

# Horses for Courses: Changing User Acceptance of Machine Translation

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**Synopsis:** The key to Machine Translation becoming a commonplace technology is user acceptance. Unfortunately, the decision whether or not to use Machine Translation is often made on the basis of output quality alone. As we all know, Machine Translation output is far from perfect, and its quality depends on a wide range of factors related to individual users, the environment in which they work, and the text types they work with - factors which are difficult and arduous to evaluate. Although output quality obviously plays an important role, it is not the only factor in user acceptance - and for some potential users it may not even be the most important one. User perception of Machine Translation is a decisive issue, and MT must be seen

- not as a universal translation solution, but *as one of several potential tools*
- not in isolation, but *within the context of the user's work processes*.

This has important implications for Machine Translation vendors. It means that Machine Translation shouldn't be offered in isolation. Depending on the product/target group, it must be combined with other tools and/or combined with other services (post-editing/human translation). Products must also be scaled to the user's purse and environment, the entry threshold must be low and products must be upgradeable as the user's needs change. It must be easy to access and use Machine Translation: complicated access to Machine Translation and arduous preprocessing activities will make it a non-starter for many people. What's more, Machine Translation must be available when and where the user needs it, whatever the application.

## 1 Introduction

Although it became obvious soon after its inception that Machine Translation would never represent the "quantum leap" the pioneering developers had hoped for, many people retained the belief that the technology would still come to revolutionise the translation industry, albeit at a much slower pace. However, almost 30 years later, critics could claim that MT has not yet started to fulfil even these more modest expectations. The answer to why MT has failed to become a commonplace technology is almost exclusively sought in the area of output quality. And, almost certainly, low quality is the reason many translators would give as to why they are not using MT. In reality, however, quality is only one of several factors which have contributed to insufficient user acceptance of MT.

There are many other reasons:

- "Fear" of computers: MT is computer based, and the widely held view of computers as "job killers" was certainly a negative acceptance factor. Even though this general situation is changing rapidly, many people still cannot believe that a computer can deal with words as well as it deals with figures.
- Technology gap: For many professional translators, the technology gap between MT and their conventional translation methods was simply too great - the move from pen and paper straight to a sophisticated computer represented too large a step. What's more, a computer was difficult to integrate into workflows that were characteristic of a cottage industry.
- Exotic platforms: Until relatively recently, MT was only available on exotic system platforms that were incompatible with other data processing environments. Their proposed acquisition often led to hefty opposition by the IT departments who would have to maintain them.
- Rigid workflows: Even where computers were already in use, MT boxes remained difficult to integrate into existing workflows and users normally had to adapt their work processes to the requirements of the MT system rather than vice versa. Use of these "take it or leave it solutions" often meant an increase rather than a decrease in effort.
- "Unfriendly" systems: User friendliness was not one of the outstanding characteristics of MT systems. The often exotic system platforms were difficult to operate, and the nature of the material normally led to complex translation processes. Vendors tended to concentrate on powerful functionality rather than ease of use, which meant that only "experts" were able to fully exploit such systems.
- High costs: The huge development costs of MT systems meant that vendors charged high prices. Thus the acquisition of an MT system was an extremely expensive proposition, which only larger companies with high work volumes could even begin to consider. What's more, the high purchasing costs were followed by expensive fees for user training and system maintenance.
- "No need" attitude: Many people tended to regard MT as a superfluous technology for which there was no concrete need. After all, to cater for increased translation requirements, companies could simply hire a few more human translators.

These are all factors which have played a role in the limited use of MT up to the present day. Another extremely damaging factor has been the user perception of MT as a per se "solution" which is able to replace the human translator completely. It is arguable but essentially unimportant whether this completely false assumption was the result of the exaggerated claims of the MT vendors or the unrealistic expectations of the user. What is certain, however, is that MT's inability to meet user expectations of near perfect quality have often lead to its complete rejection as a technology. The use of MT as just one of many tools in the translation process, or in situations where a fast result but less than perfect quality is acceptable were never even considered.

## **2 Changing User Acceptance of MT**

If we accept that the situation with regard to MT up to the present day has been characterised by the factors outlined above, why should we expect things to change now? Let us assume that there will be no huge technological leap leading to a sudden and dramatic improvement in output quality, and making MT a real alternative to human translation (which is a pretty safe assumption!) What else could cause potential users to consider use of MT where they have previously rejected it? There is no single factor which will cause this change. Increases in user acceptance will take place on several levels, will owe much to the changes in attitude on the part of MT vendors and will be the natural consequence of technological advance and economic pressures.

### **2.1 Acceptance through Technological Evolution**

Even as late as the mid-eighties, anybody working with a computer, especially at home, was regarded as somewhat exotic. PCs at home were still uncommon and computers were regarded as quirky and difficult to understand and use. Nowadays, of course, we regard anybody who chooses to work with a typewriter rather than a PC as a sort of technological caveman.

