

# Machine Translation Feasibility Study at the European Commission

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## Abstract

Since the introduction of machine translation (MT) to the Commission 20 years ago the project has been funded from a research budget; but now that MT is becoming an operational concern, at least for certain language pairs, the Commission is obliged to review its policy. A five-point study is therefore examining how MT might be used in the best and most economical way.

- a) An in-house survey of Commission MT users ascertains their MT needs in regard to languages, speed and quality.
- b) In parallel, practical experiments are being conducted in the Translation Service to provide an evaluation, as objective as possible, of the effects of machine translation on the Translation Service's production line.
- c) An investigation is being conducted on the legal issues which dictate the use, by third parties, of the Commission's multilingual tools and linguistic resources.
- d) The Commission wishes to find out if there are alternatives on the market to its current machine translation system and what costs would be involved. A technological survey of MT providers and users is underway and will give a clear picture of the state of the market for MT products and services.
- e) Finally, out of the data from the first four studies a cost-benefit analysis will be made. At the time of writing only preliminary results can be presented. The final conclusions, however, will enable decisions to be taken regarding the future orientation of MT at the European Commission.

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## Background

Twenty years ago two departments of the European Commission, the Translation Service and DG XIII (which is responsible for the exploitation of telecommunications research), decided to work together on the development of the Systran machine translation system. Since then, funding for both linguistic and technical development has been provided by DG XIII under the Multilingual Action Plans, while the Translation Service has played an active and joint role in matters relating to language. This proved to be a satisfactory solution, particularly in the early days, when the use of MT was limited as an operational tool in the institution's daily work.

However, since the beginning of this decade the use of MT in the Commission has made giant strides, mainly as a result of the general adoption of electronic mail, but also of promotion within the institution. In 1995 a total of 170 000 pages were put through the system, with the Translation Service accounting for slightly less than one third of this demand. Machine translation could now no longer be treated as a matter for research only; indeed in the case of certain language pairs, MT had already moved from a research to an operational environment. The Commission was therefore obliged to review its policy. It hardly came as a surprise, when in 1995 DG XIII announced its decision to wind down its participation with a view to withdrawal from the project. Although the last Multilingual Action Plan came to an end in December 1995, financing would nonetheless be provided by DG XIII until 1998, giving the Translation Service sufficient time to devise a new strategy.

## Feasibility Study

The Translation Service is thus faced with the decision whether or not to allocate funds from its own budget to support the use of MT in the institution. To this end, a feasibility study is examining the conditions under which all or a part of the machine translation service might be taken over. On its completion it should be possible to determine to what extent it would be appropriate to continue machine translation at the European Commission and under what conditions such a service could be managed by the Translation Service.

The study comprises five distinct, but interdependent tasks:

1. A survey of machine translation users, and non-users, in all Commission departments.
2. Practical experiments with in-house translators.
3. An investigation of the legal issues involved.
4. A market study.
5. A cost-benefit analysis.

### 1. The User Survey

#### 1.1 The Objectives

It was felt that the experiences of users would be of fundamental importance in the Commission's decision to continue, or not to continue, with MT. Indeed it is on the strength of the findings of the user survey that any future action on the remaining

four points will be determined, and the questionnaires were designed to provide both factual information and strategic guidance. A Coordination Group, consisting of 10 members representing different backgrounds, fields and languages, was set up to monitor progress and provide an objective viewpoint.

## 1.2 Methodology

MT is freely available to all Commission officials via the internal electronic mail network and the majority of users are non-linguist staff who help themselves to machine translation as and when they need it. Consequently, there is no direct feedback. We set out to discover why, how, and how much MT is used, and who the users are. The survey was an ideal opportunity for users to voice their opinion on the service offered. But it was hoped that the remarks of those who had never used MT would indicate the reasons for this and help to remove some of the obstacles to the adoption of MT. It became clear that there were three groups to be considered:

1. in-house Commission translators
2. administrators in the operational departments of the Commission
3. non-users.

A different version of the questionnaire was sent to each group, tailored to their specific context.

In the case of the Translation Service the questionnaire was distributed to all members of staff, users and non-users alike. In the case of the administrative departments questionnaires were sent to all users of the MT system over the previous 16 months. For non-users a proportional sampling method covering 4.5% of the remaining Commission staff was adopted.

## 1.3 The Questions

Objectivity has been the overriding concern throughout the whole survey; for this is an opportunity to dispel a few myths and establish once and for all a number of hard facts on the subject of machine translation.

Ten basic issues are addressed in the questionnaires:

1. Who the users are.
2. Why they use MT.
3. How they use it.
4. The volume of MT usage.
5. How useful it is to the Translation Service **directly** (texts post-edited by translators).
6. How useful it is to the Translation Service **indirectly** (texts submitted for MT by administrators that would otherwise have found their way to the Translation Service).
7. How useful MT is to the Commission departments as a linguistic tool (for browsing, translating, drafting).
8. The service's strengths and weaknesses (customer satisfaction).

