Demand for and applications of extra large EDP systems in the EEC Countries and the United Kingdom in the seventies

Vol. 3 - Development trends of the computer installations in the EEC Countries and the United Kingdom

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The survey was conducted for the "**Commission des Communautés Européennes** (Direction Générale des Affaires Industrielles)".

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C O N T E N T S

Chapter IV.

Development trends of the computer installations in the EEC Countries and the United Kingdom between 1962 and 1969

follows: contents

The two chapters of this volume deal with the past and the future trend of computer installations in the EEC countries and the U.K..

Chapter four includes, for each country, a synthesis of all information available on the trends of computer installations in the period 1962 - 1969, total and by industry.

Chapter five contains forecasts of computer total installations development, by number and value, with particular reference to extra-large computers in the decade 1970 - 1980.

CHAPTER IV.

Development trends of the computer installations in the EEC Countries and the United Kingdom between 1962 and 1969

1. The EEC countries

1.1. Sources

During the last five years the topics of the computer diffusion in European countries and of the establishment of a European computer industry have been widely discussed by international and national (1), public and private organi - zations and by economic-technical literature (2) in debates about the technological gap between Europe and the US.

The sources of information available to this respect are plentiful, and often the data reported therein are not only difficult to compare, but vary also greatly from each other, opening thus the possibility to arrive at contradictory conclusions especially when the extent and the trend of the gap between Europe and the US are concerned. Consequently, according to some of these sources (3), the EEC countries and the UK are behind the US by about 5 years in its computer instal lations, and this delay tends to remain unaltered, other sources (4) affirm that this delay is even greater and tends to increase, while still others (5) think that the delay will decrease.

The causes for these differences of opinion lie in the

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(1) OCDE - Les écarts technologiques entre les pays membres: calculateurs electroniques, March 1968

(2) Pierre Lhermitte - Le pari informatique, Paris 1968

(3) OCDE - idem

(4) W.K. De Bruijn - Computers in Europe in 1966
- Recent developments in the European market. Datamation, January 1968

(5) Expansion, June 1969.

diversity of the criteria which have been chosen by the various sources for their surveys. The largest discrepancy, however,is due to different interpretations of the expression "installed computers" (1).

In this research the statistics of the Diebold Group were primarily used, first of all, because they assure rather homogeneous surveys for all the countries, secondly, because they offer periodically a census of installed computers broken down according to the models, and finally because it is the most widely used statistics.

Unfortunately, these data are not very accurate when examined closely, especially concerning the listing of manufacturers and models and the distinction between installations and orders.

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(1) Concerning the definition "computer", some sources
   a) survey only the digital computers above a certain size (e.g. International Data Corp. in the publication EDP Industry Report)
   b) others include all digital computers,also micro - computers (e.g. Diebold Group)
   c) others survey all digital computers (in the sense of a) and b)) as well as analogic computers (e.g. official bulletin of the French Republic).

According to the sources "installed" means:
   a) the computers installed and actually in operation with specific categories of users (excepting, e.g., the constructing firms according to ISTAT, or the military forces according to the Diebold Group);
   b) all computers installed and actually in use (e.g. only "Computer Survey"specifies that it does not take into consideration those computers no longer in use);
   c) the computers installed and in operation (as in a) and b)) and those delivered but not yet in operation;
   d) the computers installed (operating or not) and those returned by users and substituted by newer models.

The information supplied by the above mentioned source has, however, been integrated or substituted by a more reliable one, wherever it was possible: thus, for example, statistics from Computer Survey have been preferred, for the UK.

The data used during the survey are, in our opinion, the only ones available, because of the lack of official statistics about computers in the various countries.

The limits of reliability which have been shown, are not, however, such as to impair the validity of the general indications of trend which can be deduced therefrom, even if the absolute data supplied have to be interpreted very cautiously.

1.2. Development of computer installations

While the first computers for scientific purposes were installed in the UK in 1951 and on the continent in 1954, their industrial and commercial utilization began only by the end of the Fifties as a result of the introduction of the IBM 1401 whose deliveries on the European market took place in 1959-1960.

In the period between 1962 and 1969 to which the data ~~collected by us~~ refer almost uniformly, in the European market:

- the third computer generation has appeared and spread changing deeply the factors of the market development;
- the conditions of the offer have changed with the increase in the number of constructors operating on the market and the range of computers offered.

Between 1962 and 1969 the computers installed in the EEC countries have increased from an initial 1,647 to 13,871, at an average annual composed rate of 39%, while their value (expressed in annual rental) has increased from 137 million US Dollars to 998 million US Dollars (+35.8%).

During the same period the computers installed in the UK have increased from 489 to 3,575 in number and from 36,8 to 320,4 million US Dollars in value, at annual rates of increase of 33.7% and 37.2% respectively.

