

Criteria for selecting MT systems

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INTRODUCTION

It was with considerable trepidation that I accepted the invitation to prepare a paper for this conference, especially when following such personalities in the field of CAT as Professor Sager and Mr Zirkle. However, I feel that, in the assessment of the current status of machine translation, some mention should be made of the endeavours to integrate computerised translation into a small business environment. The processes involved in the introduction of computer technology into a small business are very different to those encountered in large organisations from the point of view of the availability of both human and financial resources.

Yet it is precisely the application of state-of-the-art technology which is so vital to the survival of the smaller enterprise in its quest to enter a market segment which is already well served by others bigger and more powerful than itself: it has been the search for these additional benefits to offer our customers, and our desire to tune in more closely to their needs, which has led COMTEC along the road of computerised translation.

COMPANY BACKGROUND

COMTEC is a partnership which has been functioning as a translation business for some six years. We have operated along traditional lines employing translators on a freelance basis and relying heavily on the calibre of the people to whom we have sub-contracted work. Although as

yet we have a limited facility to cover all our clients' specialist needs in-house, we have developed sound administrative procedures to support our freelance panel of translators.

Our assimilation of computer technology to date can be divided into two phases. A number of years ago, we made our first investment in electronic equipment, and from there we progressed to microcomputers, multilingual word processing packages, facsimile, modems and electronic mail. At an early stage we decided to standardise, as far as possible, with IBM or IBM compatible equipment.

However, even at this stage, we experienced the familiar problems of incompatibility with our freelance translators' equipment, lack of support from software vendors and the discovery that the only way to ensure that the printer definition file works with your printer is to sit down with the manual and find out for yourself! Although, even today, I remember with some discomfort my attempts to decipher the operating instructions to our modem, I am heartened by the sound advice given in Barry Mahon's 'Guide for the faint-hearted' in Session 2!

So it may seem rather reckless of us to have embarked even further along this daunting path of computerisation without at least the comforting support of a resident computer systems expert! However, to compete in a wider market it was essential to our company's development to exploit fully the computerised technology available to the translation industry. This led us ultimately to a project for developing an integrated facility of which computer-assisted translation formed a part.

As our business developed several factors continued to recur, limiting our ability to satisfy customers' requirements fully:

1. We were very often required to translate a large volume of text in a short period of time which necessitated splitting the text between a number of translators. Although, theoretically, this should not have presented a problem, in practice the co-ordination of large translation projects from the point of view of terminology, presentation and style, was not always easy. Very often in the case of translations into English, of offers to tender, for example, our clients required a 'for information only' translation – as long as the terminology was correct and the text was understandable they were happy.
2. Due to incompatibility of equipment, or of the media on which the work was received or required to be delivered, we often had to process translated material several times.
3. Often where text and graphics were involved we undertook the cut-and-paste function manually: this was labour intensive and did not give the quality of presentation required.
4. From the marketing point of view we felt that we needed to develop a range of services which would differentiate us from other smaller

translation companies and enable us to target larger companies who are often wary of placing orders with a small business, not because the service is poor but because the image is simply not right.

PROJECT OBJECTIVES

To summarise, therefore, the main objectives of our project were to:

- exploit modern computer-based technology to help overcome the problem areas mentioned above
- compete in the international translation market by exploiting telecommunications networks
- assist businesses to export by providing good quality, well-presented, translated material at a reasonable cost
- compete with larger organisations on an equal basis
- increase the company's customer base by enhancing the range of services offered
- achieve a well-proven and operational project to support and exploit the opportunities which, we hoped, would become increasingly prevalent after 1992.

It was hoped that the objectives of this project would be fully met by developing an integrated computer-based system which would support the technical translation process from automatic input of text (and possibly graphics) through computer-assisted translation (CAT) to output of the translated material via an electronic publishing system. However, the project would still be deemed successful if only a subset of these tasks was achieved but the overall process was nevertheless significantly improved.

We envisaged that currently-available hardware and software would be used to support each of the steps in the process. Interfaces, where necessary, would be developed between each of these steps and necessary software written to integrate the process.

