

OVERVIEW OF SOFTWARE INDUSTRY IN GERMANY

by

Dr. V.B. Kaujalgi*

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INDIAN INSTITUTE OF MANAGEMENT
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P R E F A C E

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Dr. V.B. KAUJALGI

I.I.M. Bangalore

OVERVIEW OF SOFTWARE INDUSTRY IN GERMANY

1. Introduction :

Development, distribution, implementation and maintenance of software in various applications is considered to be one of the fastest growing sectors of Economy. USA has been the leader in this field by virtue of its initial developments in hardware/software and subsequent advantage of new technology. European countries and Japan are competing for higher share in software development with USA. Key factor in software development is that the activity is labour-intensive. Hence comparative advantage of cheaper labour in European countries makes it easier to develop software. Moreover, all the USA manufacturers have establishments in European countries.

Developing countries are slow in this race because of obvious reason of technology lag. It is, however, clear that the third world countries have advantage in the future as the labour is the cheapest. Given the technological access to these countries, there is no reason why these countries cannot increase their share of software development. India with its third largest pool of scientific manpower, has unique advantage in this important sector of the Economy. Proper economic environment is required immediately so that such an important opportunity does not bypass this country.

2. Software Development in Germany

Germany is one of the leading industrialized countries in Europe. Hence, information technology of USA has been adopted in various sectors of economy. Software development organizations are the most advanced among the EEC countries. German language may become hurdle as software is closely dependent on the usage of English language. It is interesting to see that most of the software personnel in Germany are learning English. Similarly most of the popular software packages have German interface.

The most important source of information about software development organizations in Germany is the "NOMINA Information Series" [1]. Apart from this important publication, other sources are from the leading journals, magazines and newspapers.

3. Characteristics of Germany Software Organizations :

This section describes the general characteristics of the Germany software development organizations.

Fig 1 shows the year of starting of 103 organizations in Germany. Around 1956-19599 the initial 11 software organizations were mainly mainframe hardware manufacturers from USA with establishments in Germany. Interestingly from

[1] "NOMINA Information Series", NOMINA, Gesellschaft fur Wirtschaftsund und Verwaltungstregiskr mbH, D-8000 Munchen 21.

1960-1967 there was hardly any change in this strength. During 1968 to 1990 the curve has almost bell-shape with peak around 1981 when IBM-PC made its presence felt as a typical micro computer. It is important to note that there is decrease in the number of organizations after 1982 to 1990 which does not confirm to the accepted fact that software market is increasing world-wide. It is interesting to explore further this observation.

Distribution of personnel has U shape curve as shown in Fig 2 for 1991. There are quite a number of organizations with less than 50 persons and more than 500 persons. Hence, software organizations seem to be either small or large. Medium size organizations find it difficult to compete with both small and large organizations. This observation requires further study and compare the findings with Indian organizations.

Sales of software development organizations has almost identical distribution as personnel as shown in Fig 3 for 1991. Some large organizations have relatively less sales. This may be due to the fact that a major portion of the software may be part of application software for the mainframe of the organization. Hence sales by developing software for sale is less.

4. Profile of Application Software :

Application software has relatively more growth compared to system software. As expected, finance and accounting (Sl.No.1) is the leader among all the types of computers as shown in Fig 4. Mainframe has almost twice the number of software packages compared to Micros upto 1991. Material & Warehouse Management Packages (Sl No.4) of mini/mainframe are the next popular packages. Office Automation Software (Sl. No.08) is the next popular application on micros. Software in Maintenance, Repair & Service (Sl.No. 06) is the least popular. Development of such software seems to be difficult.

5. Application software by Industry :

Micros are extensively used to Business and Professional Services (Sl.No. 10). Trade and Commerce Packages (Sl.No. 5) seem to be popular for both micros and mini/mainframe. It is interesting to note that, as shown in Fig 5, application software in Agriculture, Meat & Horticulture (Sl.No. 04) is not popular. (This observation is quite important considering very large agro based economy in India).

6. Hardware & Software Platforms :

Software development is related to various types of hardware and software facilities. The organization in software development may consider it as one of the important factors before taking the job for development.

