Machine Translation for Dutch: the NL-Translex Project
Why Machine Translation?

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Abstract

With a view to reinforcing the position of Dutch as a language for international communication, the Dutch Language Union (Nederlandse Taalunie) and several Dutch language area ministries have decided to invest in the development of a Machine Translation system for Dutch (from and into English and French).

With additional funding from the European Union (provided in the framework of the Multilingual Information Society Programme) and from the technology supplier (Systran) a shared-cost project with a total budget of 2,4 million € was set up. The development has started in July 2000 and will take two years.

The operational objective of the project is to develop a system that will provide translations of a quality such that the combined input (resources) needed for Machine Translation (MT) plus post-editing by a human translator is less than the input needed for a "normal" human translation: one might call this FASQT, Fully Automatic Sufficient Quality Translation…

It can be shown that even a marginal increase in productivity leads to a surprisingly short payback time. Likewise, the potential for future savings is huge. We therefore contend that the question "Why MT?" could even be answered on purely economic grounds alone, notwithstanding the political motivations often surrounding such investment decisions.

1. Background of the Project

In the European Union an ever increasing flow of documents is generated that has to be translated in an ever increasing number of languages. This is true for the private sector, but particularly for the public sector, as all official documents of the EU have to be translated in all official languages. This is a very expensive and time-consuming process, which is why European administrations, particularly the European Commission (EC), have always been looking for technical solutions to this problem, such as Machine Translation (MT).

Indeed, for many years the EC has been actively fostering the development (and use) of MT systems, in-house and also via large-scale funding programmes (e.g. EUROTRA[1]). However, at the end of the 1980s/beginning of the 1990s the fact that Fully Automatic High Quality Translation (FAHQT) was not (yet) feasible began to sink in… MT was in a crisis and EC development and funding activities all but stopped.

Another factor contributing to this relative stand-still in MT matters from the EC was the application of the subsidiarity principle, saying that the EU should only undertake or fund activities that have to be done at the European level to be done well - and leave the rest to the initiative (and funding!) of the Member States.

The EC, at that time seeing no real return-on-investment from its MT activities, decided to "cut its losses" and referred almost all new developments to the private sector and to the Member States. Each Member State had to take responsibility for its own language(s) - especially for the smaller languages…

It is in this context that in the early 1990s the Nederlandse Taalunie (NTU, Dutch Language Union), a Dutch-Belgian intergovernmental organisation for common policy on the Dutch language and literature[2], began to make plans for the development of MT systems for Dutch.

In 1995 the NTU, with the Ministerie van de Vlaamse Gemeenschap (Ministry of the Flemish Community of Belgium) and the Nederlandse Ministerie van Onderwijs, Cultuur en Wetenschappen (Dutch Ministry of Education, Culture and Science), tried to reach an agreement with the EC for the joint development of such a system. The EC, however, was not yet ready to launch or even participate in any new MT developments and the NTU and partners decided to temporarily "freeze" their plans (together with the funds they had earmarked for this development) and wait for a new opportunity.

This opportunity came in 1996 with the Multilingual Information Society Programme (MLIS)[3]. The EC, recognising that multilingualism is an important aspect of the Information Society, decided to fund this programme with 15 million €, to be used in shared-cost projects. A specific action line was created in which MT development could find a new "home": Action Line 3.2 - Promoting the use of advanced language tools in the Community and the Member States' public sector - Cooperative multilingual public administration projects.

Therefore in 1997 the NTU, with a consortium of partners from the Netherlands and Belgium, submitted a project proposal, called NL-Translex[4]. At that time the technology supplier was not yet known, as the consortium had decided to proceed to its selection through a tendering procedure. It should be noted that the project also involves a number of user organisations, acting as validation sites, who are not all formally members of the consortium. In December 1998 the proposal was approved by the European Commission and on 31 December 1998 a contract providing the project with 450 000 € of Community funding was signed.

2. Project Description

2.1 Objectives

The objective of the NL-Translex project is to develop MT modules between Dutch on the one hand and English and French on the other which translators can use effectively. In particular, the system is intended to assist the translation services of official bodies of the EU Member States and of the EU itself (including the European Commission's Translation Service, SdT) in their communication.

A further explicit objective is to improve comprehension within the European area for officials and citizens by providing a tool which will enable them, by means of machine translation, to process data from languages which they do not speak.

In addition to the above practical aim, the NTU and its partners all have objectives relating to strategy, language policy and culture. The technology supplier in the consortium, being the only commercial partner in the project, of course also has commercial motives for sharing in the cost of this development and expects to achieve a significant market share in the Dutch language area through this project.

2.2 Scope

The project concerns the development of lexica and transfer modules for automatic translation from and into Dutch. The target performance standard is post-editing quality, meaning that the translation is of sufficient quality to be useable for post-editing by a human translator. The translation combinations are: Dutch into English or French, and English or French into Dutch.