We would judge the project to be technically successful if:

- we could find hardware and software which would adequately support each of the major stages
- it would allow data to be interchanged within the system
- it could be operated in a true production environment by staff with an acceptable level of training
- the raw translation was of reasonable quality such that it could be offered to clients as 'for information only' material and that the translator/editor would feel that revising the text would be quicker than retranslating it from scratch.

The major steps of the translation process are outlined below:

1. *Data capture*

Documents to be translated could be input in a number of ways, including:

- via an optical document scanner (where documents are delivered in hard copy), or
- directly over a telecommunications network from the client.

2. *Text and graphics separation*

After data capture the text would be separated from any graphics within the process. The graphics would be stored within the system on disc and the text automatically passed to the next stage in the process.

3. *Computer-assisted translation*

Where possible microcomputer based translation software would be used to handle text.

4. *Editing*

Depending on our clients' requirements the translated text would undergo a varying degree of editing, which would be undertaken by translators linked to us by a telecommunications network – the system dictionaries would be updated at this stage and a multilingual word processing package would be used for editing.

5. *Text graphics reassembly*

The edited text would then be reassembled electronically, together with the graphics, which would have been stored on disc within a desktop publishing system, to produce the finished image for the client.

6. *Presentation to client*

The translated document could then be:

- printed on a laser printer
- output to a typesetting machine
- transmitted via a telecommunications network.

We felt the innovation in our approach was to exploit computer-based technology by addressing each task in the translation process separately, and linking these tasks together (automatically passing the data from one step to the next) in one integrated process with minimal manual intervention.

In view of the investment involved in the purchase of the hardware and software, we considered it imperative that all aspects of the proposed

installation into our small business environment should be carefully studied and assessed.

It was at this stage that I approached Aston University with an outline of our plan which was accepted as part of a postgraduate research project. I wanted to investigate the various linguistic models and strategies used in the design of machine translation systems and other computerised aids in the translation process and to understand their history and current status in relation to COMTEC's requirements. As my interest in this area has grown, I often have to remind myself that this is a commercial venture with a limited time scale while I am still trying to come to grips with the complexities of the 'predictive syntactic analyser' and 'transformational generative grammar'.

PROJECT TASK DEFINITIONS

To complete the project we identified a number of tasks which included:

- definition of hardware and software requirements; shortlisting products; identifying potential problems and defining our requirements for input/output interfaces
- evaluation and interpreting of trends and needs within the machine translation industry
- assessment of the economic viability of the project
- definition of a marketing strategy for the new service
- writing a project implementation plan.

At this stage, I would like to point out the following:

- (a) When a project of this kind is being implemented within a large company environment, it is usual for someone in the management information systems department to be seconded to the project for its duration: such a specialist would become thoroughly familiar with the products, and fully test both hardware and software. At COMTEC, unfortunately, we have no such facility. We relied heavily on discussions with various software and hardware vendors and the final decisions as to which hardware and software would be considered for this project were made after much discussion by both partners in the business. The time spent on evaluating the products had to be limited so that the immediate everyday running of the business would not be unduly disrupted.
- (b) Since we had made a decision three years previously to buy IBM or IBM compatible equipment during our first phase of development, our first inclination was to continue with this policy unless we encountered strong reasons to change this approach. We have found IBM equipment very reliable (for example, we have only had to place a service call twice in the past three years to repair our IBM PC/XT).

- (c) In establishing an initial budget to cover the purchase and installation of equipment related to this project we looked at the lower end of the market where possible and discounted high cost systems and hardware such as the Xerox Documenter System or OCR equipment in excess of approximately £5,000. The most expensive item would undoubtedly be the translation software.

Hardware and software requirements

As there is insufficient space to discuss in detail our choice of hardware and software for all parts of the project I would like to mention briefly some of the reasons which led us to choose one or two of the items of peripheral equipment and, most importantly, one particular translation software package in preference to others.