The comparison between the countries under examination and the U.S. has been summarized in the following table:

COMPUTERS INSTALLED IN NUMBER AND VALUE

	1962		1969 (30/6)		AVERAGE ANNUAL RATE	
	NUMBER	VALUE (Million $)	NUMBER	VALUE (Million $)	NUMBER	VALUE
EEC + UK	2,136	174	17,446	1,318	+ 37.7	+ 36.1
US	11,076	1,144	59,779	5,660	+ 30.2	+ 29.4

Since during the last years of the period 1962-1969 the presence of desk computers in Europe has increased noticeably, it is more meaningful for the purposes of an evaluation of the considerable development of the European installations to take a look at the trend of the installations (desk type escluded). The following results can thus be obtained:

COMPUTERS INSTALLED, EXCLUDING DESK COMPUTERS

	1962		1969 (30/6)		AVERAGE ANNUAL RATE	
	NUMBER	VALUE (Million $)	NUMBER	VALUE (Million $)	NUMBER	VALUE
EEC	1,569	136	10,938	944	+ 34.2	+ 34.7
UK	450	36	2,884	310	+ 31.2	+ 37.1
US	9,680	1,121	45,792	5,485	+ 27.5	+ 29.1

While the number of computers installed in the EEC countries and the UK by the middle of 1969 was apparently higher than the US equipment in 1962, its value was only slightly higher, due to the fact that in the US the equipment is characterized by a greater amount of medium and large computers, whereas small computers prevail in the European installations.

Thanks to the considerable development of the European installations from 1962 to 1969, the delay in comparison with the US tends to decrease, when we compare the percentage of the installations in the EEC countries, in number and in value, with the American one.

Ratio between European installations and 100 U.S. installations.

Year	EEC		EEC and UK	
	Number	Value	Number	Value
1962	14.8	12.4	19.2	15.2
1963	14.5	13.1	20.2	17.9
1964	17.2	14.6	23.3	20.1
1965	18.4	15.5	23.8	20.9
1966	16.7	14.1	21.8	19.8
1967	17.9	14.5	23.0	19.0
1968	22.4	17.2	28.8	23.2
1969	23.2	17.6	29.1	23.3

The degree of the diffusion of hardware in the EEC countries and the UK can be validly compared with the US only through certain indexes, which take into account the economic differences of the countries under examination.

The following indexes have been used:

- number of computers per million extra-agricultural employees (Table IV.7);
- investment in computer (in terms of annual rental) per extra-agricultural employee (Table IV.8);

- percentage of computer expenditure in relation to GNP (Table IV.9);
- share of the annual investment in computers (net increase of the equipment valued at purchase price) in relation to gross fixed investment (Figure IV.1).

The results of the comparison are summarized as follows:

DIFFUSION OF COMPUTERS IN THE EEC COUNTRIES, THE UK AND THE US

	EEC		UK		US	
	1962	1968	1962	1968	1962	1968
N. PER MILLION EXTRA AGRICULTURAL EMPLOYEE	28	200	20	138	179	757
HARDWARE INVESTMENT PER EMPLOYEE ($)	2.334	14.261	1,475	12.301	18.520	70.810
HARDWARE EXPENDITURE PER 1,000 $ GNP	0.48	2.30	0.37	3.02	1.73	5,83
HARDWARE INVESTMENT PER 1,000 GROSS FIXED INVESTMENT	0.264	0,952	0.735	0.492	0.907	3,773

Concerning the comparison between the Common Market and the US one has to note that:

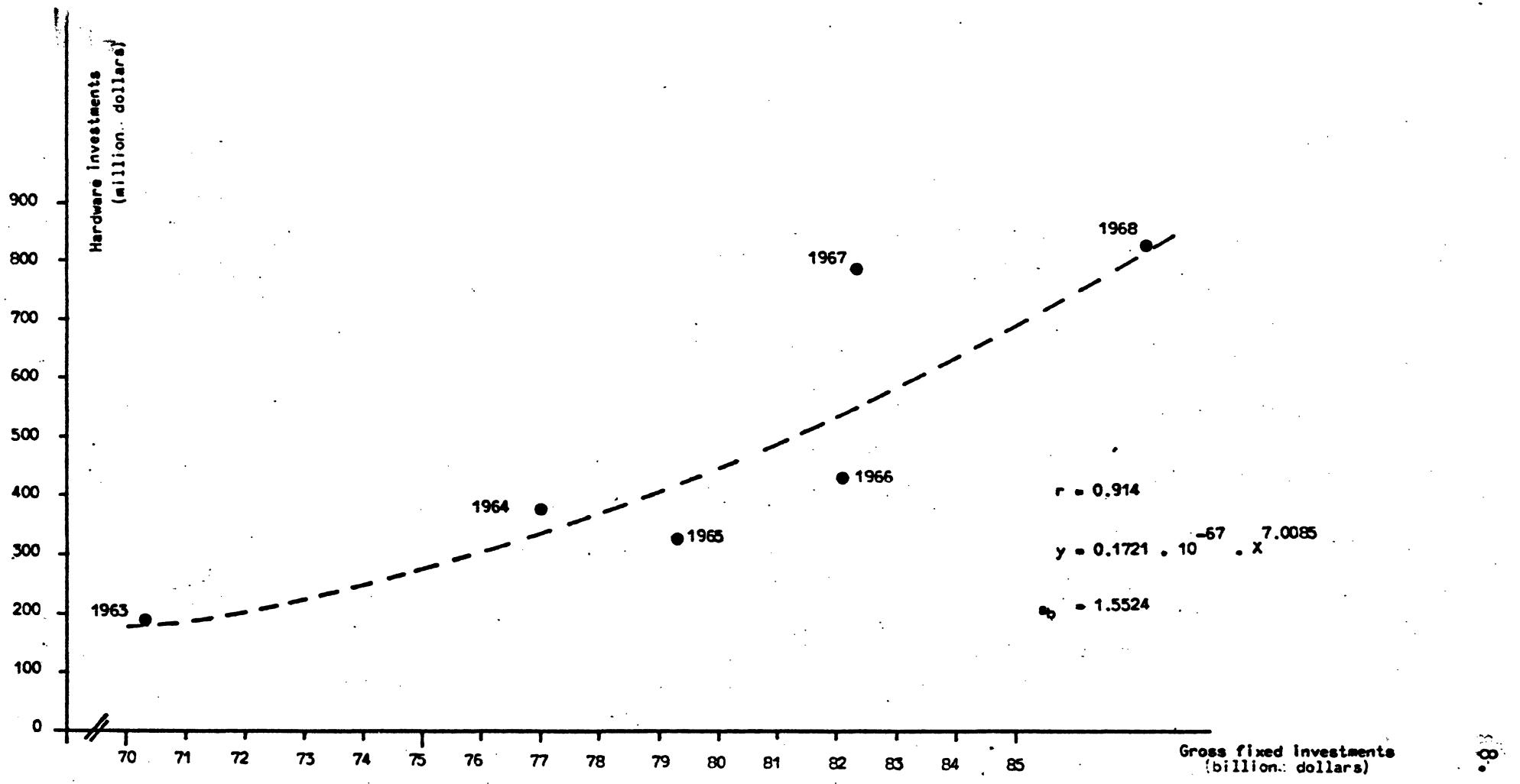
- the delay expressed by the ratio computer/extra-agricultural employee remains almost constant, i.e. 5 years, for the period considered;
- the comparison between investments per employee shows a delay behind the US of about 6 years;

