

A user's experience of the LOGOS machine translation system: a manager's viewpoint

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I work in the Field Engineering Division of Nixdorf Computer AG, as Manager of the Technical Documentation Group.

Nixdorf is a company with worldwide activities; it has no fewer than 400 marketing and service centres in forty countries of Europe, America, Asia, Australia and Africa. The company obtains 55 per cent of its income from sales, the remaining 45 per cent deriving from services and rentals. As far as the geographical distribution of company turnover is concerned, almost half (49 per cent) comes from Germany, 40 per cent from the rest of Europe and 11 per cent from the overseas markets.

As at the end of 1984, Nixdorf field service personnel throughout the world numbered 4,540, with 3,280 staff members in Europe (half of them in Germany) and 660 overseas.

The tasks of the field service personnel are to provide:

1. Installation and technical start-up
2. Maintenance
 - preventative maintenance
 - general overhauls
 - diagnostic evaluation
 - installation of technical alterations
3. Repair
 - exchange of functional components and printed circuit boards
 - repair through adjustment and component compensation
4. Software maintenance
5. Remote diagnosis and remote maintenance
6. Network management

7. Technical customer support

In providing these services, the priorities for the Field Service main office are as follows:

1. Measures for quality control
 - products
 - testing devices
 - methods
2. Execution/development of:
 - technical customer service processes
 - technical organisation facilities
3. Creation of:
 - field service documentation
 - field service information
4. Service
 - technical training/media
 - support of modification services
 - control/planning of field service material
 - support in the case of difficult technical problems
5. Measures for introducing products
 - create field service specification manual/specifications for product development
 - acceptance tests of 'prototype products'
6. Special tasks
 - revision
 - support
 - analyses
 } of the field service performance
7. Marketing
 - observing market/competition prices and conditions
 - services, field service methods

The pattern of operations can be illustrated by Figure 1.

The services provided by the Technical Documentation Group include drafting, writing, drawing, translation, typesetting, distribution and management.

The documentation chiefly consists of reference manuals of various kinds – general descriptions, system descriptions, model descriptions, equipment descriptions, component descriptions and data sheets. The group also provides customer service information of the 'quick information on paper' type, internal information, and hand-outs.