Input of data

We were looking for a method to input material to the translation system which would avoid a manual keyboarding operation. This is particularly relevant where text is not supplied to COMTEC on some form of magnetic medium, for example, a floppy disc. An electronic page scanner with optical character recognition giving direct input to, or interfaceable with, a word processing package was required. The following problems had to be investigated:

- recognition and separation of textual from graphical data
- recognition of foreign accents by the scanning software
- ability to scan a variety of typed or printed fonts
- scanner speeds and error rates.

It was envisaged that text would be processed by the computer-assisted translation (CAT) software or sent via the telecommunications network for manual translation and that the graphics would be stored on disc and re-introduced at the page make-up and composition stage within the desktop publishing system.

We discovered that OCR software at the lower end of the market, that is up to approximately £5,000 was of very varying quality. Some OCR software can be taught typefaces but if there are too many exceptions in a scan the operation does little to improve productivity. We also found that, although OCR suppliers are very eager to make claims as to the capabilities of their software, it was incredibly difficult to arrange for a demonstration! I even visited one supplier in the south west of England only to hear on arrival that the equipment was not available.

After paying a hefty deposit we did actually manage to have one scanner in the office on trial for a week (the Desk PC Scan Plus from Lexisystems). We tested various typical documents and were encouraged

to discover that a good quality photocopied A4 sheet of continuous text scanned quite well. Scanning time was greatly increased for text formatted into columns or containing diagrams. If accents or any letters were not recognised, we could do a 'search-and-replace' exercise. However, the overall productivity gain was not much above 25 per cent. Although we are disappointed in our findings, we are still very eager to find the appropriate OCR package because of the obvious productivity gains we would achieve and I would welcome any recommendations.

There are many options available for scanning images. The best solution would be to find a scanner with both image scanning and OCR software. However, these two items together with interfacing and paint software, for editing and cleaning up the scanned image files, can add a considerable cost to the basic hardware.

As regards other peripheral equipment, we replaced a 300 baud with a 1200 baud modem, thus greatly improving the speed of data transfer. We also looked at options available for editing text, both within a multilingual WP package and a DTP environment.

Our aim was to standardise, as far as possible, with the translators with whom we work most frequently. It appears that WordPerfect is the most commonly used WP package, followed by Microsoft Word. One of our favourites is the British package Wordcraft. Our choice of DTP systems has narrowed to the two giants Ventura and Aldus Pagemaker with a preference for the former. We were interested in the interface developed by Vuman Systems, which allows Vuwriter multilingual files to be manipulated in Ventura, accents and all!

Computer assisted translation software

Our choice of translation software and supplier was influenced by many factors, some of which I regard as very specific to a smaller business:

- we required a very high level of technical support which would include assistance in resolving the most basic queries
- we required a flexible approach as regards pricing of the product and the scheduling of payments
- we also required co-operation as regards our plans to test market our proposed service before committing ourselves financially
- we wanted, if possible, to contain our investment within a microcomputer environment
- in order to be able to use the translation software for more than one subject field, we needed to buy in specialist dictionaries to load into the system
- because of our limited in-house capacity to post-edit raw output, our preference was for a batch processing system
- last, but certainly not least, as I mentioned earlier, we had to be

satisfied that the quality of the raw output would be of sufficient standard to provide 'for information only' translations and be regarded by the translator/editor as worthy of revision rather than requiring translation from scratch.

Eventually our list of suppliers was narrowed down to three and our final choice was the Weidner MicroCat System. During our investigations of various CAT packages, I made contact with existing users of CAT systems. On our doorstep was Massey Ferguson who had installed four MicroCat language pairs on an IBM-based configuration so we had ample opportunity to witness their initiation into CAT. One factor was very evident: although the supplier was generally helpful in resolving technicalities, he was not able to provide the linguistic support required to make optimum use of all features of the system, for example, in resolving peculiarities occurring from dictionary updates. I also contacted and visited the ESC Alcatel offices in Harlow and was impressed with the level of expertise developed over a number of years in the use of Weidner Macro and MicroCat.

However, in both cases the user environment was significantly different to ours:

- both companies had in-house support from their respective systems departments, and could therefore rely on a reasonably quick response to any technical problems
- although they might disagree with my view, I felt that they were not entirely exposed to a real world environment.

