in e-commerce, e-finance and e-marketing.

Telemedia — Regional online services (City Web) and turnkey solutions for e-commerce are two examples of the services offered by Telemedia, a joint venture of Bertelsmann mediaSystems, Axel Springer Verlag and the WAZ publishing group. The company is one of the main providers of Internet and intranet solutions in Germany.

Bertelsmann operates media companies in more countries than any competitor, and it thus sees itself as being well equipped for global competition in multimedia markets.

Multimedia drives the convergence of industries



Under the conditions of multimedia, we experience the convergence of different industries like telecommunication, soft- and hardware companies, media and firms from the entertainment and electronic industry. They bundle their economic power, their know-how and their strategic strength.

Dr. Thomas Middelhof, Member of the Executive Board of Bertelsmann AG (November 1997)

The company sees three components of success for its new media business. These are the provision of *content*, the packaging of multimedia content with communication tools through *aggregation*, and easy, economical and fast *access* to online services.

Content — Media enterprises such as Bertelsmann can build on their skills, use existing resources and exploit established markets to migrate successfully from traditional print into the digital new media world. However, the company realises it has strong competitors, some of them from outside the traditional media .

Aggregation — A key role for the successful development of the commercial multimedia market is that of services . These services package multimedia content and communication tools into value-added services and bring together users who share common interests, so-called aggregators . Examples of service providers are Internet portal sites and search engines. Bertelsmann has made strategic alliances with some of these aggregators, most notably with AOL.

Access — As users access multimedia content and aggregators through modems and networks, access speed, cost and reliability will be crucial factors for the success of online services, content provision and e-commerce. Even at peak time, users must be provided with high quality, speedy access to a company 's services to turn it into a successful business.

8.3.3 Books going online— worldwide

Bertelsmann 's commitment to moving its business to the global stage of the Internet became clear on 6 October 1998, when Bertelsmann announced it was paying \$200 million for a 50 per cent share in Barnes & Noble 's Internet venture (barnesandnoble.com) — a new competitor of the famous Amazon.com Internet bookstore. Bertelsmann, the world 's largest bookseller, also owns Random House Inc., the largest book publisher in the US. Barnes & Noble is the largest book seller in the US.

A month later, in November 1998, Barnes & Noble announced it was to acquire the Ingram Book Group, the largest book wholesaler in the US, for \$200 million in cash and \$400 million in stock.

These moves are clearly designed to provide Barnes & Noble's (and Bertelsmann's) Internet bookstore with a competitive edge over its rivals on the Internet. Barnes & Noble will make Ingram a strategic part of its distribution network, expanding the company's coverage through the addition of 11 distribution centres.

Consequently, more than 80 per cent of the company's US online and retail store customers will be within overnight deliveries of the distribution locations.

The joint venture will also have a distinct advantage over its competitors in sourcing foreign language books, and will co-operate with Bertelsmann's own online bookseller in Europe, Books Online. Bertelsmann is to launch Books Online sites in Germany, France, Britain and the Benelux. This move coincides with the expansion of Amazon.com into Europe through the acquisition of the online book stores Telebook in Germany and BookPages in Britain.

The combination of the country's largest retailer with its biggest distributor, and, given the recently announced Bertelsmann transaction, its biggest publisher group, undoubtedly will raise industry-wide concerns.

Amazon.com, Wall Street Journal (09.11.98)

The potential of the combined forces of the biggest book retailer in the US with the country's biggest distributor and the world's biggest publishing group are enormous. The new venture could easily reshape the current Internet-based book market. Following the announcement of the deal, Amazon.com was deeply concerned about its implications for the industry as a whole.

8.3.4 Assessment: globalisation of standards, localisation of content

Online media is multimedia. Multimedia drives the convergence of different industries like telecommunications, software and hardware companies, media and firms from the entertainment

Global standards and local contents are not contradictory but supplementary. AOL is the best example. This Internet online service has a global umbrella brand that is used not only in the U.S.A. but also in Europe, in Australia and elsewhere. Yet, the appearance in terms of content and design is geared to regional needs and expectations. So the trend is clear: The technology is global, the content is local and global.

Dr. Thomas Middelhof, Member of the Executive Board of Bertelsmann AG (November 1997)

and electronic industry. The local content is channelled to the consumer by global technology. This is the vision of the future of the emerging new media industry as expressed by Bertelsmann executives.

In this framework, the distinct advantage of traditional publishing houses like the Bertelsmann group, with its huge number of magazines and newspapers, is clear. Although the company does not yet make heavy use of HLT applications, the mechanisms to deliver instantaneous access to up-to-the-minute information are all in place.

Bertelsmann has clearly taken on board the lesson learned by the conventional localisation industry, namely that making content local is not always just a matter of simple translation but often means a complete redesign and re-write of the base product's content while maintaining its technology base.

However, the company has added its own distinctive view to the discussion. While it recognises the fear by many that in the emerging global information society there will also emerge a homogenised and uniform culture dominated by the US, it sees the need for all cultures to adapt.

In terms of contents, the global information society is characterised by pluralism, diversity and cross-culturalism. The digital media make it possible to multiply the information and entertainment channels — and thus also the contents. From one single world will emerge many multimedia worlds.