Up till 1984, the group had produced some 1,000 reference manuals

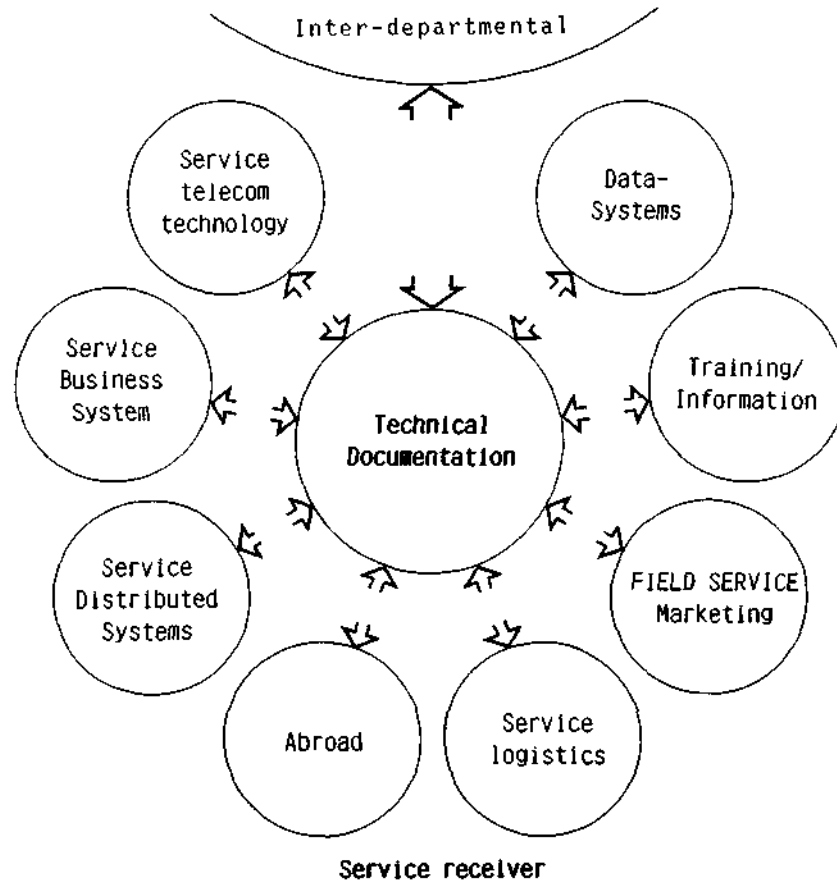


Figure 1. Pattern of operations, Nixdorf's Field Services

varying in length between 60 and 800 pages. Of these, 60 per cent were in German and 40 per cent in English. During 1984, it was planned that the group should produce about 720 customer information brochures averaging 6 pages long, 55 per cent being in German and 45 per cent in English.

The Technical Documentation Group at Nixdorf numbers eleven staff

members, seven of whom deal with planning, writing, setting, distribution and management, three (two in-house plus one freelance) with translation, and one with drawing. There is a measure of overlap between the functions. The Technical Documentation Group was recently confronted with a major problem, which had its origins in the two following facts: as from 1985, the corporate language was to be English as well as German, and Nixdorf was becoming the No. 1 firm in Europe in its field.

The structure of the Technical Documentation Group presented a problem in itself; within the group, the translation service would have to provide all the reference manuals, customer service information, hand-outs and internal information. However, the translation requirement is rising steeply; in 1981 the volume translated was 4,580 pages (114,500 lines). By 1983 this figure had risen to 6,560 pages (164,000 lines), and after that there was a sharp increase - 9,000 pages (225,000 lines) in 1984, and no fewer than 13,000 pages (325,000 lines) in 1985, 284 per cent of the 1981 figure.

At the same time, the life cycle of EDP equipment is diminishing. From over six years prior to 1984, the life cycle is now down to about three years in 1986, and by the year 2000 it will be less than two years.

Table 1 sets out the possible ways of solving the translation problem.

Solution principles	Translation performance by:			
	Human translator		Machine-based system	
Variations	extent of his/her capacities		service	
Variations divided into	<i>internal</i> - fixed employment	<i>external</i> medium	<i>external</i> medium	<i>local</i> medium
	contract - paid-up contract	- paper - floppy disk - TC ¹	- paper - floppy disk - TC ¹	- paper - floppy disk - TC ²

1. Telecommunication: Nixdorf 8860 to host

2. Telecommunication: Nixdorf 8860 to Wang

Table 1. Simplified representation of problem solution principles

The target volume for translation is estimated to be a minimum of 2,300 pages, or 56,000 lines, a year; by 1986 the volume should be 4,400 pages (110,000 lines) and from 1987, the volume anticipated is well over that figure. In order to achieve this target, the processing time for translation has to be reduced by 20 per cent as between 1984 and 1985, and by 60 per cent from 1987 onwards.

At the same time, however, standards must be maintained. In other words, 'the translation must be professionally/objectively understandable', and the user must not suffer in any way.

In fact, the desired objectives could be summarised as follows:

- enhanced translation quality
- improved, more uniform, company style and more uniform presentation of documentation
- a dictionary should be created and kept up to date
- there should be less diversity of terminology

Let's have a look at the basic data we were working on: we assume that a page of translation amounts to 25 lines, and that a translator can produce 15 pages, or 375 lines, in a day. Over a year, assuming 204 working days, this represents a total of 76,500 lines. The costs are 1.12 DM per line, or 85,000.00 DM per year. The Technical Documentation Group as a whole can produce 10 pages a day of text input (i.e. ready for publication). Looked at in another way, if in 1984 we had to produce 225,000 lines of translation and the annual output per translator was 76,000, this meant that to achieve this output we needed 2.94 translators.

Table 2 compares the cost of expanding the translation service by increasing staff numbers (and assuming a translator actually achieves 75 per cent of target performance), with the adoption of a translation system (i.e. machine translation), provided either by a bureau service or by making use of a rented LOGOS system locally.