In view of the financial limitations, these language pairs will be developed according to different degrees of priority. The first priority is translation from and into English. This was decided on account of market demand (technical translations, internet) which focuses on translation from and into English. English is also increasingly becoming the main language for intra-EU communication between administrations.

The second priority is assigned to the pairs involving French, for which there also is a clear demand. French is one of the official EU working languages, in which many documents are produced. Furthermore, the Belgian federal government, the Flemish and Walloon regions and the institutions of the bilingual region of Brussels are also expected to make substantial use of combinations from and into French.

As to the text categories and subject fields, a certain selection was deemed necessary. Since the envisaged use involves in particular written communication between the Member States and the EU institutions and between the Member States themselves, legal and administrative texts have high priority. A decision concerning the specific subject fields to be treated was deferred as the user organisations are expected to provide input to this end.

2.3 Parties involved in the project

The project involves financing partners, user organisations and associated partners:

2.3.1 Financing partners

The following organisations are involved in the project as financing partners:

- Nederlandse Taalunie (NTU, Dutch Language Union), inter-governmental organisation for common policy on the Dutch language and literature, Netherlands/Belgium
- Ministerie van Onderwijs, Cultuur en Wetenschappen (OC&W, Ministry of Education, Culture and Science), Netherlands
- Ministerie van Economische Zaken (EZ, Ministry of Economic Affairs), Netherlands
- Vlaams Instituut voor de Bevordering van het Wetenschappelijk-Technologisch Onderzoek in de Industrie (IWT, Flemish Institute for the Promotion of Scientific and Technological Research in Industry), Belgium

- Systran Luxembourg S.A., the technology supplier[5]
- European Commission (EC), although strictly speaking not being a partner, participates in the funding of the project

These organisations are interested in the implementation of the project both for language policy and for economic reasons. Some of them only have an occasional, small-scale need for translation but they wish to help ensure that the Dutch language plays a full part in new technologies, including automatic translation.

The administrations who contribute financially to this project also want to increase the awareness and the use of language technology by a maximum number of potential users, including other government bodies. Through their participation in this project, they intend to achieve objectives principally in the field of language policy and culture and also to contribute to the specific aims of the MLIS action programme.

The commercial partner in this project of course simply has commercial motives for investing in this development and expects to achieve a significant market share in the Dutch language area through this project.

2.3.2 User organisations

The following organisations are involved in the project as user organisations:

- Ministerie van Buitenlandse Zaken (BuZa, Ministry of Foreign Affairs), Netherlands
- Ministerie van de Vlaamse Gemeenschap (MVG, Ministry of the Flemish Community), Belgium

These organisations are participating in the project because they themselves have translation requirements in the pairs of languages treated by the project and could use the system developed to meet those requirements. They will not make any direct financial contribution to the project, but will contribute expertise and labour effort.

Indeed, they will provide a whole range of non-financial inputs: they have text material such as text corpora and specific terminology and expressions which can be used to build lexica. They also will have real text translated by the MT system during the development phase and perform a critical assessment of the translations with a view to optimising the components developed.

These two organisations translate texts concerning virtually all areas of government policy, many of them for bodies in other Member States and/or EU institutions. The Translation Branch of BuZa is also one of the principal suppliers of Dutch terminology for Eurodicautom, the EU's terminological database.

2.3.3 Associated partner

The Sociale Verzekeringsbank (SVB, Social Security Bank) is an associated partner in this project. The SVB is a social security organisation responsible for implementing a number of items of Dutch social legislation. The SVB Translation Agency primarily serves the SVB, but also carries out work for other social legislation administration

agencies. Much of the translation requirements concern correspondence with similar social security administration agencies in other countries.

The SVB is an associate of this project because it is not, strictly speaking, a public administration. However, it is a government body and is not liable to VAT. Like other user organisations, the SVB Translation Agency is co-operating in the project because it has substantial translation requirements involving the pairs of languages envisaged and could use the components developed to meet those requirements. The SVB will not make any direct financial contribution to the project, but will contribute expertise and labour effort.

Indeed, the SVB has text material such as text corpora and specific terminology and expressions which can be used to build lexica. It also will have real text translated by the MT system during the development phase and perform a critical assessment of the translations with a view to optimising the components developed.

The participation of the SVB is important for attaining a high standard of automatic translation in the case of texts relating to social security, one of the key areas of communication between public and other bodies of the various EU Member States.

2.4 Breakdown of financing

From a financial point of view a more interesting breakdown is in the categories Dutch language area public funding (NTU and partners), EU funding (European Commission) and private investment (Systran). Figure 1 gives an indicative overview of their respective contributions to the project (in %). The input (labour effort) of non-financing partners has been converted to money equivalents.