FIG. IV/7/1

EUROPEAN ECONOMIC COMMUNITY

HARDWARE INVESTMENTS (1) IN RELATION TO GROSS FIXED INVESTMENTS

(1963 - 1968)



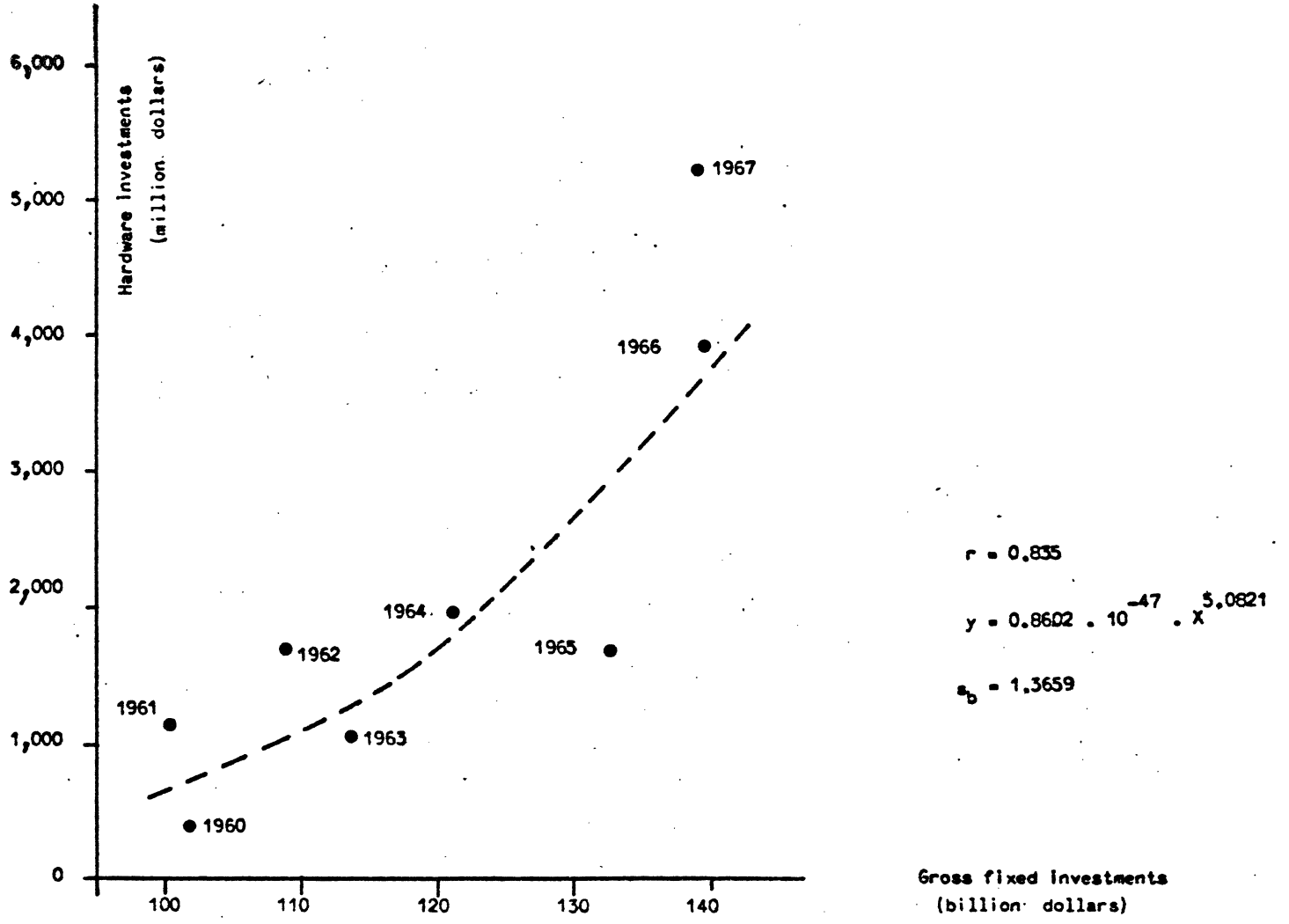
(1) Annual increase of EDP installations estimated on the basis of purchase price

FIG. IV/1 bis

UNITED STATES

HARDWARE INVESTMENTS (1) IN RELATION TO GROSS FIXED INVESTMENTS

(1960 - 1967)



(1) Annual increase of EDP installations estimated on the basis of purchase price

- smaller, but slightly increasing is the delay (about 4 years) when evaluating the index expenditure hardware per one thousand dollar GNP;
- extremely conspicuous (7-8 years) is the delay expressed through the ratio hardware investments/gross fixed investments.