As far as the potential quality of translation is concerned, it was estimated that Nixdorf could bring influence to bear if extra in-house translators were to be recruited, but not if the additional capacity took the form of freelancers. The same applied to the processing of the texts. When machine translation systems were studied, it was found that translation provided by a service bureau could not be influenced in any way by Nixdorf, nor could anything be done about the text processing stage. If a LOGOS system were adopted, however, Nixdorf would be able to bring influence to bear both on the translation and the text processing stages.

Figure 2 shows the configuration adopted for the machine translation process.

Overhead estimate for 75% translator performance 57,375 lines				
	Capacity extension		translation system	
	Internal	External	Service	LOGOS (local)
Translation	85,000	103,275 (1.80 DM/line)	87,576 (Computer costs, Revision, Dictionary maintenance)	21,630.29 100,279.20 (RENT)
Editing		19,125 50 pages/day	19,125 50 pages/day	31,874.99 30 pages/day
Text processing	63,311	45,900 0.80 DM/line	45,900	15,861.11 (40 pages/day)
Total	148,311	168,300	152,601	169,645.59
Percentage	100%	113.47%	102%	114.38%

Table 2.

The plan was to apply the translation system to all types of document: simple, moderately difficult, and difficult, of ten pages or more.

There would be no so-called 'good deeds', e.g. translating 'Mein lieber Herr Gesangsverein' as 'My nice gentleman Gesangsverein' without a New Word Search (NWS). As regards the number of lines translated, there should be a very marked increase, with the number rising from 1,445 in February to 57,375 by the beginning of the following year. A

Table 3.

Creation time estimate for 75% translator performance 57,375 lines				
	Capacity extension		translation system	
	Internal	External	Service	LOGOS
Translation	153	153	No data 1)	76.5
Editing	0	45.9 2)	45.9	76.5 3)
Text processing	229.5	229.5	229.5	57.38
Total	382.5	428.4	313.65	210.38
Percentage	100%	112%	82%	55%

1. In benchmark (comparison) test: 32 days including postage. Assumed value for bureau service machine translation: LOGOS time \times 0.5.
2. Editing service 50 pages/day.
3. Editing service 30 pages/day.

comparable increase was to be expected in the number of words entered in the dictionary, from 107 in February to 4,100 by the beginning of the following year.

Various considerations were taken into account when evaluating the quality of completed translations. In the first place the old adage 'garbage in - garbage out' (GIGO) holds good for translation just as much as for any other field. There is no getting away from the fact that a highly sophisticated text requires a much greater editing effort, whereas a clear, plain style makes it possible for a machine system to provide an almost perfect translation. Where a text is worded with a certain amount of nuance, the meaning which lies behind the words, and which would be readily apparent to a human translator, is completely missed by the machine, which can only translate literally.