Table 1 shows the wide spectrum of hardware used for software development. They are the popular systems used by different users world-wide. Apart from computers from USA, and ICL computers from UK, German systems like Siemens and Nixdorf are popular. A large number of micro computers are used by various manufacturers for software development in MS-DOSx. Similarly Table 2 shows the variety of system software. It is interesting to note CP/M, MP/M used for a few software development activities. Emphasis is shifting to Window based software and LAN/WAN applications. These trends influence the software required for various users.

TABLE 1 : Typical Hardwares for Software Development used in Germany (Micros, Mini/Mainframe)

HP3000	ICL 2900
IBM/370	HP/Apollo
IBM AS/400	SUNx
IBM 43xx	COMPAQ
IBM/36,/38	TOSHIBA
Nixdorf Siemens 8890	Calcomp
IBM30xx	Telxon
Siemens 7500	Inter Quadram
IBM Rs/6000	BULL DPS 6/7/8

TABLE 2 : Typical System Software used by software Development Organizations in Germany (Micros, Mini/Mainframe)

UNIX	OS/1100	KMan	PDF
XENIX	OS/2200	DES	A DBAS
MS-DOS	C	MHS	DEC-NOT
OS/2	COBOL	WINDOWS 3.0	TCP/IP
CP/M	PASCAL	PL/I	DEC-Siemens
HP-UX	BASIC	CADKON	Unicad
MP/M	Assembler	Oracle	DIVERSE
NIDOS	dBASEx	IMS/DC	Cigene
RX-11	Adimens	CKS	Natural
DRIVE	CULPRIT	APL	Modula-2
ELAN	VAX/VMS	UNISYS	VME2900
SINIX	FORTRAN	RPG	Toekn Ring (APCC)

7. Technical/Scientific Software on Micros :

Personal computers have advantage in the use of scientific application. This is clearly seen in the large number of such packages on Micro Computers in Table 3. The applications range from pure sciences like Chemistry and Mathematics to specific technical applications like piping and Air-conditioning.

TABLE 3 : Technical/Scientific Software on Personal Computers in Germany

Sl.No.	Type of Software	Number of packages
1	Graphic	62
2	Modelling	67
3	Engineering Design	107
4	Plant Design/Piping	29
5	Process Engg	51
6	Electrical Engg	45
7	Construction Engg	130
8	Heating/Air-conditioning	23
9	Mathematics	39
10	Chemistry	17

8. System Software Development for Micros :

Compared to application software, system software development on micros is not very popular. A few standard software facilities are having the highest share of the market. Table 4 shows the number of packages developed. High demands in OS Extensions (Sl.No.1), Network/Communications (Sl.No.2), System Tuning (Sl.No.4) and CASE tools (Sl.No.13) are worth noting.

TABLE 4 : System Software Development on Micros

Sl.No.	Type of Software	Number of organizations
1	OS, Extensions	194
2	Network, Communications	245
3	Computer Centre Management and Control	110
4	System Tuning & Job A/c	150
5	Disc Mgt, Tape Mgt	50
6	Sort/Merge, security	56
7	Data Mgt, File and DB	131
8	Inquiry, Reports Mgt	89
9	Programming Languages	81
10	ES, Shells, tools	33
11	Editors, Library Mgt, DD	57
12	Project Mgt	10
13	CASE, 4GL, Reengineering	183
14	Screen Prog. Generators	49
15	Prog. Analysis & DOC	38

9. System Software Development for Medium/Large Systems

Mainframe software distribution by types is always different compared to Micros as shown in Table 5. The types of applications and users are generally different. Database (Sl. No.1), Software Development Tools (Sl.No.5) and Networking Communications (Sl.No. 175) are leading in terms of packages developed. Software maintenance (Sl.No. 4) to keep track of different versions of the programs and access to the previous versions is still not in demand.