Whatever index of comparison is used, the European gap behind the US remains unchanged during the entire period 1962-1969, being thus in contrast to the indications which can be deduced from the percentage incidence of the European installations as compared with the US ones.

Further confirmation of the evenness of the gap EEC-USA concerning the computers diffusion, can be drawn by examining the ratio which exists in the two areas between hardware expenditure and GNP (Figure IV.2 and IV.2 bis). The estimated equations of regression assume the following form:

$$y = 0.91987 \cdot 10^{-67} x^{6.56} \quad (s_b = 0.246)$$
$$r = 0.996$$ for the EEC Countries

$$y = 0.11935 \cdot 10^{-67} x^{6.50} \quad (s_b = 0.447)$$
$$r = 0.981$$ for the U.S.

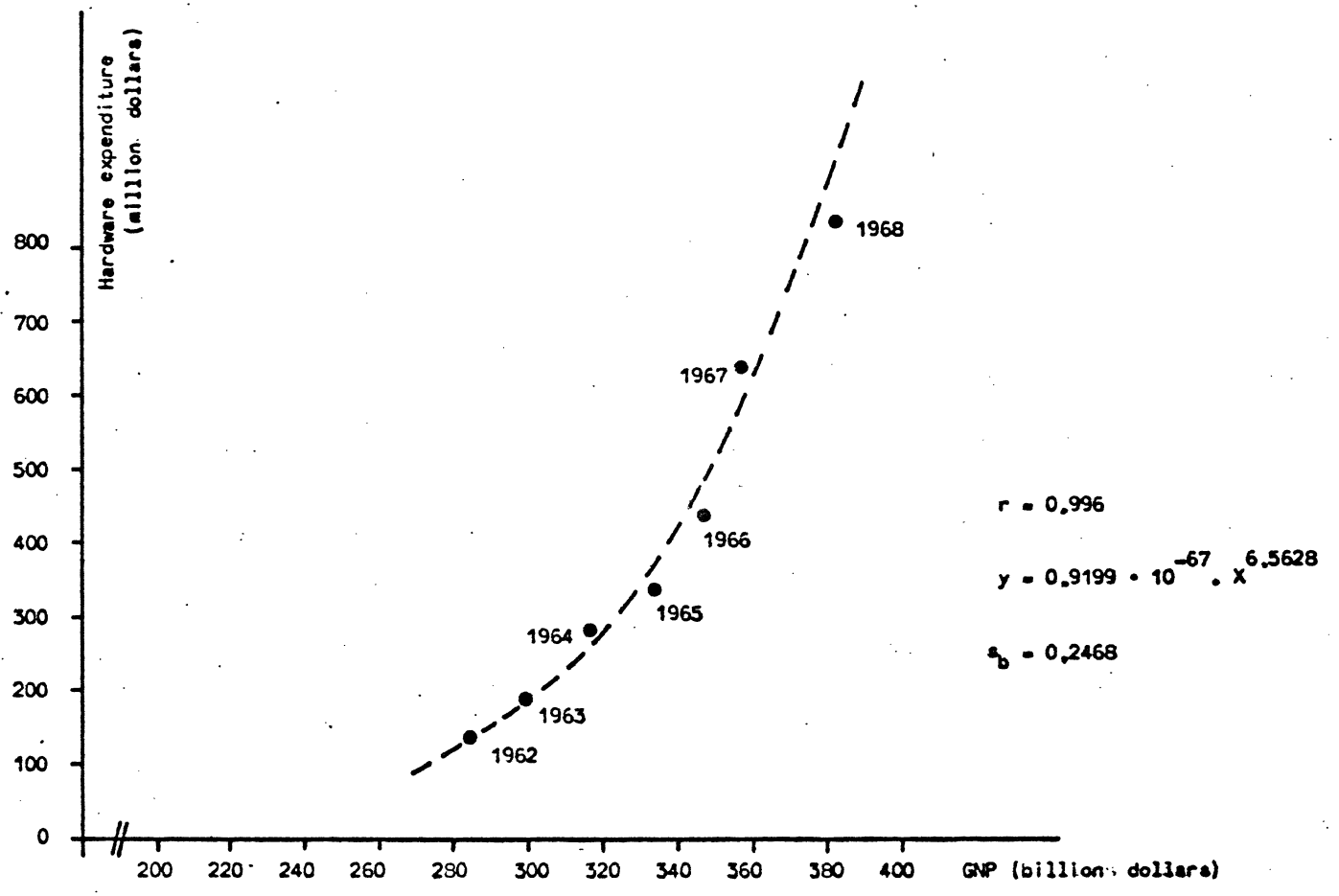
where y = annual hardware expenditure
and x = GNP

FIG. IV/2

EUROPEAN ECONOMIC COMMUNITY

HARDWARE EXPENDITURE (1) IN RELATION TO GNP

(1962 - 1968)