This sort of dramatic change in user attitudes is a prerequisite for widespread use of machine translation. Not only has the acceptance of the computer itself changed radically, millions of people are now using programs that deal with words on a day-to-day basis. The term word processing has now

become a synonym for the handling of texts and documents by the computer, and this expression in itself represents an important advance. After all, people were quickly ready to accept that computers could handle complex number crunching operations, but it has taken them a lot longer to accept the idea that computers can process words in a similar way. The use of tools such as spelling or grammar checkers have also played a role in convincing people that word crunching on the computer is just as feasible as number crunching.

A further technological driving force leading to widespread use of PCs for text-based applications was certainly the emergence of the Internet. The multilingual nature of the Internet as a means of communication and a source of information produces a natural demand for translation.

## **2.2 Acceptance through Accessibility and User Friendliness**

A number of MT projects began to yield practical results as early as the 1980's. These complex programs, however, made huge demands on the computer hardware and operating systems, and their use was restricted to mainframe computers and high-performance workstations. Thanks to the rapid advances in hardware and software technology in the last decade and the accompanying performance gains, a personal computer can now provide the speed and power necessary to run a fully featured MT application.

In the days when MT belonged to the world of research, nobody gave a thought to the user. The focus was placed solely on the technology itself. Researchers and developers expended all their energy in trying to overcome the formidable linguistic barriers and forgot about the user as the final target of all their work. Operating system manufacturers have forced the whole computer industry to change its ways. The emergence of graphical user interfaces has led to an increased software acceptance by normal users as they make any PC application so much easier to use. What's more, the dominance of Microsoft Windows has led to a standardisation of many aspects of program use, such as interfaces, menus, help systems etc.

These developments have meant that MT vendors have been forced to rethink the very basics of their systems right down to the architecture level. They have had to adapt their programs to existing standards of appearance

and use. This in itself is a huge step towards user acceptance of an MT system. The user is not forced to remember any special commands; he can use the same menu item or shortcut that he is accustomed to from his word processing application.

But despite all the advantages this type of standardisation can bring, MT vendors should not make the mistake of imposing a straight-jacket on their users. Systems should be easy to operate for the non-experienced user, yet offer a selection of settings and parameters for the expert. An even better strategy is to completely conceal the complexity of the MT system behind a simple but highly intelligent user interface.



Figure 1: Intelligent Lexicon Editor

In the T1 Machine Translation system (Lernout & Hauspie), the user can enter verbs into the lexicon using the same patterns he finds in printed dictionaries. The true complexity of such operations is hidden from the user.

### 2.3 Acceptance through Choice and Modularity

In the past, most vendors offered their customers only one single MT-based solution. It was a take-it-or-leave-it situation, where customers had the choice of using the system on offer, or not using MT at all. And if they used it, it had to be in the way the MT vendor had designed it. There was little room for flexibility and customisability. What's more, the MT vendors

offered no alternative tools to MT or program variants which allowed for upgrading. The entry-level threshold for use of an MT system was much too high. Other vendors have concentrated on completely different tools such as lookup dictionaries, terminology databases, spell checkers, grammar checkers etc. which were not compatible with any existing MT system.

In the last few years, the situation with regard to user choice has changed dramatically. MT vendors have finally come to appreciate the deadlock situation they have engendered with their earlier approach. They have also realised that the development of MT engines and linguistic components was far too expensive to use them in a single product only - a change of thinking which naturally leads to the idea of a range of NLP products. Modularity and reusability became important principles driving the development of scaleable and compatible tools within product families. After all, once a component such as a lemmatiser or a morphological analyser has been developed, they can be used in a wide range of applications such as lookup dictionaries, text analysis tools and frequency list generators, as well as in the analysis and generation modules of actual MT systems.

An MT vendor that wants to target various types of user - from the occasional home user to the corporate environment - has to have a product family on offer; he must analyse the requirements of the individual customers and be able to offer each of them the adequate product or solution. Such a product family will have to include several stand-alone products with different functionality and add-on tools, one or more multi-user workgroup solutions that allow for central lexicon and memory data, and Internet offerings<sup>1</sup> that address the needs of the various Internet players - the surfer, the Internet Service Provider and the Content Provider.

Modularity becomes even more important when we consider the needs of the corporate customer. No two companies are the same, and no two companies have the same translation requirements. Apart from obvious differences such as size, each company or corporation has its own individual profile, the main parameters being line of business and internal organisation. This means that a corporate solution cannot be a single off-the-shelf product; it must be a customised Intranet solution for companies and corporations assembled together from a range of modules. The corporate package that is put together

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<sup>1</sup> McLaughlin/Schwall: *Spicing up the Information Soup: Machine Translation and the Internet*, AMTA 1998.

for a particular company will depend on the answers to questions such as:

- Which translation services are required by the company, and how many users need access to these translation services?
- How many users need to be able to add terminology and Translation memory modules to the system?
- Does the company employ in-house translators, and which other language tools do users need on a day-to-day basis?