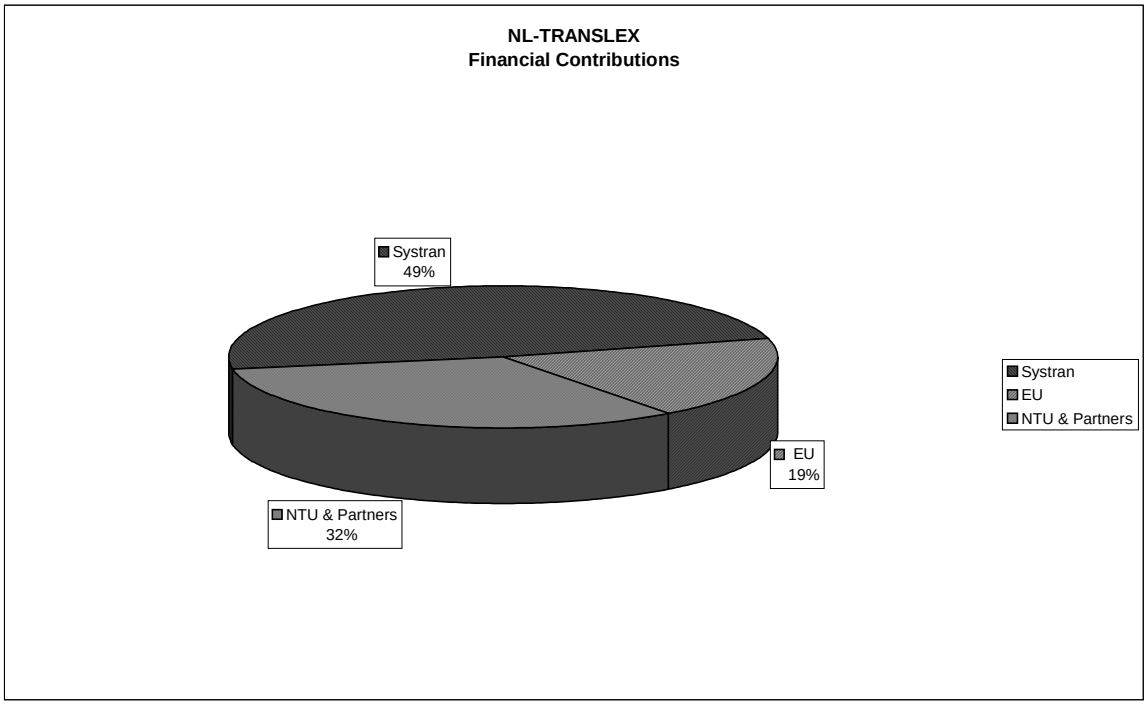

Figure 1 - Financial contributions to the NL-Translex project (in %)

2.5 Available resources

Apart from their financial contribution and labour effort, the project partners also provide other resources. The resources available to the project include:

- The Dutch Reference Database (RBN) of the Committee for Lexicographical Translation Facilities, a committee set up by the Dutch and Flemish Ministries of Education, which is legally accountable to the NTU. The RBN is a database for producing bi-lingual or multilingual dictionaries with Dutch as the source language and has 45 000 entries, selected on the basis of frequency in modern source material, comprising texts not specific to a particular field. The database is linguistically enhanced not only with morphological information (word types, inflection) but also with semantic categories.
- The database of the Dutch Orthographic Dictionary developed for the NTU by the Institute of Dutch Lexicology (INL). The Dutch Orthographic Dictionary contains 110 000 entries selected on the basis of frequency and distribution in general post-war source material. The database is enhanced with morphological information such as word classes and inflection. If necessary and subject to certain conditions the expanded word list file developed for the Electronic Dutch Orthographic Dictionary, which contains many more word forms, can be used.
- Terminology files of the participating user organisations.
- Text material in different languages of the participating user organisations and possibly their sister organisations in other countries, including a high proportion of parallel texts, i.e. texts in Dutch and their translation in English and/or French.
- On conditions yet to be decided, use of the text corpora of the Institute of Dutch Lexicology in Leiden, produced and linguistically enhanced partly with the support of the NTU.
- OMBI, an editor for producing bilingual or multilingual dictionaries, developed by the Lexicographical Translation Facilities Committee for dictionary projects.
- Possibly, on conditions to be decided, other tools and resources available to the NTU's partners, such as term extractors, pre-processors, etc.

The user organisations, in particular, also provide labour effort:

- representatives of the advisory group of users who attend the group meetings, consult their colleagues at work and produce preparatory consultation documents;
- testers in the translation field who have real text translated by the system (prototype) in the development phase, assess the quality of the translation and of the interface and contribute their experience to the development process.

2.6 Market and user population

The NTU and its partners are aiming at maximum versatility with this project. The systems to be developed are intended primarily for use in the translation services of official bodies in the Member States and the EU institutions. They will therefore be largely tailored to those fields which are crucial to this institutional context, such as law and legislation, social security, agricultural policy, economic policy, etc.

At the same time the systems should provide the basis for use in other types of text (e.g. engineering) and in other fields of application (e.g. internet). To achieve good quality the modules will need to be further adapted to the specific requirements of the fields in question. This is a job for the market operator involved in the project, i.e. the technology provider. Further tailoring to particular fields and users is therefore beyond the scope of this project.