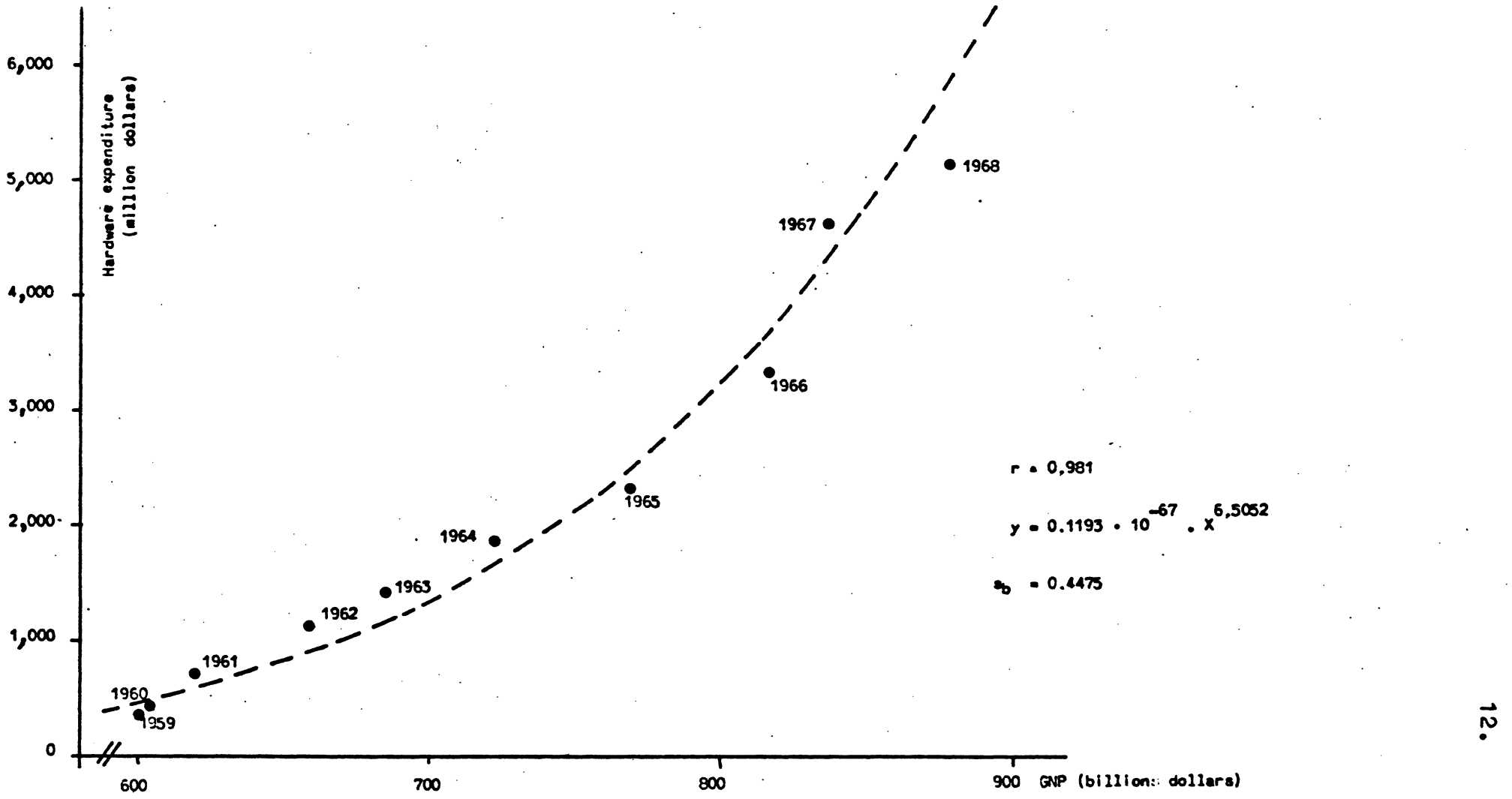
(1) Annual rental of hardware installed

UNITED STATES

FIG. IV/2 bis

HARDWARE EXPENDITURE (1) IN RELATION TO GNP

(1959 - 1968)



(1) Annual rental of hardware installed

1.3 Computers installed by size-classes

The subdivision of computer installations per size classes in the EEC countries and the UK has changed between 1962 and 1969 in such a way as to grow more alike the US subdivision. The variations are illustrated in the table.

PERCENTAGE AND ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLED

	1962			1969 (30/6)			ANNUAL RATE (1962-1969)		
	EEC	UK	US	EEC	UK	US	EEC	UK	US
	Number								
DESK	4,7	8,0	12.6	21,1	19.3	23.4	+ 79.6	+ 51.9	+ 44.7
SMALL	84,8	85.5	73,8	69.3	64,3	60.3	+ 33.7	+ 28.4	+ 25.9
MEDIUM	5,8	3,9	4,8	7,0	12,0	10,5	+ 44,5	+ 51,3	+ 50.7
LARGE	4,3	1,8	8,0	1,7	2,8	4,1	+ 19,5	+ 49,2	+ 14,8
EXTRA-LARGE	-	0.4	0,8	0,7	1,2	1,7	+188,9(1)	+ 61.8	+ 45,7
UNCLASSIFIED	0,4	0,4	-	0.2	0.4	-	-	-	-
TOTAL	100,0	100.0	100.0	100,0	100,0	100,0	+ 39.0	+ 33,7	+ 30,2
	Value								
DESK	1,0	2,1	2,0	5,4	3,1	3,2	+ 81,7	+ 43,5	+ 40.3
SMALL	65,9	68,1	44,6	55.9	46.2	39,5	+ 31,7	+ 29,2	+ 27.6
MEDIUM	11,9	9,3	8,3	19,8	25,9	23.4	+ 47,8	+ 53.9	+ 55,4
LARGE	21,2	12,3	38,2	10,2	12,7	18,2	+ 20,2	+ 41.6	+ 11.8
EXTRA-LARGE	-	8,2	6,9	8,7	12,1	15,7	+151,2(1)	+ 50.4	+ 45,7
TOTAL	100,0	100,0	100.0	100,0	100.0	100.0	+ 35,8	+ 37.2	+ 29,4