Dr. Thomas Middelhof, Member of the Executive Board of Bertelsmann AG (November 1997)

8.4 Netscape

No other single company has had such an innovative and visionary approach to the Internet as Netscape. Without the wide availability of the Netscape Navigator Internet browser, end-user take-up of the global network and the breathtaking development of millions of web sites across the globe would arguably have been greatly slowed. Netscape invented the technology — but its impact was only made possible by the company's visionary approach to the distribution of this technology to end users. By making it freely available to everybody who cared to download it from its web site and distributing it on CD with millions of IT magazines it reached a market penetration only rivalled by the large operating system providers.

Netscape was the first company on Internet time: in 1994 it emerged from nowhere, it (almost) immediately went public and its stock value quickly reached levels most businesses could only dream of — while never approaching revenues that could have justified such rapid development. Now the company is again driving radical changes in technology and established business practice by taking a new approach to localisation.

In the context of this study, we take a close look at Netscape as an example of a company that has developed from software developer to portal site developer and services and solutions provider. From the beginning, Netscape has been aiming at the global market, making its products available in most major languages with content provided by its local partners.

8.4.1 Company background

Netscape Communications Corporation was established in April 1994 by Dr James H. Clark, founder of Silicon Graphics, and Marc Andreessen, creator of the NCSA Mosaic software. The company is based in Mountain View, California, and aims to be the leading provider of open software that links people and information over the Internet and intranets. Netscape offers a full line of clients, servers, development tools, and commercial applications to create a complete platform for next-generation, live online applications.

The company has been described as the fastest growing software company in history. It employs more than 2,000 people in 17 countries and reported revenues of \$346 million in 1996 (\$85 million in 1995). For the six months ended in June 1998, total revenues were at \$277 million. Although it faces strong competition, Netscape Navigator is still one of the world's most popular PC applications.

Netscape was initially seen by many as a one-product company. Breaking all rules of generally accepted marketing and sales strategy, it made its web browser available free of charge to end users, aiming at setting the standard in this market, waiving potential, short-term financial gains. In November 1998, Netscape had a base of more than 70 million users.

Established as a software development company, Netscape quickly recognised the opportunities in the emerging Internet-based economy. The developer of the first industry standard web browser expanded its business into three strategic areas:

Technology-based products — browsers, servers, development partnerships, commerce applications ;

Services and solutions — professional digital publishing services and solution provider for business, education and government ;

Portal site — Netcenter, one of the Internet's fastest growing portal sites, which provides users with easy, personalised and structured access to the Internet.



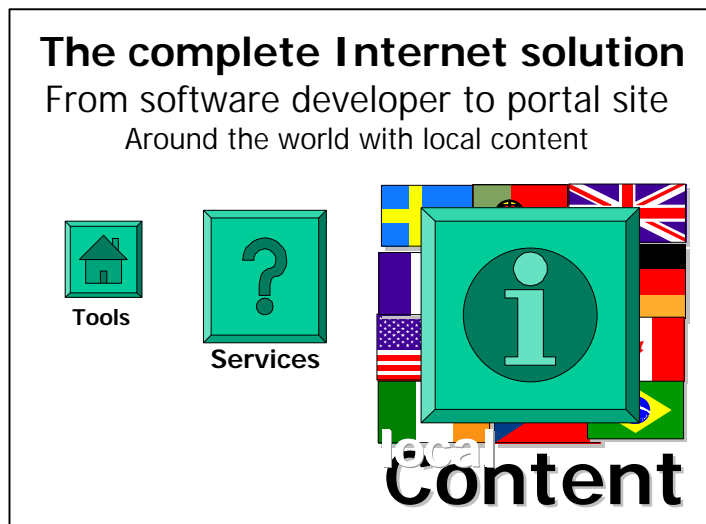
A new development in 1999 will be the custom portal, which will allow organisations to tailor their Internet, intranet and extranet services and create personalised business services for their users.

8.4.2 Content, services, tools — with a localised sales force

The strong demand for Netscape Netcenter services and client software clearly demonstrates Netscape's success in delivering consumers the best combination of exciting content, services and tools on the web.

Mike Homer, Executive Vice President and General Manager, Netscape Netcenter Division

Netscape's Internet site now registers more than 120 million hits a day and serves around five million users. In September 1998, at least 850,000 new users registered with Netcenter. Downloads of Netscape's Communicator and Navigator client software in the four months between June and September exceeded 17 million worldwide.



One of the new developments on Netscape's Netcenter site is the provision of local channels providing local news and information, weather, sport, entertainment and movie listings, dining and event guides. AOL's Digital City programs the local channels with almost 5,000 interactive marketing partners and tens of millions of dollars in advertising and e-commerce revenues annually.

Netscape sees the key to the success of its portal business in Digital City's localised sales force dedicated to generating revenue at the local level.

AOL's Digital City on Netscape Netcenter expands Digital City's reach significantly and increases the quality of our content offering — a win-win for both companies.

Mike Homer, Executive Vice President and General Manager, Netscape Netcenter Division

However, the company knows that marketing alone does not guarantee success and has introduced smart, language-technology driven tools, which automatically correct typographical errors in search requests, cleaning up mistyped URLs, and implementing an Internet Keyword service, sending the users to the site that best fits what they typed.