The applications and functions which the project should be able to handle include:

- automatic translation of official texts of the Member States and EU institutions as input for post-editing by human translators;
- integration of automatic translation into overall interface systems for human translators providing other translation tools such as translation memories and terminology databases;
- automatic translation of texts, providing an end-product that is of sufficient quality for browsing purposes;
- automatic translation on the internet, e.g. by integrating translation systems and components into internet search engines;
- use of the system components for applications other than automatic translation, e.g. for restricted grammar checkers and for automatic indexing programs.

The fact that key intended user organisations are involved in the development phase will ensure that the project produces the best possible results for application in practice. Organisations not involved will be urged to familiarise themselves with the facilities by using the information channels of the government services of the EU Member States.

Finally, the project will also produce tools for other potential users of automatic and semi-automatic translations, such as:

- translation services of major multinational companies requiring translation of technical documents;
- translation agencies carrying out assignments for third parties;
- providers of internet facilities, such as navigation systems, search engines, servers, etc.;
- providers of on-line translation assistance for small translation services and freelance translators.

2.7 Activities carried out so far

2.7.1 Preparatory phase - Setting up Structures

After the European Commission approved the project proposal and the contract between the European Commission and the NTU (being the coordinator, acting on behalf of the consortium) was signed, a number of structural arrangements were made:

- formation of a project management board;
- appointment of a project manager;
- formation of an advisory group of experts;
- formation of an advisory group of users.

The project management board is made up of representatives of all the partners from the Dutch language area and representatives of the European Commission. This board takes all fundamental decisions regarding the project.

In view of its complexity and scale in terms of duration, budget and number of players involved, the project needs a central person to implement and advise on the project as a whole. This is the project manager who reports to the board and is responsible for coordination and support for the various advisory groups, conducting the tendering procedure and following up implementation by the technology supplier.

The advisory group of experts consists of experts in the field of machine translation, natural language processing etc., i.e. people from the scientific or academic world and people with proven experience in an industrial environment. They have advised the board in drawing up the technical specifications for the tendering procedure and have assessed the proposals received.

The advisory group of users provided input concerning the wishes and requirements of the user organisations during the preparation of the project, e.g. in relation to the technical specifications and the assessment of the proposals received from the users' point of view.

2.7.2 Draw up Technical Specifications

When drawing up the documents for the call for tenders the technical specifications were defined following consultation with the advisory groups of users and experts. The principal requirements or expectations as regards technical aspects were:

- The system to be developed should be used as a tool for human translators in their normal computer operating system and PC word processing environment. The system should preferably not require anything other than access to an up-to-date work station and possibly a modem. The system should be capable of being incorporated in current word processing environments and/or supporting the text formats of these word processors, e.g. MS Word and WordPerfect.
- It should be possible to integrate the system with other modern tools for translators, such as terminology databases and translation memories.
- The user interface should be as user-friendly as possible and require a minimum level of specific knowledge of controls and interaction.
- The components envisaged must be compatible or capable of being integrated with the existing CAT/MT environment at the European Commission.
- The components to be developed should be structured files which are separated as much as possible from the (program code of the) translation engine and should offer maximum guarantees as regards potential re-use: (a) in subsequent machine translation systems and (b) in applications other than machine translation, e.g. as a basis for electronic dictionaries on CD-ROM.
- An MT system which has already demonstrated its practical value in real life situations would be preferred.

2.7.3 Call for tenders

After the technical specifications were drawn up, the project management board worked out a procedure for the call for tenders aimed at the selection of a technology supplier for the translation system who would be willing to be integrated in the consortium and invest jointly in the development of a Dutch system.

Apart from the technical specifications other criteria were also considered, such as:

- The company's proven experience in developing similar components, references from existing customers using the system.
- Stability of the commercial partner, direct or indirect financial, manpower and organisational scope for executing projects of such a size.
- Willingness to make a financial contribution, and the level of that contribution.
- Willingness to grant free users licences to the participating organisations and to the public administration sector in the EU as a whole.
- Willingness to accept the NTU's ownership/joint ownership of the components developed.
- Once the components have been developed, the company's willingness to take on their technical maintenance on its own account and at its own risk.
- Willingness to work with other companies or technology suppliers such as publishers of dictionaries and lexicographical products, and with centres of scientific expertise, particularly in the Dutch language area.