(1) From 1964.

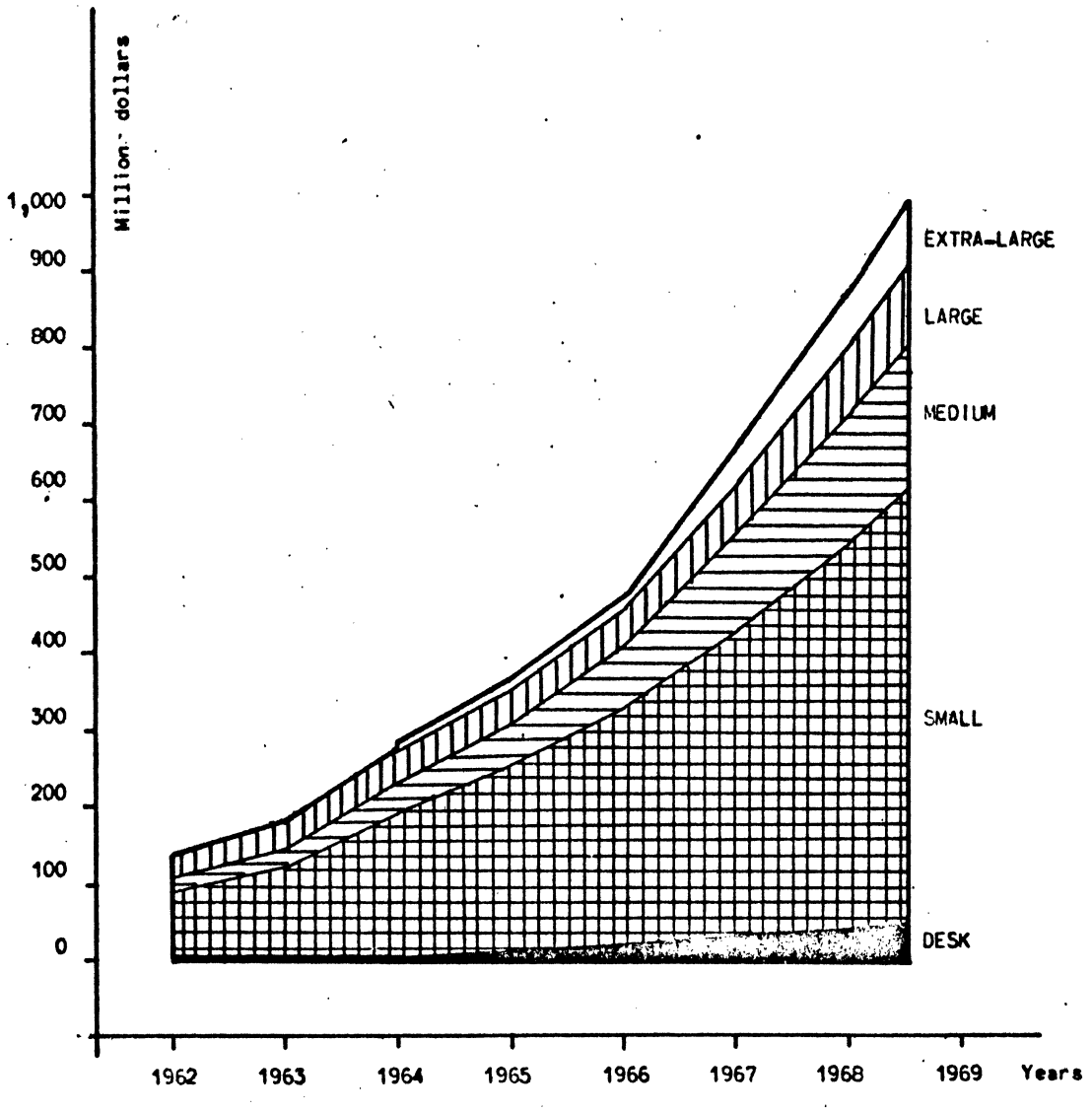
Between 1962 and 1969 an increased development has been recorded for the EEC countries and the UK in the extreme size classes: desk on one side and extra-large on the other. The total of the large and extra-large computers maintains also in 1969 a relative importance as compared to the total number of installations which is higher in the U.S. than in Europe.