8.4.3 Portal tenants — strategic alliances on the web

Netscape is making strategic alliances with leading players from many industries.

Its strategic worldwide agreement with Citibank, making it the anchor tenant in the upcoming Netcenter Personal Finance Channel, represents the largest sponsorship and distribution agreement in the industry to date.

Netcenter is already one of the most visited sites on the Internet. This agreement gives us the opportunity to lock in a low-cost mass consumer acquisition programme in 150 countries, while setting up a distribution pipeline for future electronic commerce products and services.

Mike Homer, Executive Vice President and General Manager, Netscape Netcenter Division

Citibank believes it will achieve its goal of one billion customers by the year 2010 by promoting its financial services globally through Netcenter.

Another major customer making a strategic Internet commerce alliance with Netscape in the second half of 1998 was Visteon Automotive Systems, an enterprise of Ford Motor Company. It has 81 plants and 35 sales offices with 82,000 employees located in 21 countries . It also produces vast amounts of documentation (manuals and brochures, for example) that must be made available to a global market.

8.4.4 Assessment: browsers for the global user — DIY localisation for everybody

First we made the client and distribution of the client free, then we provided free customisation with the Client Customisation Kit and now we are extending this initiative with free localisation. The programme provides an unprecedented opportunity for our partners to create customised, privately branded localised client products as part of their solutions.

Ira Scharfglass, Vice President of Global Applications, Netscape

When Netscape first offered its web browser free of charge to users, it took its competitors by surprise and struck marketing experts with disbelief — until they were forced to follow the lead.

Now Netscape is targeting Internet service providers, distributors, PC and UNIX vendors, universities, cultural organisations and software developers with its Universal Localisation programme. Netscape hopes to broaden its client software coverage in markets where there are currently no localised products and to foster client localisation for emerging markets. Netscape also plans to set up a community newsgroup on its mozilla.org web site for developers to share localisation ideas and technical support in a public forum.

Netscape managed — against all odds — to dramatically change the distribution and licence arrangements not just for its own browser software but for those adopted by its competitors. Its latest move could redefine localisation as we know it.

9 Conclusions

As the tremendous growth of the Internet radically transforms the industrial landscape and heralds the arrival of the age of the information society, Europe's linguistic and cultural diversity, with its more than 45 national languages spoken by 371 million people, presents opportunities and challenges.

9.1 Convergence

We have shown how the emergence of new technologies and the globalisation of the economy are leading to the convergence of formerly distinct industries. The computing, communications and content industries are converging to create the *new media industry*.

We have also shown how delivery platforms and technologies (printing, audio and video, software) for formerly distinct services (books and journals, television, radio, and computing) are converging and now deliver very similar services using just one platform, the Internet.

9.2 A mandate for politics — an opportunity for business

New media publishing on the Internet is at once computing, music and video production, broadcasting and entertainment. New media content is now available to all European citizens without restrictions imposed by time, location or technology.

The only restriction remaining for many is the language barrier. The removal of the language barrier is a mandate for political action and offers tremendous opportunities for business. Removing the language barrier means:

- preserving and protecting Europe's cultural and linguistic heritage;
- facilitating equal access of European citizens to the information society;
- creating opportunities for European businesses.

The European localisation industry has the expertise and the experience to meet the challenge of multilinguality across the global information flow. Making extensive use of HLT, it has already provided the key to IT for millions of non-English speaking people. Now it is enabling the inclusive multilingual information society.

9.3 Business cases

Case studies of companies from different backgrounds confirm our analysis.

HLT providers like Lernout & Hauspie are beginning to move into the consumer market and end-user applications. Its policy of acquisitions, investment and licence agreements provides an almost perfect example of how the convergence between formerly distinct industries and technologies has dramatically accelerated since 1996 and how HLT is going mainstream.

Computer hardware manufacturers like Compaq are now developing complete solutions for new media enterprises and supporting the most sophisticated digital media developments. More and more, they are using HLT applications to facilitate their entrance into the consumer market (e.g. multilingual web search engines, online MT, indexing and information retrieval).

Traditional publishers like Bertelsmann have been slow to enter the cyber-world. However, they are quickly catching up following the general trend of mergers, acquisitions and new business partnerships. So far, they have made only limited use of HLT to facilitate their entry into the global digital market, but they are already actively involved in researching the opportunities HLT can offer.

Software developers like Netscape have been the first to make their digital applications available to customers in a wide variety of languages. As they are entering the digital content market, they can take advantage of their localisation expertise, but must also develop new business models to respond to the changing business environment. There is an overall shift in emphasis from purely technical localisation issues towards cultural localisation.

9.4 HLT opportunities

Business drives innovation where it makes economic sense. A large number of applications that have facilitated the development of user oriented multimedia and content products in mainstream languages have been developed and are in commercial use. In fact, some of these products themselves incorporate HLT applications.

Politicians and the E U, however, have a mandate that goes beyond purely commercial reasoning. They are the guardians of Europe's linguistic and cultural diversity and must secure equal access to the emerging information society for all European citizens.