And as a company grows and its translation requirements change, modules may be added.

Choice with regard to output quality is also an extremely important factor in user acceptance. Wherever possible, along with Machine Translation, the user should be provided with the mechanisms and channels for obtaining higher quality human translations whenever the need arises. Internet and Intranets provide the perfect vehicles for these types of services.

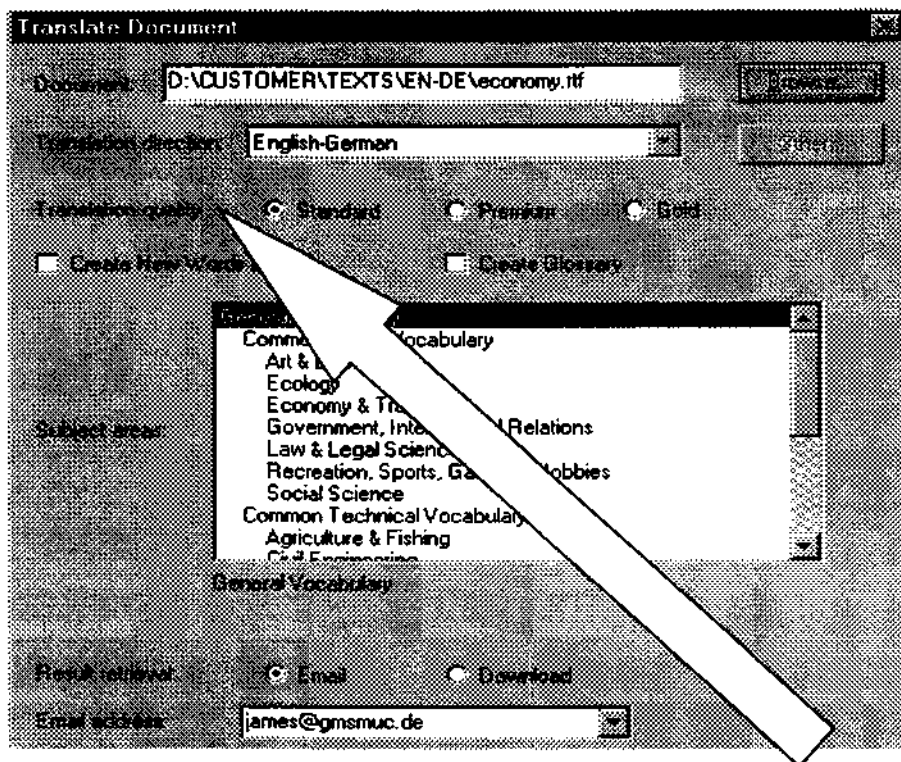


Figure 2: Choice of translation quality

In the iTranslator system (Lernout & Hauspie), the user can choose to have machine translation only, additional post-editing or full human translation.

## 2.4 Acceptance through Integration

As we have already seen, the MT systems of the past were isolated solutions. The emphasis was based on the translation process in the "blackbox" itself, and the systems only worked on exotic and highly expensive hardware and software platforms. Little thought was given to how such a system could be integrated into the user's working environment - how to get a formatted text in and out of the system or how to connect the MT system to user applications on other hardware and software platforms. The users had to change their work processes radically in order to use MT.

The two main reasons for this situation were the lack of a standard industry platform and the fact that complexity of the systems themselves prescribed the platform they had to use: a LISP program, for example, ran on an expensive LISP machine.

As we have seen above, this situation has changed. C++ has become a quasi-standard which has considerably increased portability, and platform standardisation has led to far fewer target hardware and software systems. Most MT vendors now offer a direct link to the most popular word processors and Web browsers. While in the past layout and formats were often lost and texts had to be completely reformatted after translation (often by a separate group of employees), modern MT systems retain all format information, such as fonts, graphics, bullets and numbers, tables etc.

Vendors have also learnt the importance of modularity. This is the prerequisite for integration of MT engines or other linguistic components into any systems that deal with texts, words, and possibly speech or into systems to be controlled through language input. In order to integrate linguistic engines into systems of this kind APIs (Application Programming Interfaces) are needed. These in turn allow us to react much faster to specific user requirements with regard to integration of components.

Integration means that the user is offered a much higher accessibility to MT engines within environments with which it was not originally associated. An example of one such environment is the Internet as a source of multilingual information which a surfer possibly needs to have translated into his or her tongue and which is to be searched in languages other than his or her own. User might also want to use the Internet as a service medium to submit



documents for human and/or machine translation. To meet these needs different products have to be developed, but they might all contain the same linguistic core components.