The NL-Translex management board launched a call for tenders based on the negotiated procedure. The call for tenders was officially published in May 1999. After evaluation of the offers and a subsequent round of negotiations Systran S.A. was chosen because it had submitted the economically most attractive offer and could offer the best guarantees of achieving the project aims. As the selection of the right partner was of paramount importance and also had to be done with the utmost care, the project finally could begin the real development work only in July 2000, but the work is now well under way…

3. Expected Benefits of the Project

3.1 Strategic impact

The project makes a substantial contribution to the objectives of the MLIS Action Programme, particularly the following sub-objectives:

- enabling Europe to safeguard its linguistic and cultural diversity in the information society of tomorrow;
- guaranteeing a balance between the major languages and the languages of smaller communities in Europe;
- promoting and establishing cooperation between the EU and the Member States for the purpose of developing basic components for the multilingual information society;
- developing an advanced translation industry by tendering;

- creating a trained, advanced community of users by involving large user organisations from the public sector of the Member States concerned and by judicious dissemination of the project results to other potential users.

The NTU and its Dutch language area partners also have their own aims in carrying out the project. These objectives are not only practical but are also related to language policy and culture. Their main objectives that will be fulfilled with the project are:

- strengthening the position of Dutch as a working language in the EU institutions by supporting the infrastructure required for that purpose;
- strengthening the position of Dutch in linguistics and language technology in general and in automatic translation systems in particular;
- strengthening the position of Dutch in new developments in automatic translation, e.g. as regards the integration of automatic translation in the internet and the integration of translation and speech technology in new systems for interaction between humans and machines;
- promoting the use of modern tools by the public administration of the Member States concerned in dealing with their translation requirements;
- making it easier for companies and institutions in the Dutch language area to enter new markets with different languages by providing the basis for automatic translation tools which can be used to translate documentation and marketing material.

3.2 The Economic aspect - Why FASQT?

As stated above, the aim of the project is to obtain a machine translation system "which translators can use effectively" (2.1), providing a "translation (that) is of sufficient quality to be useable for post-editing by a human translator" (2.2). So the project aims to produce an MT system that will make it possible for translators to carry out their work in less time. Please note that the objective of Fully Automatic High Quality Translation (FAHQT) has been explicitly abandoned as not being realistic.

The operational objective of the project therefore is to develop a system that will provide translations of a quality such that the combined input (resources) needed for Machine Translation (MT) plus post-editing by a human translator is less than the input needed for a "normal" human translation. We suggest to call this FASQT, in contrast to FAHQT, in the sense that the system delivers fully automatically (FA) a translation (T) of sufficient quality (SQ) to be of economic use.

Of course the question immediately comes to mind as to how much more efficient the system has to be, before it earns the label "SQ". If we consider all inputs involved, we quickly realise that nowadays the equipment used is not part of the equation anymore: all translators today use a computer for their work and a modern MT system does not use more (computer) resources than the normal software used by translators (word processing, terminology database, etc…).

The same holds true for many other elements, like training (use of MT for post-editing requires no more training than the use of the standard modern translation environment, see also the final remarks in section 4), maintenance, etc.

In fact, the only element that represents a significant extra cost compared to normal human translation is the cost associated with the development of the system. Therefore the question as to what is SQ can be answered in terms of the payback time of the development cost.

It is safe to state that if the system pays back itself within a few years of use through increased productivity, the SQ criterion is met. We will not pronounce ourselves as to the (strategic) question as to how many years exactly would be acceptable, but fortunately it can be shown that a small increase in productivity can lead to a surprisingly short payback time.

The figures 2a, 2b and 2c below give a graphic presentation of the payback time for three scenarios. Scenario (a) concerns a small country (or language area), in which annually 100 000 pages would be translated with MT into and from two other languages. Scenario (b) concerns a medium-sized language area with 200 000 pages/year (the NL-Translex scenario) and scenario (c), finally, concerns a large language area with 500 000 pages/year. Other basic assumptions are that the price of a translated page is 40 € (an EU average) and that the development of two (bidirectional) language pairs costs 2,4 million € (the NL-Translex project…).

These scenarios are not only realistic, they are even on the pessimistic side, mainly with regard to the number of pages translated per year in the respective language areas. Exact figures for the whole Dutch language area are not known, but the EU institutions alone translate approximately 200 000 pages/year from and into Dutch (about 90% of which is from and into French or English). The assumptions underlying the scenarios will not further be discussed here, but anyone familiar with the sector will probably agree that the estimates used are indeed on the conservative side.