HLT can provide the framework to bring these interests together. Business will benefit from innovative solutions to problems associated with Europe's linguistic and cultural diversity. Industry experts say logistical and financial constraints mean that only a fraction of what could be translated is currently being translated and adapted for local markets.

Innovative HLT can help to reduce the cost of localisation, thereby making the linguistic and cultural adaptation of software, multimedia and digital content financially viable even for lesser-used languages. This will satisfy business requirements and is, at the same time, in line with the political mandate given to the European institutions.

How this can be achieved in detail is outlined in the following chapter, which first discusses strategic issues in connection with collaborative EU funded European R&D initiatives and then recommends tactical lines of action for HLT within the general framework of the EU's IST Programme.

10 Recommendations

In this chapter we have formulated recommendations for the EC based on the results of our analysis of the development, needs and requirements of the localisation industry in the context of human language technologies. Many of the issues raised here have been pointed out to us directly by industry representatives during interviews carried out between July and November 1998.

10.1 Strategy

This section will provide an overview of the strategic approach recommended to the EC.

We first identify some of the main problems for the participation in EU funded R&D projects and highlight the underlying reasons. We then recommend a strategy to overcome these problems focusing on the opportunities for the localisation industry within the HLT action line of the IST Programme.

10.1.1 The problem with collaborative EU funded R&D

Different groups have different problems with collaborative EU funded research:

- **industry** works on tight deadlines and does not always see the relevance and pay-off of such research;
- by and large, **universities and researchers** are not market driven;
- **European citizens** are not sufficiently involved, and generally have not yet benefited directly from the results of research.

The reasons for these problems can be found to a large extent in the presentation of the funding programmes themselves as being:

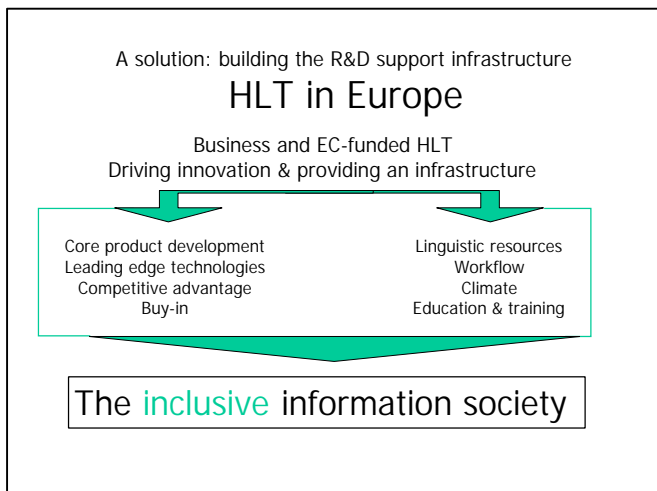
- **collaborative** — mission-critical and highly confidential core technologies are not employed;
- **driven by the EC** — the Commission is seen as a huge bureaucracy that by its nature cannot respond adequately to the rapidly changing needs of emerging technologies like the Internet and the new media, yet which needs increasingly to be driven by market requirements;
- **low impact European R&D** — heterogeneous consortiums spend much time on achieving consensus, with extremely high overheads. The perception is sometimes that too many small low-impact projects with relatively low budgets are funded. Consequently, citizens have received few visible benefits.

This analysis shows that if the EU wants to respond to the needs of the localisation industry, *changes in the presentation and direction of the programme are imperative.*

10.1.2 HLT: the opportunities for collaborative EU funded R&D

The opportunities for the HLT sector are being seen in the building of a solid R&D infrastructure for HLT in Europe. This can only be achieved if the infrastructure is solidly anchored in and strongly motivated by user-oriented core product R&D. The overall aim should be the realisation of the inclusive multilingual information society.

This aim will be achieved if business and EU concentrate on their strengths and core competencies.



Business will probably always drive the innovation effort as the industry itself is probably best positioned to look after its core product development and leading edge technologies, building up their competitive advantage. However, these efforts have to be backed up by appropriate support.

The **European Union** funded HLT programme should support innovative, leading-edge projects, giving preference to projects that also intend to develop an appropriate European HLT infrastructure by building up linguistic resources, optimising

and adapting workflow, creating the right climate for HLT and developing education and training programmes.

10.1.3 Project proposals

There is a general view that fewer but higher impact projects should be funded (i.e. of longer duration, stronger project management and adequate financial resources). The following areas provide opportunities for the establishment of projects seen as strategically important to the development of the industry surveyed:

European Language Resources Centre — to establish a central, accessible repository of European language resources strongly connected to and supported by the industry sectors that would, at least initially, gain most from their establishment (e.g. the call centre industry and the localisation industry). The centre's brief should cover the development and maintenance of professional, high quality linguistic resources for all European languages, especially for lesser used ones, centrally coordinated but locally compiled.

European Localisation Institute — to provide a focal point, a central resource and a research centre supporting a much needed European localisation network. According to a recent report published by Forrester (JIT Web Localisation, July 1998), the European localisation industry has pioneered web localisation and is well positioned to take a world wide leadership role within the new paradigms of the industry. Initiative is required at European level to bring together researchers and industry to address localisation related HLT issues in all their facets and manifestations.