9. The reasons why MT is not used.

10. Assuming that it is of use, how the service can be improved.

#### *1.4 Response Rates*

Of the 1,700 questionnaires distributed to Translation Service staff, 520 of whom were identified as MT users, 773 responses have been received. A total of 2,600 users in the administrative departments were surveyed, with 735 responses received. In the case of non-users a proportional sampling method covering 5.5% of the remaining Commission staff was adopted and 270 responses have been received.

#### *1.5 Results*

The findings presented here are preliminary. The final results will be published in the autumn.

##### *1.5.1 Translation Service - Users*

Translators like to use MT because of its speed, the typing time it saves, and the fact that the raw MT is returned with its original format. MT is also sometimes used to provide assistance with terminology. As nearly all those translators who use MT do so to produce a final, polished translation, they tend to be somewhat negative about the quality of the MT output. They do not like the heavy post-editing involved, although a certain number do appreciate the system's sense of humour. The majority find less than half the documents useful, and a small percentage find no texts useful. Over 50% of users in the Translation Service request MT only occasionally, and although they do save some time, a significant number say they save very little time. Everyone at least agrees that the system's response time is very good. As regards the assessment of language pairs, the best marks are attributed to French-English, French-Spanish, French-Italian, and English-French. About half the users in the Translation Service would like to be able to create and manage their own personal dictionaries. Although only 25% say they would not have met deadlines if MT had not been available, the majority (67%) of MT users feel it is a tool worth having at their disposal.

##### *1.5.2 Translation Service - Non-users*

Most non-users do not know how to use the system, or tried once or twice and did not like the result. Some consider that the texts they have to translate are not suitable. Fears are expressed that it might dehumanise the work of translating. In many cases the relevant language pair is not covered.

##### *1.5.3 Administrative Departments - Users*

Administrators tend to request MT on an occasional basis for the translation of urgent documents they would have preferred to send to the Translation Service. They also use MT for information scanning in languages unknown to the reader and for drafting in a foreign language. They like MT for its speed, ease of use, the lack of bureaucratic procedures and the fact that it is available round the clock. They do not, however, like having to correct the texts, the fact that the system is slow to learn, and that some language pairs are missing. Texts are revised in most cases, normally by a native speaker. More than half of the respondents in this group do not indicate on the

text that it is revised MT output. Those who rely on the post-editing service are happy with it. On the assessment of language pairs, administrators tend to be more lenient than their translator colleagues. The majority find half or more of the output useful. In stark contrast to the Translation Service figures, 74% consider MT saves them a considerable amount of time. More decisively, over 50% think that some of their documents would have been late had it not been for MT. Also interesting, since it proves that MT is at least saving the Translation Service some time indirectly, 59% say they would otherwise have sent their texts to the Translation Service for translation. A resounding 94.8% feel that MT is worth having at their disposal.

#### *1.5.4 Administrative Departments - Non-users*

About 20% of non-users have no real need for translation. Of the others, most do not know how to use MT and those who do complain about poor quality, determined from direct experience in the past or from the comments of colleagues. As with non-users in the Translation Service, many judge that their texts would not be suitable. In some cases people solve their day-to-day translation problems with the help of colleagues. The majority of non-users requested more information about MT, which is still relatively unknown.

#### *1.6 Preliminary Conclusions*

There are two quite different pictures emerging here. On the one hand there is a lukewarm, but by no means entirely negative, reaction from professional translators. Although results vary from one language group to another, a significant number of in-house translators have been able to make MT work for them, particularly in the case of targeted development, where the Systran dictionaries have been programmed for specific text types. On the other hand, there is a more enthusiastic reaction from the administrative departments. This group has perceived needs for urgent translations, browsing and drafting, which MT is already meeting to some extent. Nevertheless, the initial findings show quite clearly that increased efforts are required here to provide better support and information for this user population.

## **2. Practical Experiments in the Translation Service**

As the user survey confirms, a number of Commission translators are making good use of MT in their daily work, particularly where the system's dictionaries have been prepared with the appropriate terminology, and it was decided to back up the survey with data provided by these translators. The aim is to provide an evaluation, as objective as possible, of the ways in which MT helps in-house translators, if not to increase their page count, at least to speed up the workflow. The experiments are to be conducted from June until October. Initial conclusions will be drawn this autumn in the context of the cost-benefit analysis, where the results obtained from these volunteer translators will be produced as vital evidence.

### *2.1 Language pairs*

The experiments are limited to those language combinations that have reached a sufficient quality to make post-editing worthwhile:

- English into Spanish, French, Greek, Italian and German.
- French into English, Spanish, Italian.

## *2.2 Translators taking part in the experiments*

In line with this pragmatic approach, we initially approached those translators who are already experienced in the use and the post-editing of MT. Since staff translators are often understandably wary of MT, a modest response was expected to the call for volunteers. In the event, over a hundred translators have come forward to take part in the experiment.

## *2.3 Selection of texts*

Volunteers are under no obligation. They are not required to use machine translation systematically, but only when they feel they have a suitable job in hand. The choice of text type and subject matter is left to the volunteer post-editor, but, naturally, text types for which terminology has already been coded yield better results.