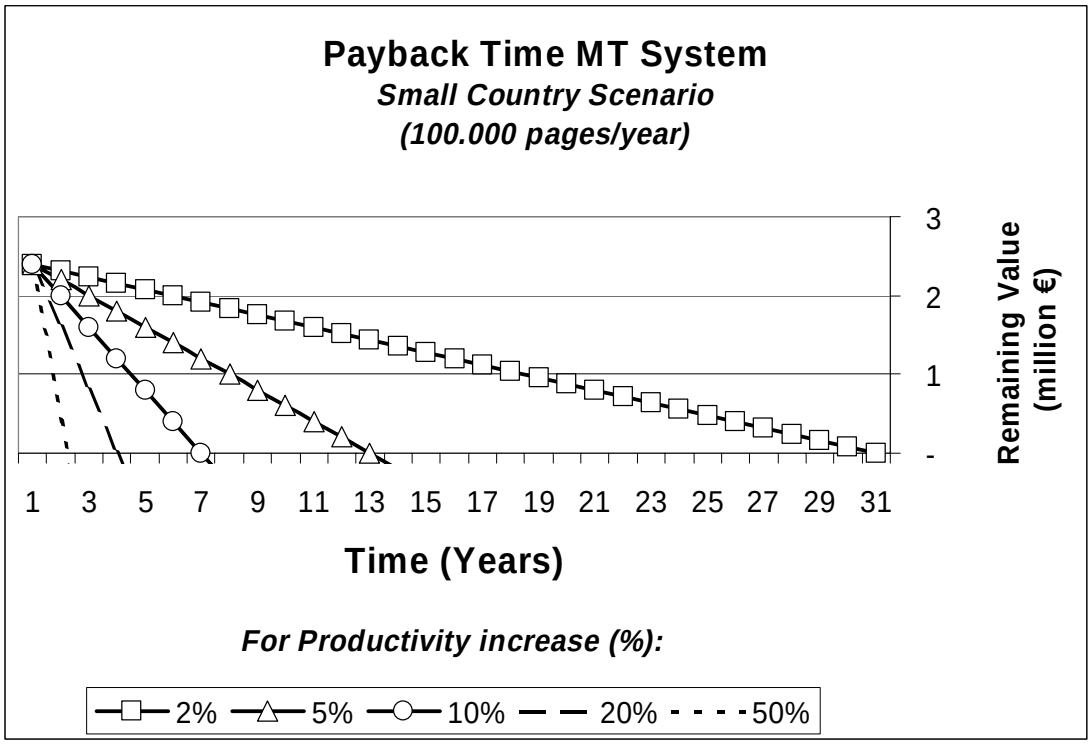

Figure 2a - Payback Time - Small Country Scenario

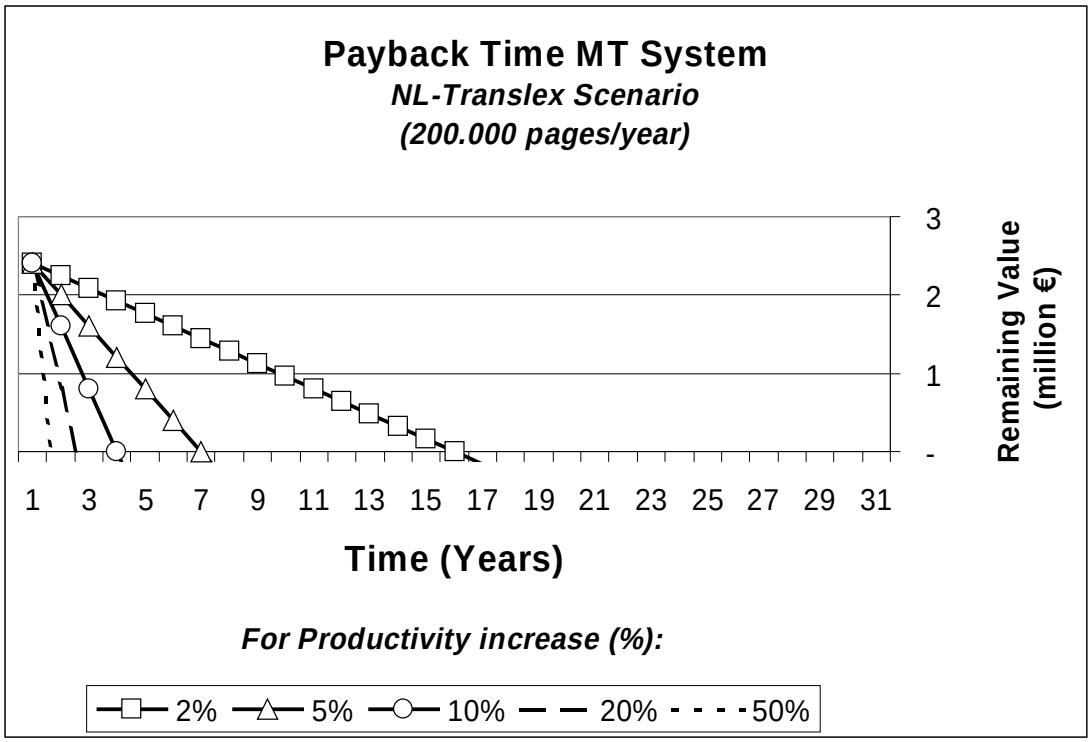

Figure 2b - Payback Time - NL-Translex Scenario

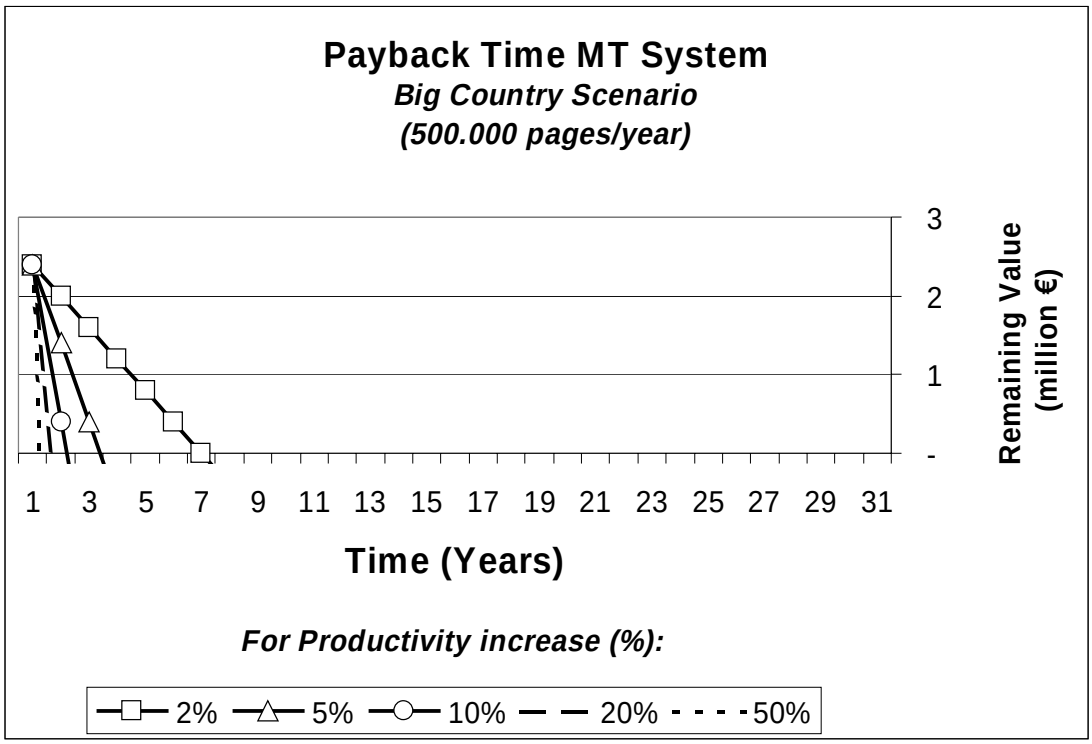

Figure 2c - Payback Time - Big Country Scenario

As becomes clear from the graphs, even a marginal increase in productivity leads to a surprisingly short payback time. Likewise, the potential for future savings is huge. If we consider that according to some sources the use of Translation Memories (TM)

leads to an increase in productivity in the double digit range, it is not unreasonable to expect similar effects from the use of MT-generated TM segments.

We therefore contend that the question "Why MT?" could even be answered on purely economic grounds alone, notwithstanding the political motivations often surrounding such investment decisions.

4. Evaluation methodology - How is FASQT measured?

The expected benefits of the project include political (or “strategic”) components on the one hand (3.1) and economic (or “efficiency”) components on the other (3.2). Whereas the assessment of the strategic impact falls outside the scope of the project proper, a thorough evaluation of the efficiency aspects (“Did we achieve SQ?”) has been built in from the very start.

In order to determine whether the objective of Fully Automatic Sufficient Quality Translation has been achieved (and also whether the technology supplier has lived up to the expectations) it will be necessary to further operationalise the concept of FASQT. It should be noted that this aspect was deemed sufficiently important to devote a separate work package of the project to this subject of evaluation methodology and acceptance procedure, including the experimental design.