Workflow models for the language industries — to develop up-to-date workflow models to help companies adapt to and survive in the constantly changing, highly competitive and globally operating localisation industry. While it is generally accepted that available and affordable HLT, such as MT and TM based translation, can shorten translation time and increase the quality of translation in the localisation industry, many potential users are reluctant to employ it. In many cases, they believe the cost of changing work methods, on top of the cost of the technology itself, will be too high. In other cases, users either underestimate or are not sufficiently aware of the impact of HLT tools on their workflow.

The biggest implementation barriers for translation technology applications are often established, difficult-to-change company work practices and *not*, as might have been expected, implementation cost or technology issues.

“Climatic” change — required to showcase the exciting side of HLT; to demonstrate the usefulness of HLT to business, politicians and citizens; to make HLT accessible. These projects could include a HLT road show or European HLT information centres. Here citizens could try out the latest technologies (speech recognition, dictation systems, online MT for searching and reading foreign Internet pages etc.).

Business could, with the support of experts, evaluate the suitability of specific technologies for its requirements (MT, CAT, term banks etc.). Politicians could measure the uptake and see the usefulness of HLT for business and the public. These trends should increase the confidence in the use of HLT applications , inject a sense of realism in to what can be expected from HLT and create awareness of existing technology and products.

Training and education — to address the skills requirements of the information society at third level, in the area of vocational education and in industrial training; to build on existing initiatives to introduce national and European certification systems. Projects should build on existing initiatives to introduce national and European certification systems and define the changing roles in engineering, testing and QA, translation, project management, DTP etc. They should investigate and describe the challenges of internationalisation and localisation, especially for the Internet, the web and cultural issues.

10.2 Tactics

This section will provide a more detailed tactical view of the approach recommended to the EC and introduce some concrete proposals for action.

Cultural adaptation — never before were people able to instantly access multimedia material anywhere in the world . Never before were publishers in a position to reach out to such a vast (potential) audience as that represented by the users of the world wide web. *Detailed studies on the implications of cultural dominance, change and development are required to deal adequately with the impact of the new media on the European consumer.*

Working globally — as people increasingly work within a global environment, it becomes necessary to produce software that adequately and transparently supports individual work habits, different cultures, languages and individual preferences — independently of location.

The needs of people who use technology designed for a multilingual information society should be considered . Applications should be able to function in several languages that the user can select at the beginning of a session . Users not working in their own language and cultural environment (for example, when travelling) should be able to work with applications as if they were at home. This includes a general move from a perfect (academic) mode where many of the issues listed below have been resolved to a practical (commercial/end-user) mode, where most of the issues are still problematic:

- keyboard, character set encoding, user interface ;
- man-machine interface in a multi lingual context ;
- swapping forms and language versions of documents ;
- easy and transparent access to spelling checkers, grammar checkers and summarisers .

Tools — existing tools need to be adapted to , and new tools will have to be developed for emerging standards and development environments (e.g. Java, HTML, XML, Unicode). Tools will also have to be provided to port existing data resources to emerging file and data formats (based on Unicode , for example).

Language technology products have to be integrated into easy-to-use, easy-to-access platforms. This will not require basic research and development of the technologies themselves but substantial work on the man-machine interface and ergonomics.

Other tools that should be considered include:

- terminology consistency checker;
- workflow management;
- multilingual content management;
- mark-up and formatting preservation;
- conversion tools (into Unicode) for existing files based on older character set conventions;
- performance improvement tools, e.g. search, retrieval, summarisation and alignment tools;
- technical writing management.

Language resources — the creation of new and the management of existing linguistic resources should be initiated in a European project, especially (but not exclusively) focusing on minority languages. These resources should cover text (including parallel text and translation memory [TM]), audio and video resources as well as tools for the adequate processing of all European languages. The creation and management of these resources should be driven by demonstrated industry and consumer requirements.

Specific areas to be addressed include:

- **Metaphors**
These are not easy to handle with current translation technology, but could possibly be dealt with by the development of a customised “metaphor TM”.
- **Linguistic resources**
These could cover large multilingual translation memories by topic, such as printer installation, software installation routines.

Access to tools and resources — this issue should be addressed by the establishment of a European Localisation Institute. Although localisation tools and resources are available, they are not always easily accessible. In some cases, potential users don't know that the tools and resources they need even exist. In other cases, they find it difficult to gain access to the technology, to evaluate it and to acquire the necessary skills to use it in their production process.

Internationalisation — new technologies and applications require new approaches to internationalisation. While large multinational developers are generally able to investigate the implications for the internationalisation of their products, small and medium-sized development companies will need support. Internationalisation guidelines addressing the new media should be compiled and published.

Multimedia localisation — multimedia has become part of many mainstream products. The market for many types of multimedia products (especially in areas like education) has not really taken off. This means that the relatively high cost of localising these products is often unjustifiable. Attempts to reduce the high cost of multimedia localisation should be supported by the development of tools aimed at reducing the labour now required for multimedia localisation.

Multimedia localisation and cultural issues — cultural aspects of localisation are often mentioned but have never been really described comprehensively. Even the term *culture* is difficult to define. It may include language, living conditions, dress codes, religion, politics,

history, music, geography and economy. How are cultural boundaries defined? Which group belongs to a certain culture?