TABLE 5 : System Software on Mainframes developed in Germany

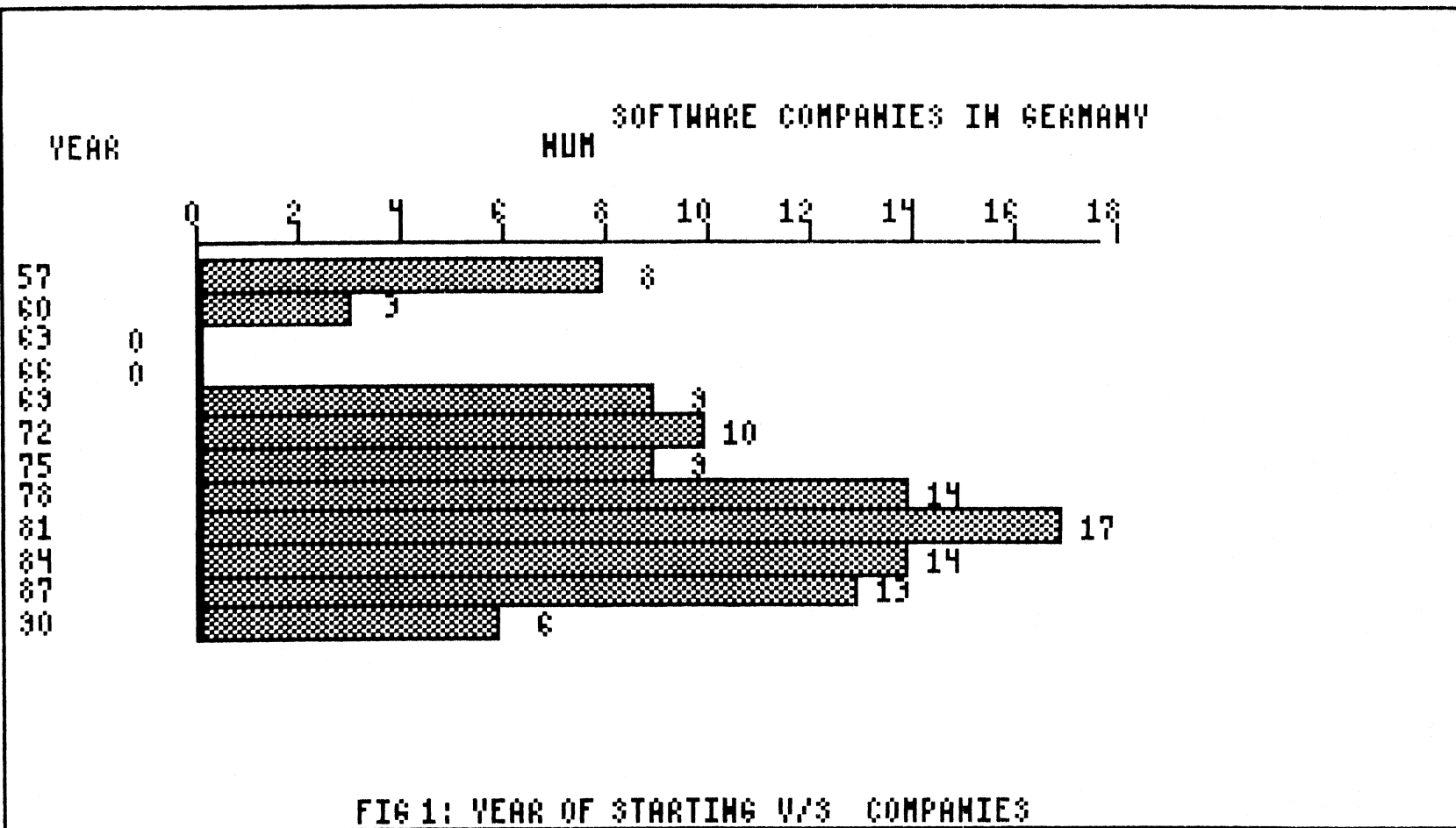
Sl.No.	Type of Software	Number of organizations
1	DBMS	56
2	Files Management	71
3	Programming Languages	72
4	Software Maintenance	10
5	Software Development Tools (Program Drive)	169
6	Software Development Tools (Data Driven)	43
7	AI, ES, KBS, PROLOG	34
8	OS, (Ext, Interfaces, Drivers, Utilities)	94
9	Networking/Communications	175
10	PC-Host Software	43