Indeed, traditional methods of MT system evaluation unfortunately provide almost no guidance, as they tend to concentrate on either abstract theoretical system characteristics assessment, or on self-referential benchmarking. In short, traditional methods try to give an answer to questions like “How well is *<fill in your favourite grammatical construction here>* handled by this system?” on the one hand, or to the question “How well does version 4.2 of this system compare to version 4.1?” on the other hand.

Of course, these questions do not cease to be relevant and in fact they are highly important from a theoretical perspective and also from the viewpoint of the systems developer. However, from the perspective of parties commissioning and funding (the development of) such a system, we contend that there are more relevant questions, like: “Will I profit from using the system, will it help me produce translations more efficiently, will I make money from it?…”.

These questions indeed correspond exactly to the operational objective of attaining the criterion of “Sufficient Quality” as explained above, for which we now can formulate a test condition: “When I use the system, do I translate more efficiently than when I do not use it?”.

It becomes clear that our test in fact boils down to the carrying out of an experiment in which a simulation of a real-life translation has to take place and in which the outcome (measured productivity), making use of the MT system, is compared with the outcome when not using the system - keeping all other things equal. We will have to measure whether or not the combination of MT plus post-editing by the translator requires less time than making the translation “from scratch”, in a parallel set-up: hold a kind of “shoot-out”, so to speak…

As said before, the exact design is to be defined in a separate work package, not yet finished at the time of the writing of this article, but we can already give an indicative description of the method envisaged.