Figure 3: iTranslator Publish button (Lernout & Hauspie)

Buttons of this kind can be used to add MT functionality to any Web page on the Internet.

Assuming that further advances are made in the areas of integration and modularity, products such as multilingual fax machines combining MT and OCR, multilingual telephony, multilingual hand-held traveller's systems and the like will no longer belong to the realm of science fiction.

## 2.5 Acceptance through Necessity

In the past, the need for Machine Translation was not as obvious as it is today. There are several factors that have created a need for use of MT systems even by professional translators. Globalisation of business, the parallel upsurge in regionalisation, the emergence of new information media in multilingual settings such as the Internet, ever shorter product life cycles requiring localisation - all these technological trends are leading to a reassessment of language and translation needs.

The new guiding principles can be identified as follows:

- translations must be fast, but may not always need to be perfect.
- a large number of languages must be covered
- a range of translation services must be easily accessible, preferably without leaving the usual working environment
- pricing and billing must be as transparent as possible.

It is obvious that the French reader faced with Internet texts in Korean and Arabic will only be too eager to accept the help that MT can bring him. In most situations, he will have no other choice; the need will overcome the reluctance. Once pressurised into considering MT, many people will slowly come to appreciate what it can actually do.

The human translation industry will also feel the wind of change. To cope with the fast growing potential, this sector has already begun to change its structure radically: it is moving away from a cottage industry type of organisation towards a more diversified and geographically wider business organisation. In order to accomplish this, the business inevitably has to concentrate on greater automation of its internal processes. This will provide fertile ground for Machine Translation systems and resulting productivity gains.

## **2.6 Acceptance through Cost-Effectiveness**

MT research and development is an extremely slow and expensive business. In former times, the restrictions on platforms meant that only high-end customers could afford a serious MT system. Nowadays, platforms are standardised and an affordable proposition even for home users. This is the prerequisite for mass production and mass distribution of MT applications and services.

Only ten years ago, a complete MT system including all the necessary hardware and software was sold at more the \$200,000. Today comparable single user systems can be bought for as little as \$200.

But not only the purchase price has changed dramatically. Due to huge increases in performance and translation speed, the cost-effectiveness of MT systems is incomparably and immensely higher. And the possibilities of upgrading within an MT product family now protects users' investments much more effectively.

Finally, the user-friendliness of modern MT systems means that there are no longer hidden costs such as lengthy user training.

### **3 Changing User Perception of MT**

Because of the complexities of natural languages, Machine Translation will not be able to produce perfect output in the foreseeable future. Any high quality MT system must therefore aim to supplement and improve translation output through use of additional tools and database components adaptable to a user's specific needs. Translation Memory technology is certainly one such component.

MT can also profit from the user being able to differentiate what the technology is good at, and where it can best be employed. Combining MT with controlled language is an obvious step, but any vertical market where special lexicons can be integrated also holds great potential. Within clearly defined areas in business, science, and administration, MT systems can produce very satisfactory results - provided that extensive terminology is available.

In many ways, the growing need for translation and localisation pressurises users into accepting quality levels that would previously have been rejected. However, when talking about the practical use of MT systems, we must try to get away from viewing translation quality as some sort of abstract entity, or as an absolute value that can be measured in percentages. MT output should to be viewed in relation to the purpose for which the system in question will be used. When a surfer is interested in a Japanese Web page, he will normally be much happier to read a real-time English gist translation from an MT system (where the quality is possibly low) than waiting a couple of days to have it translated by conventional means, and paying an exorbitant amount of money into the bargain. And, in the case of an operating manual, another typical MT candidate, quality should be measured more in terms of technical accuracy and terminological consistency than stylistic finesse.

Further progress in computer linguistics will naturally lead to further improvements in translation quality. But experience has shown that MT is a field in which enormous amounts of time and money must be invested to obtain even tiny improvements. For economic reasons, vendors must be pragmatic in what they attempt to do, and users will not be prepared to wait several years for a system which is only slightly better, but much more expensive. There are two ways in which MT vendors can proceed in a pragmatic and effective fashion. Firstly, by further modularisation of system architecture and concentration on those modules which will bring the most

benefit to as many applications as possible. Secondly, by analysing the frequency of difficult linguistic phenomena, and prioritising these in accordance not only with their recurrence in large general corpora, but also within the domains of specially targeted applications.

This paper has attempted to outline the reasons why MT will play a much larger role in people's lives than ever before. But its complete acceptance as a technology can only be achieved by radically altering user perception of MT. The challenge for vendors is being honest about quality issues, emphasising and concentrating on what MT is good at, and, at the same time, combining it with any other useful technologies.