In view of the foregoing, therefore, measures had to be taken to

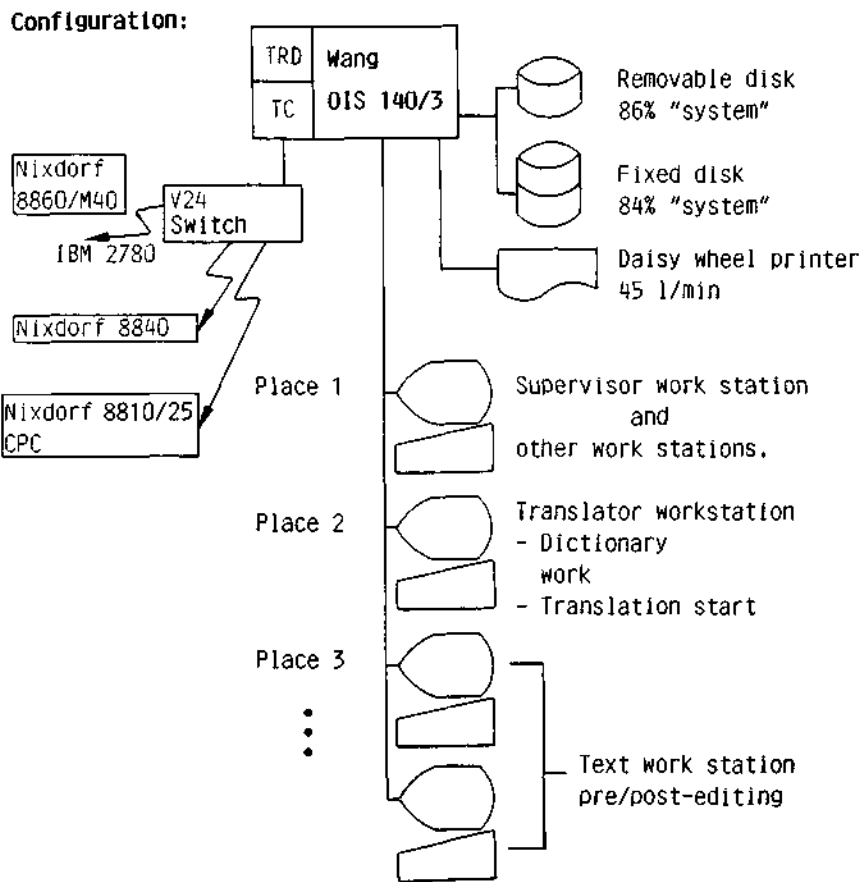


Figure 2. TRD: Translation Device (co-processor beside CPU O/S 140)

minimise the editing effort. There were two principal approaches, the first being to pre-edit the source texts, and the second to adopt standard paragraphs. As a result of this different approach to translation, there were a number of side effects: one was that texts were examined carefully for correctness of style in both German and English. As a result the text processing capacity rose by a factor of 2 to 3.5.

From the point of view of the manager, the machine translation system

could be diagrammatically represented as shown in Figure 3. There the process of translation by the LOGOS system is regarded as merely one part of the editing procedure as a whole.

Use of the LOGOS translation system has resulted in optimum organisation of the Technical Documentation Group, a clear division of responsibilities, which had hitherto not been the case, and a high level of system availability. All these factors lead to enhanced efficiency and a high degree of economy.

Figure 4 indicates how the various stages in the text processing sequence are allocated. It can be seen that the human translator intervenes at only two stages.

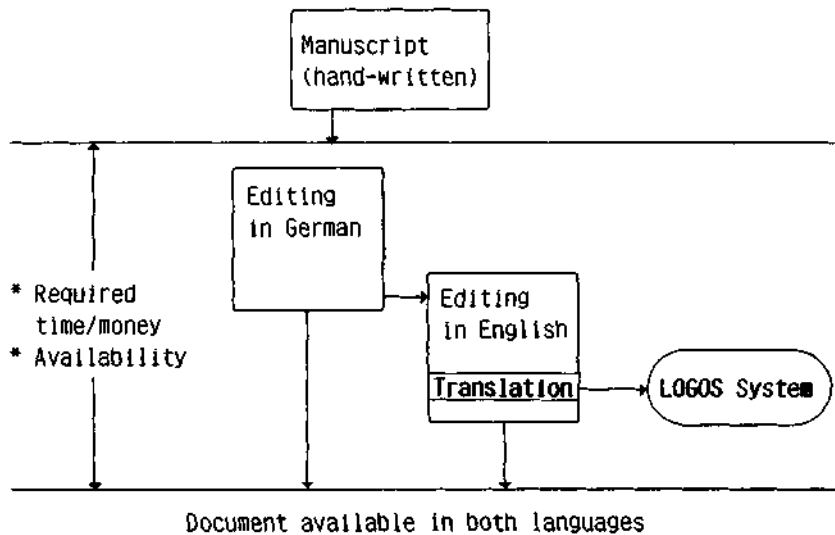


Figure 3. Diagrammatic representation of the machine translation system

(‘Editing in English’ means in this case preparations for the translation, i.e. LOGOS-compatible format.)