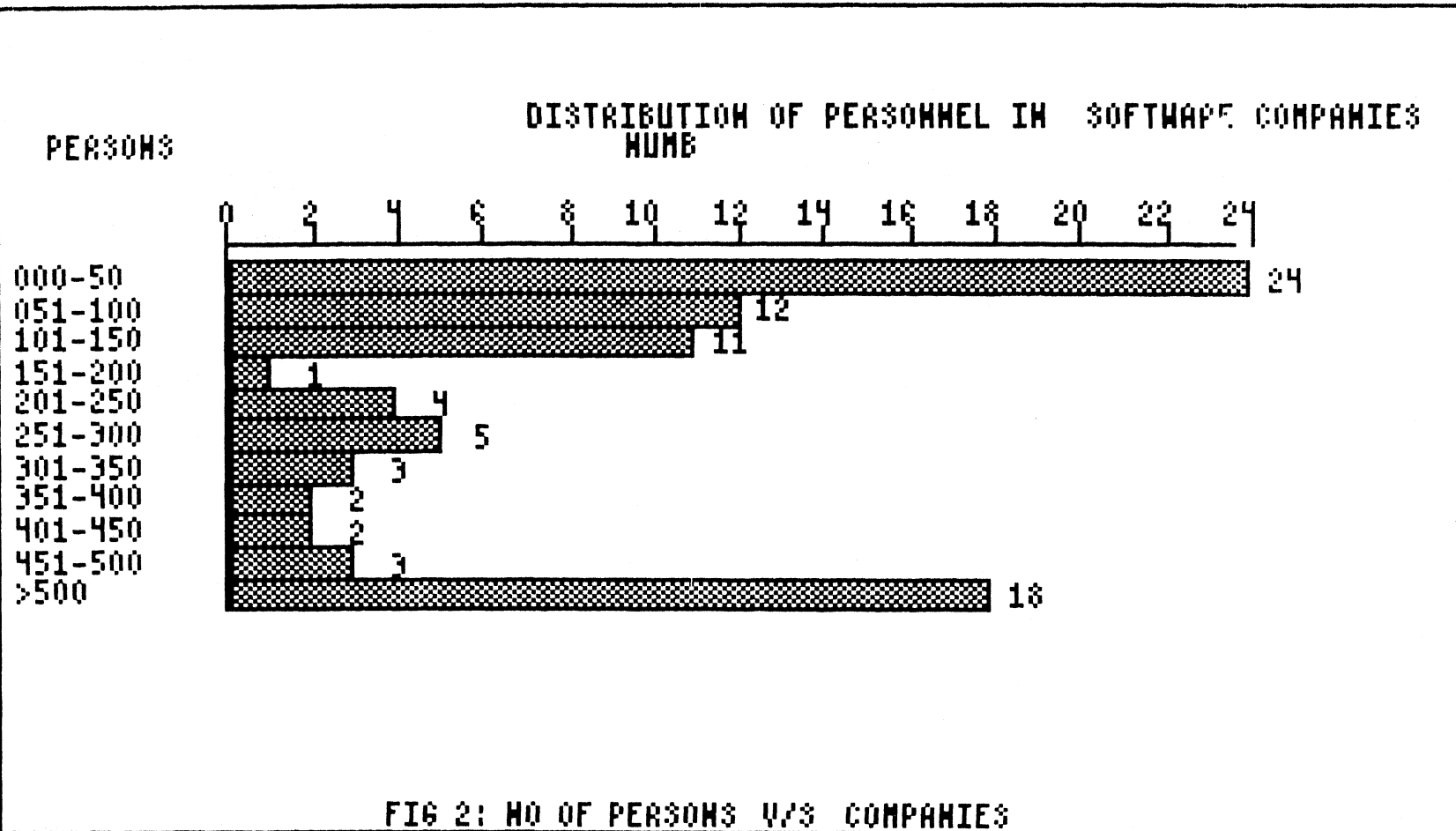
10. Concluding Remarks :