Shortly after my visit to ESC the translation services department became an independent company acquiring distribution rights for the Weidner system. On all accounts this new organisation met all our supplier criteria:

- the company had extensive user experience of the system
- we could buy in specialist glossaries which had been built up over the years, based on actual translations carried out, and, if necessary, we could subcontract dictionary work to the company
- the company was prepared to negotiate favourable terms of payment and to let us hire a language pair for a number of months' trial period
- we could attend a training course prior to hiring the system, the cost of which would be deducted from the final price of the software
- the company agreed to organise a number of demonstrations of the system to our potential customers and to produce test pieces of material submitted for translation.

After considering potential clients' CAT requirements and our in-house capabilities we decided initially to opt for the French-to-English

language pair. We would be able to control the quality of the output more easily and use the systems to assist us in the marketing of our new service. I will discuss the marketing aspects in more detail later on.

Supplier difficulties

Unfortunately, as we have found so often in our dealings with software and hardware suppliers, nothing is ever certain! Due to lack of systems support from the United States, ESC withdrew the French-to-English and a number of other language pairs. We have had to change our plans accordingly and accept the English-to-French language pair on a trial basis. This will create a number of problems for us, not the least being that, although the basic principles for all the language pairs are the same, there are important differences which were not covered during our initial training. In addition, we discovered that, for the time being, ESC would not be actively marketing the Weidner system in the UK. Our confidence in the product has suffered considerably as a result.

As I mentioned earlier, as a small business we rely heavily on the expertise and advice of our suppliers. If anything goes wrong, we are in the vulnerable position of having to make drastic changes to our basic business strategy.

It is not the first time that a potential supplier has not been able to deliver the goods! Our attempts to link up with the Systran computer in Luxembourg ended unsuccessfully. Despite three visits to our office a link up was never achieved. The instructions for going online were unnecessarily complicated, transmitted files were lost and at one point we actually received someone else's translation! Although the potential for using this online facility sounded exciting on paper, the supplier was in reality a long way from being able to offer this service. One positive benefit from this exercise was that we were able to experiment successfully with a faster modem which was lent to us by a client interested in the service.

Another supplier, whose name I shall not mention (whose offices we visited in Frankfurt), seemed very eager to assist us in evaluating their product until, I presume, they discovered that we were only small fry; they failed to cancel an appointment made with us and simply did not turn up.

Before discussing the economic viability of our project and the proposed marketing strategy, I should mention that our evaluation of trends and needs within the machine translation community took into consideration the following:

1. The methodologies used for evaluating CAT output (I am particularly grateful to Mary Dyson of Reading University for the material she made available to me relating to her evaluation of the Weidner MicroCat system).

2. The reaction to CAT output, and to the concept of CAT in general, of the translators with whom we work on a regular basis. Since we would be relying heavily on their co-operation (for post-editing text, for agreeing a compatible medium for data transfer, for preparing glossaries for the system dictionaries) it was essential that we sell the concept to them. We were fortunate that our administrative/secretarial staff had already reached a relatively high level of computer literacy and were willing and interested in acquiring new skills in the field.

Economic viability of the project

One of our most important tasks was to assess the project's financial viability. Our business was labour intensive rather than capital intensive. As the proposed capital investment for the project would be now quite substantial (for a small self-financing business) the risk element would increase considerably.

Our first step was, therefore, to seek outside objective advice and we applied successfully to the DTI, (Department of Trade and Industry), for a business counselling grant. Over a three-month period a consultant analysed the various resources of the current business in detail, that is equipment, work force skills, financial resources, and identified the company's strengths and weaknesses. We decided that our new extended service should, for the time being, be treated independently of the current business, not only for accounting purposes – that is to be able to monitor closely all items of expenditure related to the project, including the number of man hours – but also in order to define more clearly a separate strategy for the new market segment we had defined.