EUROPEAN ECONOMIC COMMUNITY

FIG. IV/3

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEARS, BY SIZE CLASSES

(1962 - 1969)



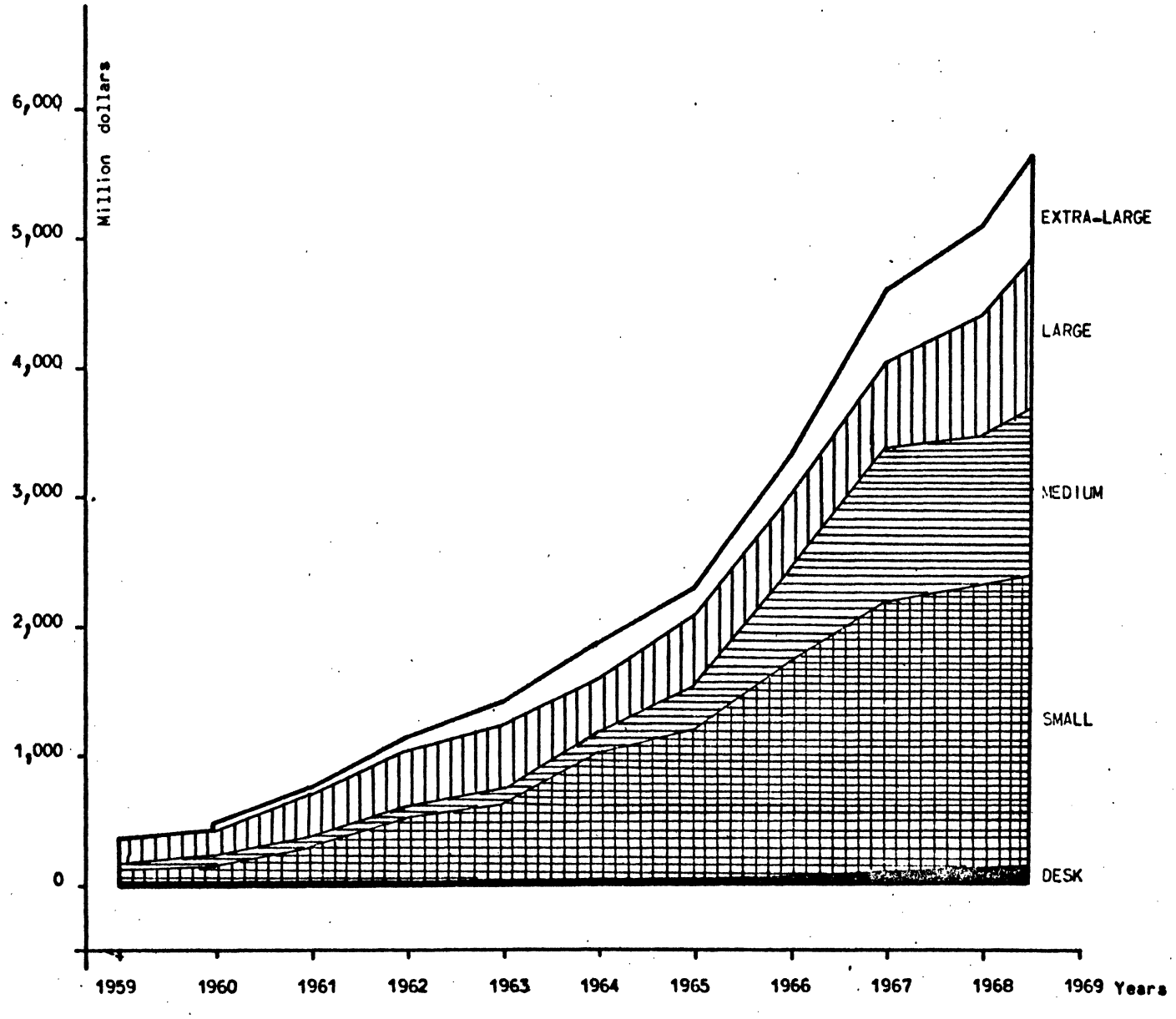
NU

UNITED STATES

FIG. IV/3 bis

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEARS, BY SIZE CLASSES

(1959 - 1969)