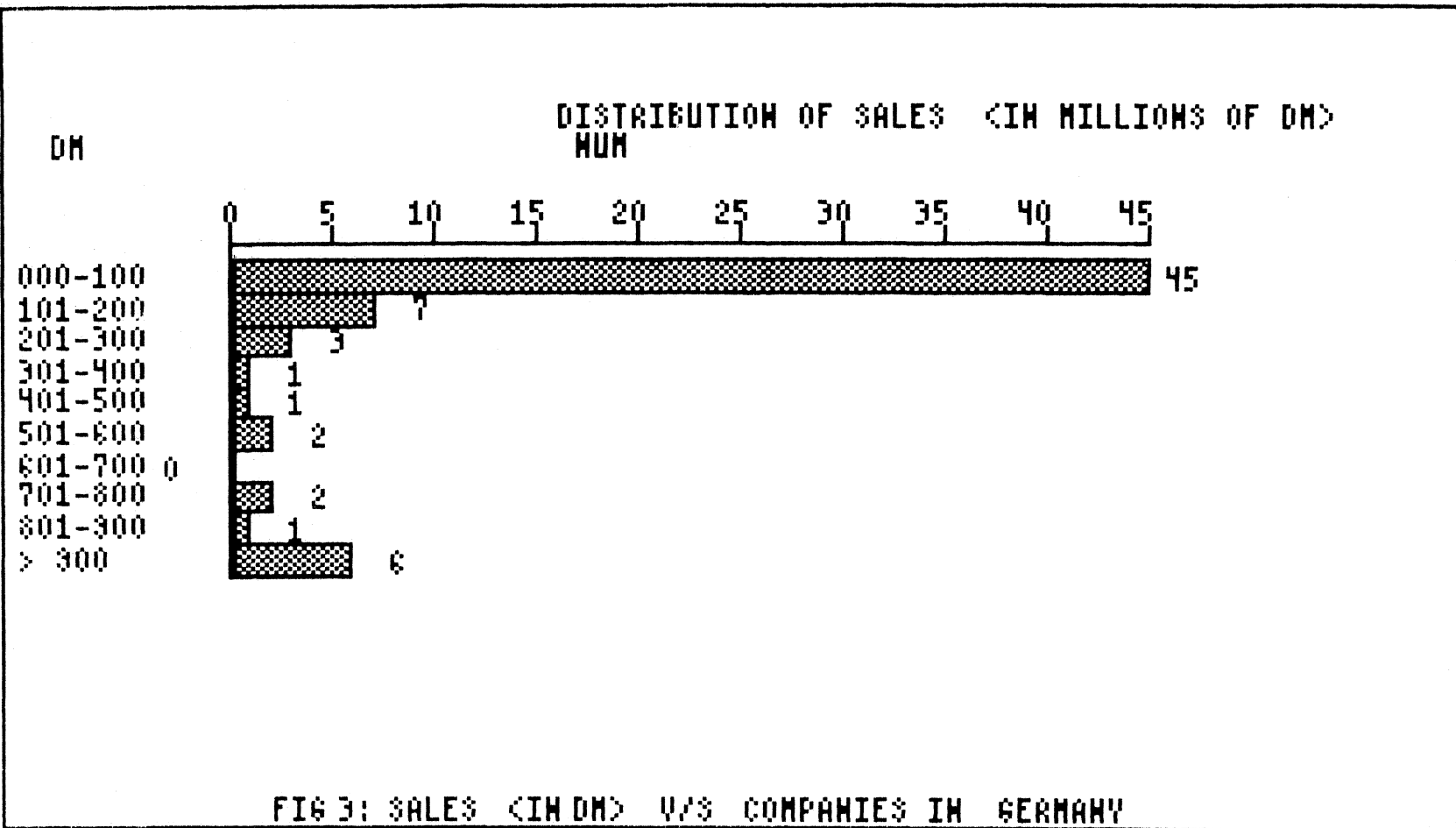
- * Small and large organizations in software development seem to be doing better compared to medium size. Special corporate strategy may be required to manage medium size organizations.
- * Finance & Accounting software has the largest demand on all the different types of computers.
- * Professional service/Business software on Micros is very popular for development. In India, any effort in Agriculture, dairy, poultry has to be properly planned in view of the difficulty in the development of such a software to the satisfaction of the users.

- * India may have to consider Nixdorf and Siemens computers as they are popular in Europe.
- * Communication and Window based software has the largest growth rate on different types of computers.
- * Scientific software on Micros is an important type of software for development as seen in Germany. Indian organizations may have to consider them seriously.
- * Database and Networking/Communication related software on mainframe is very popular for development.

Europe is one of the attractive software markets in the World. Indian organizations have to consider different economic and environmental conditions in Europe as shown in the case of Germany. Software development strategy for USA market and European market are different. European organizations have characteristics closer to Indian organizations than to USA organizations. Indian organizations should make use of this advantage for more software export to European countries in the future.