However, cultural issues do play a major role in software localisation, and especially in multimedia localisation, as the following quotes highlight.

As an example, the content you put into a multimedia encyclopaedia application has got to take into account that the local culture your product is targeted at may have quite a different opinion on areas like history, inventors, great scientists, great writers. You have got to put in place local content that is relevant to that market place. As an example, not everybody agrees that the Wright brothers were the first people to fly. The Norwegians have a certain opinion on that, as do the Brazilians. You have got to be conscious that it is quite a different audience ; it is not just translating words.— Michael Gavin, Sales Director , Berlitz Translation Services, Europe

What would attract a Greek person to explore education? Do you use the Acropolis or do you use a logo that somebody has come up with in Seattle , which might be a yellow bus? —Marc Keane, Microsoft

In cooperation with similar initiatives, e.g. that co-ordinated by Kenneth Kenniston of the MIT's Media Lab, a detailed study should be conducted into cultural issues of localisation.

Standards and interchange formats — the increased use of translation technology will make the development and implementation of (interchange) standards indispensable, especially in areas such as:

- terminology database formats (OLIF);
- TM (TMX — Translation Memory Exchange);
- text format for MT (OTEXT — Open Text);
- character sets (Unicode);
- text tagging (OpenTag).

Language and translation technology (text and voice) — first experiments with real-time voice translation through the integration of dictation systems and translation technology have been very promising and should be further investigated.

Up to 12,000 edited words in six hours, as opposed to a daily standard amount of 2,500 words , were produced by translators working with this technology. One significant problem encountered during these experiments was the preservation of the appearance of the original when translators did voice-over dictation .

Online automatic translation— online translation on the web is already being offered but will need further development to make it really useful for businesses and occasional users. Areas of improvement could be the extension of the language and lexical coverage, functionality and user interface/accessibility.

MT developers regard online translation on the web as one of the most promising application areas for automatic translation .

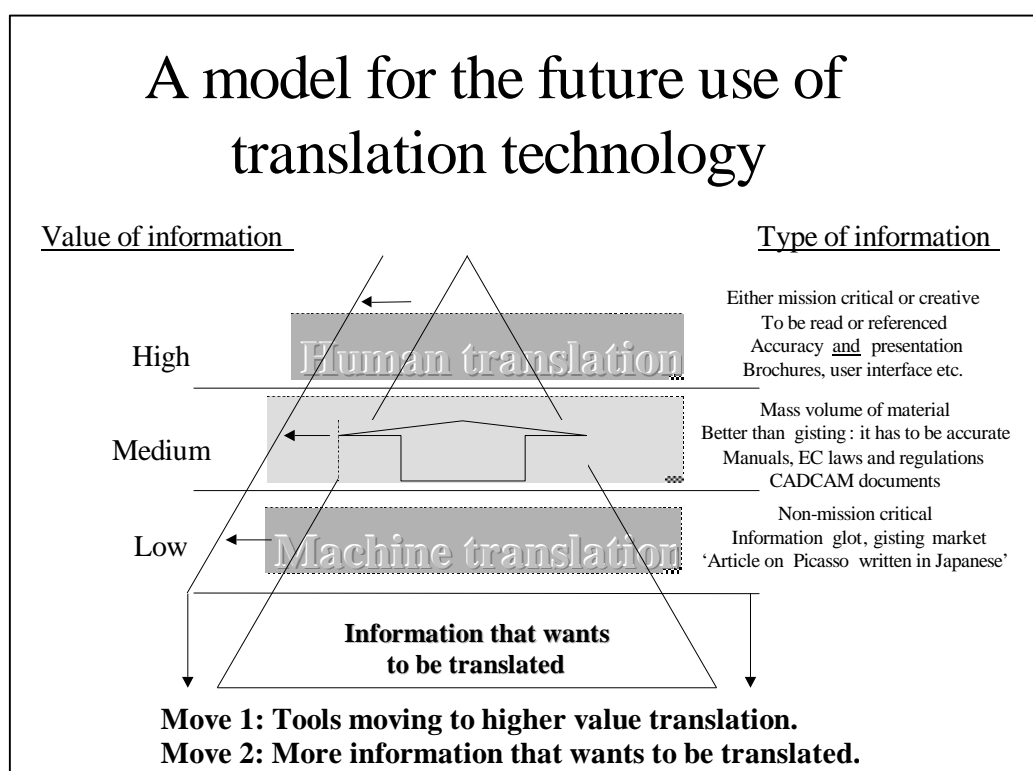
A new model for the use of MT — a new model for the use of MT and CAT has been developed in discussions with localisation and translation technology experts during this study.

It will address many requirements of consumers and professional business users alike. This model should be further investigated and a prototype developed.

Working on the assumption that information can be categorised into three types each associated with a certain value, it visualises translation in the form of a pyramid.

At the *bottom* of this pyramid comes non-mission-critical information, the so-called gisting market. An example of this type of information is an article about Picasso written in Japanese and published on a web site in Japan, of which an English speaker with no knowledge of Japanese but interested in the Spanish painter wants a rough and cheap translation. This is the ideal application scenario for a wide use of MT.