	In charge Responsible		
	Typist	Supervisor	Translator
Preparation and editing steps			
1. Data communication from Nixdorf 8860↔LOGOS		*	
2. Text preparation for conversion	*		
3. Conversion into LOGOS format	*		
4. NWS for orthography		*	
5. Preparations for translation	*		
6. NWS collection for translation		*	
7. Dictionary update for translation			*
8. Start of translation		*	
9. Formal check of the translation		*	
10. Post-editing			*
11. Preparing the printer's copy	*		
12. Data back-up		*	

Note

When a document has to be input manually, steps 1 to 3 are replaced by a LOGOS-compatible entry of the manuscript by the typist.

Figure 4. Allocation of the stages in the text processing sequence

Examples 1 and 2 set out in figures the time saved by the adoption of the new translation system.

Example 1: May/June 1985

Editing of an application manual of about 400 pages in German and in English.

Preparation and editing steps	Required time in days	
	Previously	Today
Text entry (German)	40	20
Preparations for translation	1	2
Dictionary update	0	2
Translation	27	2 *1
Post-editing	0	14
Text entry (English)	40	0
Preparations for printing	2	5
	110	43
	100%	39,1%

Note

In both cases the manual costs DM 60,00 per copy.

*1 The translation was performed over a weekend.

Productivity has risen steadily – after the introduction of the LOGOS system, production in 1985 rose to 121 manuals, whereas in 1984 it had been 95 manuals.

In the opinion of Nixdorf Computer, the introduction of the LOGOS system was well supported by LOGOS, and their observance of deadlines was considered to be very good. Documentation was satisfactory, and training good. The support and co-operation provided by LOGOS were both felt to be very good.

As far as the LOGOS software was concerned, Nixdorf came to the following conclusions. The translation quality achieved, the operating

Example 2: August 1985

For an important seminar, a manual of 85 pages had to be available in English for photocopying within 4 days. (The manual had been entered before in German)

Preparation and editing steps	Required time in days		
	Previously max.	min.*2	Today
Preparations for translation	0	0	1
Translation	6	3	(1)*1
Post-editing	0	0	1
Text entry	8,5	3,5	0
Preparations for printing	0,5	0,5	1
	15	7	3
	100% not possible	46,7%	20% possible

Note

In both cases the manual costs DM 12,75 per copy.

*1 Editing steps were performed over night

*2 2 translators, 2 typists (parallel work)

environment, and user friendliness were all good. Training was felt to be very good, and throughput was also considered good.

Turning to the installed hardware and the stability of the equipment, the central processing unit was found by Nixdorf to be very good, and the magnetic disk good. The TRD, TC and screens were all very good, while the printer was no more than satisfactory.

The supervisor in the Technical Documentation Group, Mrs Emde, gave the following impressions. In the first place, her opinion of the system was good. The break-in period was short, and handling was simple. Text processing was particularly easy, with excellent menu support. She particularly liked the simultaneous operation in the case of TC sessions. Data backup and data set maintenance were very simple, and throughput was high. In fact, when asked if she had any criticisms, she

said she would have to think hard, because none spontaneously occurred to her.

In the opinion of Nixdorf's staff translator Mr Plöger, the translation quality varied. Sometimes he felt it could be described as almost excellent, and yet in other parts considerable editing effort was required. He found it frustrating to have to edit a translation which was almost perfect apart from petty blemishes like incorrect plurals and 'of/by'. (For the German *von*, often 'of/by' is offered for selection, so that one always has to delete either 'of' or 'by', which is a bit tedious.) He would like to be able to have more time to spend on terminology, but overall his opinion of the LOGOS system was positive. He had some criticisms of it, of course, but found editing on screen extremely straightforward. He also thought that the text processing functions were excellent.

Comparing 1985 with 1986, in 1985 the hardware comprised an O/S 140/3, with four display workstations, and one daisy-wheel printer. In 1986, this was to be stepped up to a VS65, with eleven display workstations, a line printer and a daisy-wheel printer. The sole translator present in 1985 would in 1986 have one colleague working in-house, plus one external translator for post-editing on screen.

In 1986, *all* documents were to be entered in the LOGOS system and translated by it, with the aim of achieving higher production rates, earlier availability of documents, higher efficiency, and increased terminology standardisation.

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