In assessing economic viability, we accepted the following factors:

1. As with all growth products, initial promotional expenditure would be high but was necessary to support the high development costs of the new project.
2. Until we began to reap the benefits of our promotional campaign, during the early part of the new product's life, there could be an initial loss. However, we were thoroughly committed to the project and, as I mentioned earlier, if at least a subset of our fixed objectives were achieved and we had significantly improved the overall level of our service, we would judge the project successful.

Pricing

We felt that the pricing of our new service should not be based on cost information alone, as it was highly unlikely that a price based on a cost calculation would match the market value of the service. In any case, it would be almost impossible to measure the true costs of the project.

Figure 1 shows how we arrived at our initial costings, spread over a two-year period. As I mentioned before, however, the cost of production is irrelevant to the customer and I therefore strongly favour a market-based approach where price is based on the value of the product to the customer, that is, what the customer is prepared to pay. This in turn depends on the value ascribed to the product by the customer, based on the strength of the total offer associated with it, as compared to that of our competitors.

Although, initially, prices would need to compare favourably with manual translation, it may be necessary at a later date to charge a higher price in order to fully recoup capital equipment, training and dictionary development costs. The factors of non-price competition would then have to be emphasised: quality, reliability, performance, credibility and delivery.

Expenditure	Year 1 Total (£000s)	Year 2 Total (£000s)
1. Pay of personnel	9.8	9.8
2. General overheads	2.0	2.0
3. Consumables	1.1	1.0
4. Sub-contract charges	5.0	10.9
5. Training	3.0	1.7
6. Trials and testing	4.4	1.9
7. Procedure manuals	0.0	2.0
8. Software support	10.9	18.2
9. Capital equipment	20.1	6.3
10. Marketing	2.1	4.9
11. Contingency 25%	2.6	2.5
12. Inflation (5% per annum)	1.8	6.0
Total	62.8	67.2

Figure 1. Project Financial Plan

Marketing strategy

Many theories and practices valid for large firms are inapplicable to the small firm which has to undertake activities on a strictly limited budget and often on a DIY basis. Marketing is a good example of this: effective marketing is essential to the success of any enterprise and is frequently the weakest area of management in small companies. We are therefore very aware of the need to develop a sound marketing strategy in line with the development of our new product.

Initially we carried out a market segmentation analysis so that our marketing efforts and resources could be concentrated in a clearly defined market segment to which we would offer our new computerised translation service. Naturally any spin-offs from this service which enhance the marketing of our manual translation service would be welcomed. We are also very much aware that the market segment we have identified is already well serviced by others. It is therefore essential to our growth that we distinguish ourselves from competitors by offering additional benefits. To date we have mainly operated with small- to medium-sized companies. Our aim now would be to target larger companies who would perhaps be reluctant to deal with smaller companies.

The objective of the preliminary market research was to confirm our hypothesis that there is a demand for the translation of text produced from a highly-integrated computerised system which would fulfil all the requirements of clients in equal measure, that is, speed, consistency, quality, cost and presentation.

For one major client we organised a seminar and demonstration of the equipment (hardware and software) which we proposed to buy, in our offices. The demonstration was attended by senior managers of the company. We assessed and replicated their translation needs and were able to demonstrate the potential of CAT for their needs. The response, especially for 'information-only' translations, was encouraging. We repeated this exercise with a number of other potential clients.

During routine sales visits, sales telephone calls and in sales letters the advantages and features of computer-assisted translation as an alternative method of handling a company's translation requirements were introduced: the reaction again was favourable. We distributed a quota of questionnaires to both existing and potential customers to test their reaction to CAT and other computerised aids: the result has been encouraging.

One very interesting factor emerged from these demonstrations, namely that the MicroCat software took on a life of its own! As a sophisticated example of computer technology it proved a powerful marketing tool in itself! This statement may cause some consternation. Am I in fact debasing the role of CAT? Will it prove only to be a promotional tool or will we be able to use the system effectively to produce translations. Only time will tell!

Note: The author would like readers to know that since preparing this paper and embarking on the project, the Weidner operation in the UK has closed down. Established users are continuing to get some support from

the current rights' owner in Japan, but potential customers have been left with unsupported software.

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