In the *middle* of the pyramid come large amounts of material that has to be translated accurately, where gisting is not acceptable. Examples of this type of information are technical manuals or European laws and regulations. MT is currently being used at this level, although not widely. It is more the exception than the rule.



At the *top* of the pyramid come small amounts of mission-critical or creative material to be read or referenced where accuracy *and* presentation are paramount. Examples of this are brochures, user interfaces and creative literature.

The model presumes (1) that the shape of the pyramid is expanding in two directions and (2) that improvements in translation technology (MT in its widest sense) will open new markets for developers of MT systems.

The expansion of the pyramid will be driven by two factors:

- a growing demand for translated material because of the globalisation of the economy (horizontal expansion);

- the increasing availability and accessibility of information in a variety of languages to end-users, i.e. information that wants to be translated , on the web (vertical expansion).

At the same time, MT will push its way up the pyramid and be used for higher quality translation.

Translation service vendors will offer various translation facilities online, from high-quality human translation to low-end, cheap machine translation , with a range of mixed options in between. These options will include human-edited MT using specialised and fine-tuned lexical and semantic databases, TM-based translation combined with MT, and alignment and maintenance of previously translated material.

Translations will be routed through the available translation options according to criteria such as the type of text on hand, the value of the information to be translated, the quality requirements of the consumers , and the resources (time, money) available to them. Consumers will, before they select one of the translation options , receive accurate information on the quality, pricing and time implications of their choice.

This model should be further investigated. Prototypes, pilot implementations, business models and realistic user trials should be supported to assess its viability. The development of specialised linguistic resources covering a range of vertical markets and several languages (including lesser-used languages) would be an integral part of this development.

Although this model, in its current state, is mainly addressing text-based translation, it could easily be expanded and modified to address more complex translation problems , including graphics, video and voice.

Appendix A: Validation

Detailed review

Alan Barrett, of Lotus Development Ireland , and Claude Henri Pesquet, of Compaq, reviewed the preliminary study report. They are two of the most experienced and senior executives in the localisation industry.

Tony Hegarty and Antonio Sanfilippo of Anite Systems, and Norbert Brinkhoff of DGXIII reviewed the complete draft report.

We would like to acknowledge the invaluable feedback received from the reviewers, which we used to refine the initial drafts of this report.

However, the responsibility for the accuracy of the statements made in this report remains, of course, with the author.

Executive round table

The preliminary findings of the analytical part of this report were presented at a half-day executive round table on 7 October 1998 in Dublin as part of Europe's prime localisation industry event, the annual SLIG conference . The executive round table was attended by representatives from the European Commission, the European LINGLINK project, and senior executives from European and US localisation companies .⁶

The discussion after the presentation focused on the following four questions:

- Why do companies localise their products?
- What are the recent trends and developments shaping the industry?
- How could the new face of localisation be described?
- What opportunities does HLT offer for localisation?

We will now summarise the discussions of the executive round table.

Reasons to localise

According to the preliminary results presented to the executive round table, the principal reason to localise is the competitive advantage localised products give businesses. This statement was further discussed addressing the following questions:

- Are there differences among areas of software publishing, and if so why do certain areas stand to gain more from localisation?
- To what extent are multimedia products and digital content being localised?
- To what extent are web pages being localised?

⁶ Among the companies represented by their CEOs, vice presidents, general managers, managing directors or other senior executives were: Berlitz, Bertelsmann Telemedia, Bowne Global Solutions, Clockworks International, Compaq Computer Corporation, Dragon Systems, International Communications, International Translation and Publishing, LionBRIDGE Technologies, Lotus Development, Oracle, Star, Sun Microsystems, Symantec, TRADOS, VistaTEC and Volvo Car Corporation.

The rationale of the localisation effort as presented in the study was broadly supported :

- the huge demand for software products in the area of information management in Europe and Asia;
- the high percentage of total revenue from international sales in the case of many publishers (60%+);
- the globalisation of the economy.

In addition, participants highlighted the following reasons for localisation:

- to increase profits ;
- to increase global market share;
- to make products appealing to a broader range of people.

It was also noted that publishers want to increase the number of products localised and to increase the number of target markets.

Trends and developments

The discussion of trends and developments in the localisation industry was guided by the following questions:

- Which priorities are emerging in languages, products and platforms?
- Are strategic partnerships needed to offer clients global solutions (industry consolidation)?
- To what extent do more traditional industries such as print publishing , communications and the automotive industry consolidate and converge? Why?

The preliminary findings identified the globalisation of the economy and the advances of the Internet as the main reasons for a tidal wave of change approaching the IT industry and more traditional industries in the area of content provision and communication. In the localisation industry, it identified the following trends:

- the number of languages for which localisation is done is increasing continuously;
- time to market for localised products is getting close to zero (SimShip);
- the number of products being localised has dramatically increased;
- the number of platforms supported has increased;
- the average size of products has increased.

The executives discussed these findings and generally agreed with them. They also raised additional points:

- localisation industry expertise will be used by other industries (e.g. traditional publishing) now facing similar problems;
- as software becomes more ubiquitous there is a move from technical markets (users who generally speak English) to consumer markets (users who often do not speak English). This leads to greater demand for localised products (as in the ad slogan, “You could not imagine a Volvo car just speaking English”);
- technology will make localisation projects financially viable that otherwise could not be considered;
- web commerce and contents will aggressively hit Europe after their current success in the US;
- publishers will increasingly develop and ship just one general multilingual product;

- e-commerce will require more complex localisation for which simple solutions still have to be identified.