A number of texts will be selected at random from a large text corpus. These texts then have to be translated by translators who should have experience with post-editing MT translations. We will then check how much time was necessary to make the translations from scratch and how much time was required for the combination of MT and post-editing.

All translations will then be checked by experts who will not be told how the various translations were obtained. By weighting the two criteria, i.e. time required and quality achieved, we will then determine whether the developed MT system does indeed comply with the requirements.

Refinements to eliminate individual variations in translation/post-editing speed are possible. For example: the first half of the translators (group A) would translate half of the texts from scratch. The other half (group B) would post-edit the translations produced by the MT system. Then the other half of the texts is translated with groups A and B changing places. Some test runs will be necessary to establish whether such refinements are necessary.

Of course, to keep all other things equal, the translators would all have to use the same working environment, equally suited to translation from scratch as for using MT results for producing the translation. Fortunately such a working environment exists and is now in general use among translators: this is what we now commonly call a translator's workbench (TWB)[6]. Speaking in TWB terms we could say that in the test one group of translators works with an empty Translation Memory (TM) and the other group works with a TM filled with proposals from the MT system.

As a final note, one could add that in fact the generalised introduction of TWB type products was a pre-condition to enable the use of MT systems for real translations. There are several reasons for this, the most important maybe being that this kind of environment has accustomed translators to work with proposals "from the machine" and to edit these proposals before inserting them into the translation. Post-editing (be it from so-called "fuzzy matches" or from "MT proposals") has become part of the daily routine of many translators.

5. Conclusions

It is too early to draw final conclusions from this project, in which the development work has only just begun. However, the project so far has already produced some interesting new ideas and concepts which may be useful for other projects in the area. They are summarised below:

1. **Political motives** (language and culture policy) for developing MT systems, especially for smaller languages, are more valid than ever.

2. **Private/public partnerships**, involving the policy makers as initiators and providers of seed capital, administrations as user organisations and validation

sites and a commercial partner as technology supplier, are a feasible and efficient model.

3. In such a model joint development implies shared results. The approach followed in this project, which leaves the commercial market to the technology supplier and serves the participating organisations (and the public administration sector in the EU in general) through **free licences for the public sector**, provides a win/win situation.

4. Return-on-investment awareness and the notion of **payback time**, long absent in MT development projects, can now be made explicit, thanks to a more mature market and mature technology.

5. **"Shoot-out" type evaluation** design provides a way out of the theoretical or self-referential properties that traditionally have been characteristic of MT system evaluation methods.

6. Paradoxically, abandoning the ideal of FAHQT and introducing the **FASQT** concept has made MT more mature. This development has been enabled by the widespread introduction of the translators' workbench using translation memories.

7. Finally, it seems that now at last **the time is right to invest in MT systems**. Machine Translation has finally come of age, will soon pervade our daily lives and as a mature technology is here to stay.

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Brussels/Den Haag, January 2001

Notes

1. In the 1980s, the Commission funded the multi-national EUROTRA project in machine translation, together with a number of basic and applied research projects in natural language and speech processing through the ESPRIT programme, and various exploratory actions in the Multilingual Action Plan. These played an early role in seeding written and spoken language processing expertise around Europe. For an overview of Community actions in the field, see: http://www.hltcentral.org
2. NTU website: http://www.taalunie.org/
3. MLIS website: http://158.169.50.95:10080/mlis/
4. Official title of the project: NL-TRANSLEX - Automatic Translation System from and into Dutch for public administration (MLIS Project nr. 4003).
5. Systran website: http://www.systransoft.com/
6. Translator's workbench (TWB) is a generic name for a Computer Aided Translation productivity environment based on the interactive use of Translation Memories. It is also the brand name of one popular software package using that concept.

List of Abbreviations

BuZa: Ministerie van Buitenlandse Zaken (Ministry of Foreign Affairs, NL)
CAT: Computer Aided Translation
EC: European Commission
EZ: Ministerie van Economische Zaken (Ministry of Economic Affairs, NL)
EU: European Union
FAHQT: Fully Automatic High Quality Translation
FASQT: Fully Automatic Sufficient Quality Translation
IWT: Vlaams Instituut voor de Bevordering van het Wetenschappelijk-Technologisch Onderzoek in de Industrie (Flemish Institute for the Promotion of Scientific and Technological Research in Industry, B)
MT: Machine Translation
MLIS: Multilingual Information Society (Programme)
MVG: Ministerie van de Vlaamse Gemeenschap (Ministry of the Flemish Community, B)
NTU: Nederlandse Taalunie (Dutch Language Union, NL/B)
OC&W: Ministerie van Onderwijs, Cultuur en Wetenschappen (Ministry of Education, Culture and Science, NL)
SdT: Service de Traduction, the Translation Service of the EC
SVB: Sociale Verzekeringsbank (Social Security Bank, NL)
TM: Translation Memory
TWB: Translator's Workbench