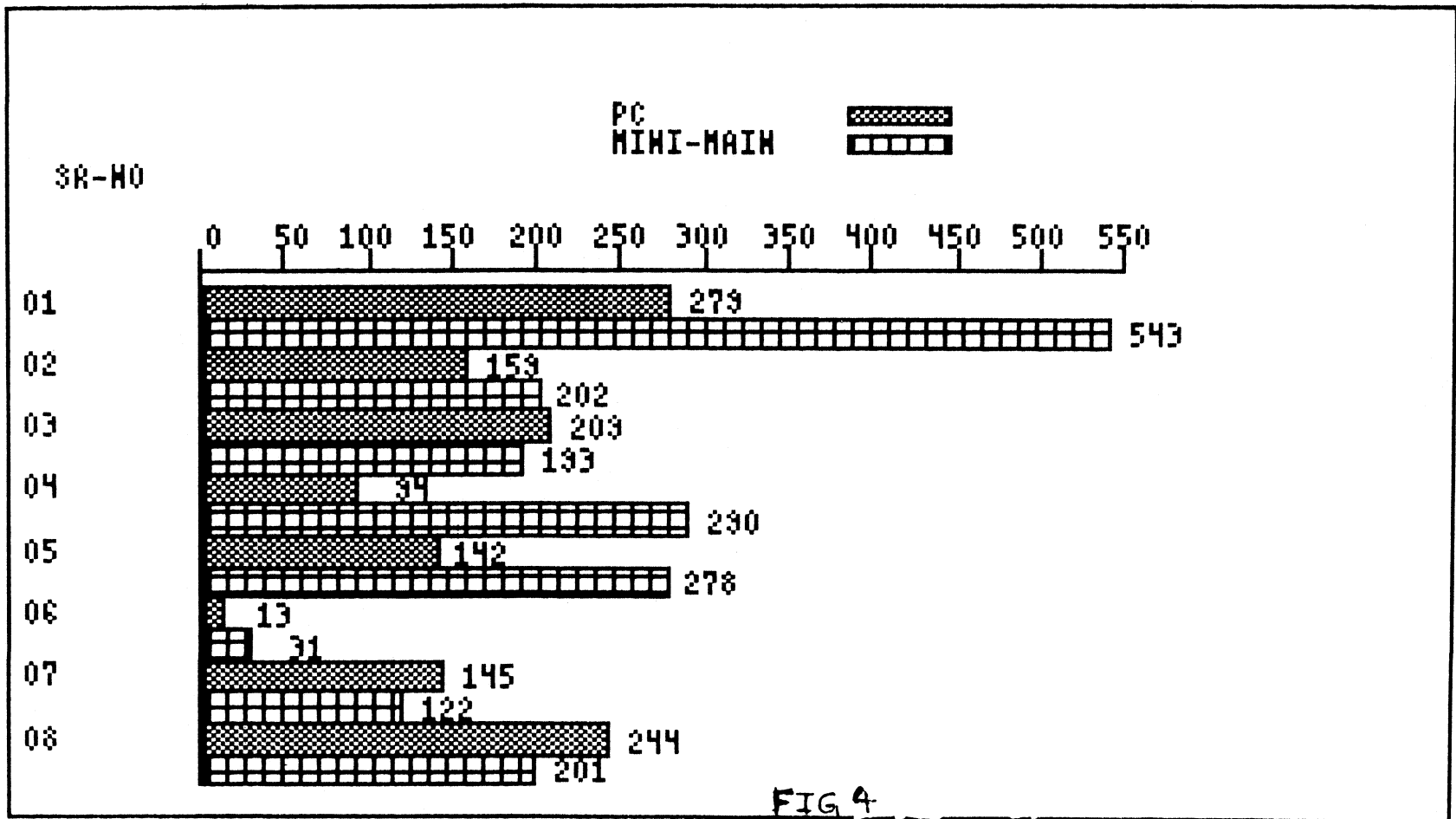


FIG 4

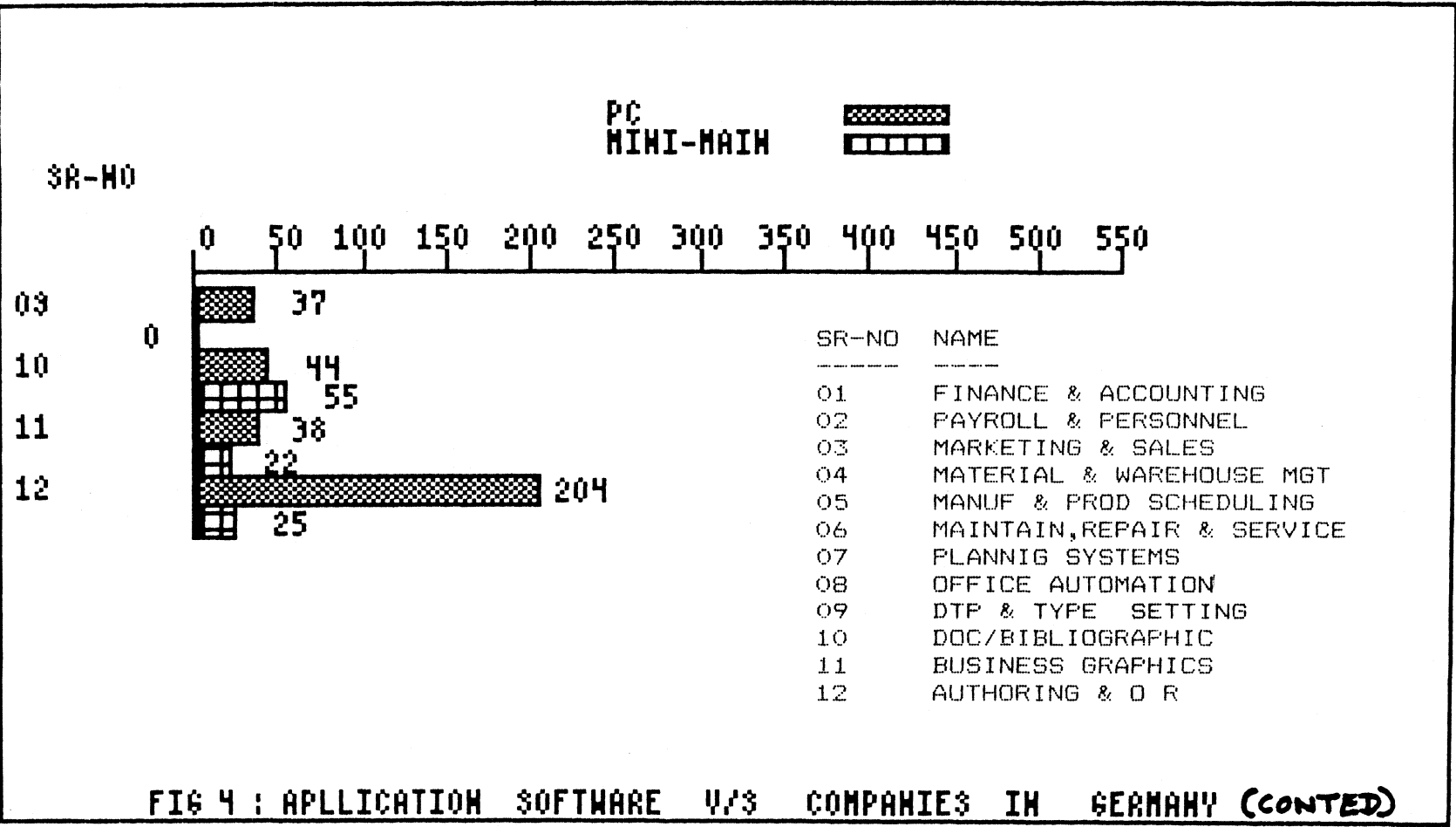
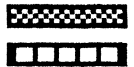


FIG 4 : APPLICATION SOFTWARE V/S COMPANIES IN GERMANY (CONTED)