## *2.4 Evaluation*

Since the aim of the exercise is to produce quantifiable data, post-editors fill in an evaluation form each time they post-edit a machine translation in the course of their daily work in which they are asked to calculate how much time, if any, they have gained in relation to traditional translation, and this may include time saved in typing and lay-out as well as terminology searches - difficult questions to answer.

We tried to avoid a pitfall encountered in previous exercises of a similar nature, where the evaluation of the linguistic content of the MT output tended to become confused with the surrounding organisational issues. It is important to try to keep the two issues separate if a clear and objective picture of the actual performance of the MT system is to be obtained. Hence, we divided the form into two sections: the first (compulsory) asking for an appreciation of the linguistic content; and the second (optional) aimed at gaining an insight into any difficulties experienced in getting an electronic version of the source document to the translator's PC.

## *2.5 The results so far*

The initial results show that although, generally speaking, translators do not find it easy to quantify the amount of time gained, a number do report time-savings of between 30% and 60%. The remarks concerning the quality of the MT output argue in favour of stepping up the linguistic development of the system. The striking improvements to the French-Spanish language pair which have been recorded recently are an illustration of just what can be achieved when translators and linguistic developers collaborate actively on the development of an MT system.

## **3. Legal Issues**

This part of the feasibility study involves an examination of the legal aspects which dictate the use of the Systran system. A number of related questions, covering the policy of distribution of the Commission's multilingual tools and linguistic resources and their use by third parties, will also have to be treated.

The investigation so far shows that the Commission owns a licence which gives it the right to use its system without restrictions as to territory or sector. However, not wishing to distort conditions of competition, the Commission has decided to restrict itself to the territory of the European Union and to the public sector (governmental bodies and Community institutions).

## 4. Market Study

The Commission is seeking to establish whether there are alternatives on the market to its current system and what their costs would be. This market study covers MT only and not, at this juncture, other translation aids and other computer-assisted tools. The study, financed by DG XIII and conducted by external experts, takes the form of a questionnaire, distributed to MT vendors, aimed at identifying all machine translation systems which are available for use in production environments and any service organisations that provide access to such MT systems. At this stage it is a fact-finding rather than an evaluation exercise, and does not cover products which are still under development or the subject of research.

In particular, the market study sets out to identify:

1. what fully automatic MT **systems**, compatible with the Commission's informatics environment, are currently available on the market and what languages they cover.
2. what MT **services** can be offered, in what form, e.g. raw MT, post-edited MT; and via which access methods (e-mail, Internet or other communication channels).

Depending on the results of the study, which is due to be completed by September, a call for tenders might be held with a view to meeting the Commission's needs for machine translation and for post-editing services.

### 4.1 The questions

Questionnaires were sent out to 70 MT vendors. In the case of MT systems, the information required by the Commission includes:

- technical specifications
- linguistic processing techniques
- linguistic resources provided
- text handling features
- performance and quality
- product training and support
- costs and licensing schemes.

In the case of companies providing access to their MT technology as an outside service, some additional information is required including:

- means of access
- peripheral services (dictionary encoding, pre- and post-editing).

### 4.2 Preliminary results

Although it is too early to draw specific conclusions, some general trends are beginning to appear from the 30 responses received so far. The sector in general is still very shaky, with the exception of three or four stable players. Language coverage is patchy. On the new PC-based market one vendor has an 80% market share, but its success lies more in the home systems market and is no alternative to the current EC system.

As regards MT offered as a service, both raw and post-edited, the questionnaire elicited a very poor response. The message seems to be that the time is not yet ripe. In this embryonic market a consensus needs to be reached on the question of prices. For the moment, then, the overall picture shows little demand for raw MT via teleservices and very few new services coming to the fore.

The picture would not be complete without a view of the experience of actual users of MT products and services, and a parallel research project is being carried out with the MT user community. It would appear that the successful users of MT are those who have built up extensive dictionaries covering their specific fields, and users express a clear preference for maintaining control over their MT dictionaries.

## **5. Cost-Benefit Analysis**

Once all the data from the first four studies has been gathered, a cost-benefit analysis should enable some conclusions to be drawn. Based on forecasts regarding the budgetary impact of any new policies, a decision will then be taken about the advisability of certain activities being taken over by the Translation Service.

There are no easy answers, particularly as MT at the Commission continues in some respects to be a hybrid creature, hovering somewhere between a development issue and an operational issue. A specific feature of MT in the institution is its wide user base and, hence, extremely varied text types and subject fields. We have at our disposal considerable resources in the form of twenty years of development on the system's dictionaries. We have a core population of over 2,000 regular users, whose needs cannot be ignored. In addition, the study clearly shows that more information about MT is required throughout the institution. It is probably safe to say at this stage that machine translation at the Commission is here to stay, in some form. Looking to the future, there are a large number of officials in administrative departments throughout the member states with a latent need for MT. Whatever the final outcome, our assets need to be exploited wisely in the best interests of current and potential users.

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