The new face of localisation

The study introduced the provision of services and technologies for the management of multilinguality across the global information flow as the new face of localisation. The discussion of this statement considered the following questions:

- The localisation workstation of the future: which tools are needed and how should they be integrated?
- How crucial is the multimedia perspective in software and content localisation?
- Is translation technology up to the challenge?
- How will localisation services be deployed?

Indicators of the development and changing face of the localisation industry were identified in the preliminary findings as follows:

- the consolidation of the localisation industry: identification and acquisition of strategic partners to offer clients global solutions;
- the convergence of the IT industry with other industry sectors (e.g. convergence of the software development and content provision sectors);
- the widening of the localisation industry to make it the catalyst for the electronic multilingual documentation production processes linked to the requirements of the aeronautics, automotive and publishing industries;
- the new face of localisation: provision of services and technologies for the management of multilinguality across the global information flow, with participation by:

tools developers (MT, CAT, etc.);

Internet companies (content providers, application developers, service providers);

government bodies;

producers of IT-enhanced products (telecommunications, automotive, publishing etc.) .

These were generally accepted and qualified by highlighting some recent developments:

- sourcing locally is emerging as an option to localisation, especially in the context of digital content provision on the web , and is influenced by price, interest, relevance and timeliness;
- "global technology with local language, culture and content avoids the cost of keeping localised content synchronised;
- the localisation industry will no longer be associated exclusively with the localisation of application software but also with the new media industry and other industries that deal with multilingual information;
- because of its experience and background, the software industry can become the provider of know-how and technology for other industries now requiring localisation;
- cultural localisation will become increasingly important.

Opportunities in HLT — localisation in the IST Programme

The last point of discussion dealt with the opportunities presented by HLT within the framework of the IST Programme.

Preliminary study results suggested several strategic issues and tactical lines of action .

Strategic issues

- Problems concerning participation of industrial partners in EU R&D, because the industry does not always see the relevance and pay-off;
- confidentiality and intellectual property rights in collaborative projects ;
- projects that are too small and consortiums that are too large to deliver results with real impact;
- innovation visibly driven by demonstrated business and consumer requirements;
- HLT support for the development of the necessary infrastructure, again driven by demonstrated industry and end-user requirements (e.g. by building up relevant linguistic resources and by developing education, training and certification programmes).

Tactics and focal points in localisation for the IST Programme:

- in-depth review of current practices, processes and workflows;
- investigation of the impact of cultural issues in localisation with reference to e-commerce;
- production of tools that support individual language/locale preferences independently of geographic location;
- adaptation and development of tools for emerging technologies and standards (e.g. Java, XML, Unicode);
- linguistic resources for all European languages (with specific reference to MT and TM);
- new approaches to internationalisation;
- multimedia localisation, with focus on cultural issues;
- standards and interchange formats;
- language and translation technologies.

While these were generally accepted, more concrete areas of interest were also suggested:

- development of easily accessible workflow models and processes for localisation;
- guidelines and tools to deal with cultural localisation;
- development of a flexible and dynamic “localiser ’s workspace ” as opposed to a more static localiser ’s workstation ;
- support for minority languages;
- support for specialist tools developers;
- support for recognised and industry-wide accepted interfaces (*not* standards) between different applications, file formats and approaches;
- preference for pragmatic approaches effectively addressing problems;
- R&D of intelligent localisation tools;
- development and support of suitable training and educational programmes for localisation to address the shortage of skilled people.

Further consultation

After the executive round table, further consultation with individual senior executives and other industry experts took place. The analytical part of the study was revised on the basis of the feedback received during the executive round table and the consultations that followed.

The suggestions made by individual reviewers were also referred to and taken into account during the preparation of the remainder of the report.

Appendix C: glossary

G11N	abbreviation for ‘globalisation’, mostly used by American authors
Globalisation	most broadly defined as “ the breakdown of national boundaries in economic and political life”
I18N	abbreviation for ‘internationalisation’, mostly used by American authors
Internationalisation	during product development, enabling a product ’s international features and preparing it for localisation
ISOC	Internet Society (http://www.isoc.org)
L10N	abbreviation for ‘localisation’, mostly used by American authors
LINGLINK	European funded project supporting language engineering activities in Europe (http://www.linglink.lu)
LISA	Localisation Industry Standards Organisation
Locale	cultural conventions of a specific user group ; one language can have several locales associated with geography and cultural conventions, e.g. Australian English, US English etc.
Localisation	adaptation of a product to the requirements of a foreign market, its language and locale
LRC	Localisation Resources Centre
Multimedia	combination of text, image, video and sound
SimShip	simultaneous shipment, i.e. localised versions of a product are shipped simultaneously with the original language version ; in practice, this generally means within the same quarter
SLIG	Software Localisation Interest Group , based in Ireland (http://lrc.ucd.ie)
Unicode	industry standard based on ISO 10646 , which allows the concurrent use (input, display, output) of all known human languages without data corruption

Appendix D: references

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