INDUSTRY SPECIFIC SOFTWARE IN GERMANY

PC
MINI-MAIN



SR-NO

0 50 100 150 200 250 300 350

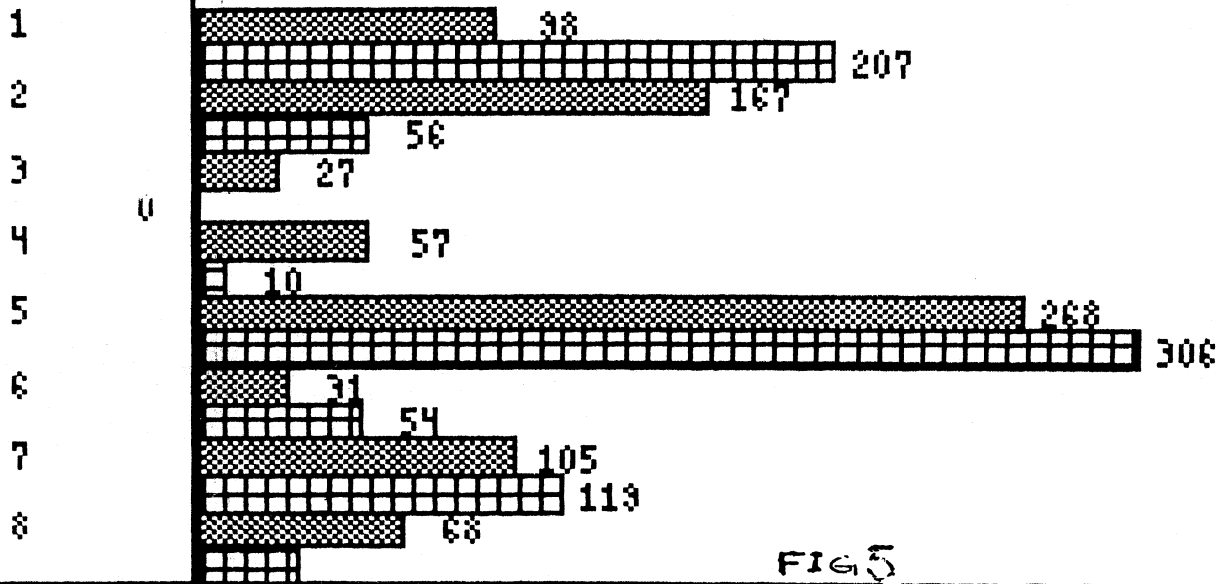
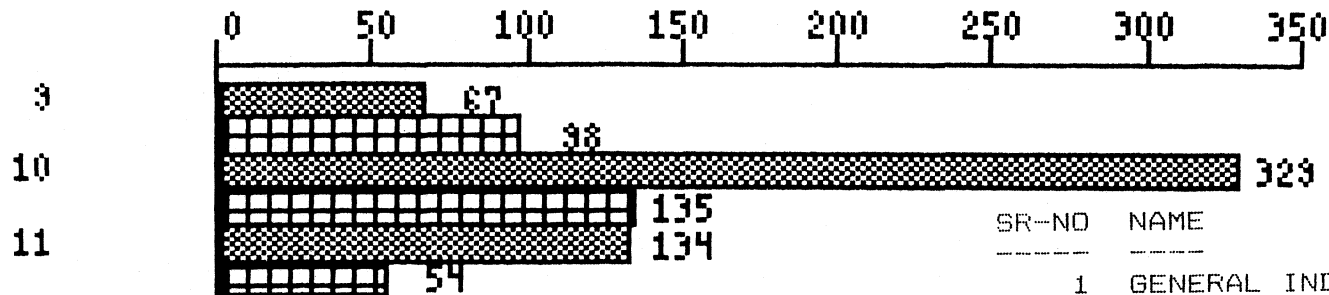


FIG 5

INDUSTRY SPECIFIC SOFTWARE IN GERMANY
 PC
 MINI-MAIN

SR-NO



SR-NO	NAME
1	GENERAL INDUSTRIES
2	CONSTRUCTION/BLDG/ARCHITECT
3	CRAFT & TRADE
4	AGRI, MEAT & HORTICULTURE
5	TRADE & COMMERCE
6	PUB, BOOKS/NEWSPAPERS
7	BANKING & FINANCE
8	INSURANCE
9	TRANSPORT & SHIPPING
10	BUSINESS & PROF SERVICES
11	HEALTH SERVICES

FIG 5 : INDUSTRY-SPECIFIC SOFTWARE V/S COMPANIES IN GERMANY (CONTD)