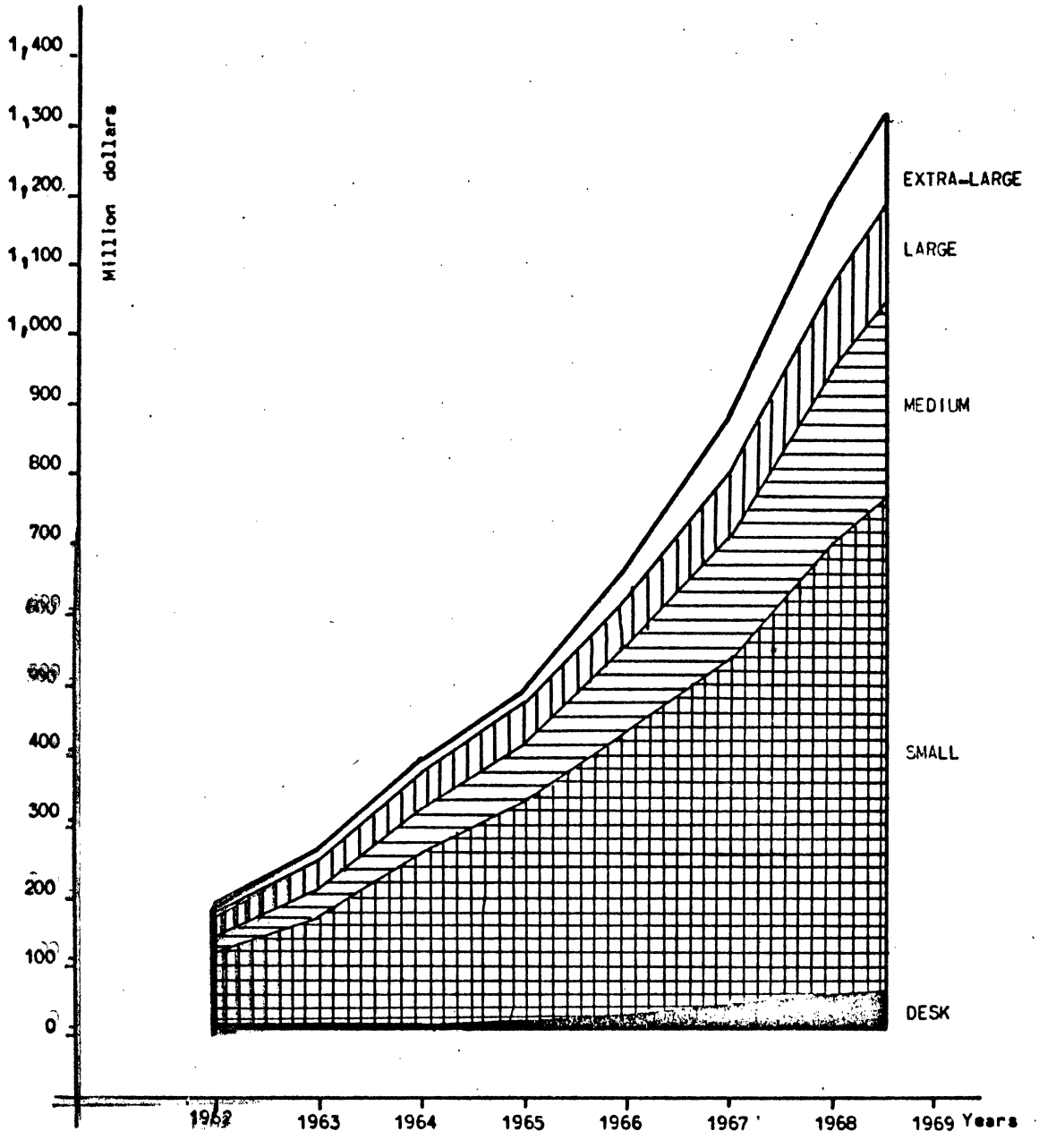


EUROPEAN ECONOMIC COMMUNITY
AND UNITED KINGDOM

FIG. IV/4

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEARS, BY SIZE CLASSES

(1962 - 1969)



This is due not only to the more advanced state of development of EDP applications in the US, but, above all, to the fact that in this country, contrary to the EEC, there are more large private and government offices which employ high capacity computers.

The development of the European park seems to have been faster than that of the US one, in number as well as in value, in all computer classes with the exception of the medium class which has recorded in the US between 1962 and 1969 an average annual rate of increase of 50.7% in number and of 55.4% in value, whereas in the EEC countries the rate registered was only 44.5% in number and 47.8% in value.

The differences in the rates of development of the various computer classes in the EEC countries and the USA can be explained mostly by historical reasons.

In the US, where automation had begun first, the structure of the installations was already well balanced at the beginning of the period under consideration.

In the UK, where the diffusion of automation began earlier than in the EEC countries, a growth rate higher than the average for the EEC can be recorded as a consequence, at least in terms of the installations value which has, in the period considered, increased at an average annual rate of 37.2% (against the 35.8% recorded for the EEC), while in number the rate has increased by 33.7% against the average EEC of 39.0%.

As has been indicated in the preceding table, this difference can be attributed to the fact that in the EEC countries the computer types which have recorded increases considerably higher than the average are the desk types, whose value is

small, and the extra-large class which possesses relatively few installations.

In the UK, however, considerable increases took place in the medium class which accounts for 12% of the total and whose unitary value is rather important.

Large and extra-large computers in the EEC countries and the UK numbered 331 and 138 respectively, in June 1969, and their distribution per country can be seen in the following table.

Number of large and extra-large computers installed in the EEC Countries and the UK by the middle of 1969

Country	Large	Extra-large
Belgium	13	-
France	80	53
Germany	82	16
Italy	40	21
Netherlands	16	6
United Kingdom	100	42
Total	331	138

1.4 The Computer Market

On the EEC and UK computer markets, American as well as European companies are present: as a result, the European market is much more competitive and lively than the American one.

The American manufacturers' presence is maintained not only through the creation of branch offices and efficient sales networks, but also through the establishment of production plants and through the stipulation of license agreements with national manufaturers.

MARKET SHARES PER MANUFACTURERS

Value 1969

	BELGIUM	HOLLAND	FRANCE	GERMANY	ITALY	UK	US
BULL/GE	17,2	10,4	14,5	4,6	20,4	1,5	2,0 (1)
CDC	0,4	4,9	3,1	2,7	1,5	0,9	5,3
CII	2,0	0,6	4,0	0,3	-	-	-
HONEYWELL	1,2	2,0	1,7	2,4	2,2	5,0	4,1
IBM	64,9	54,8	62,6	63,3	66,3	40,3	71,0
ICL	2,6	3,4	1,7	0,7	0,2	42,0	-
PHILIPS	0,8	8,7	-	-	-	-	-
SIEMENS	2,9	2,2	1,0	13,2	0,8	-	-
UNIVAC	3,8	7,4	4,5	7,1	7,5	3,8	7,0
OTHER	4,2	5,6	6,9	5,7	1,1	6,5	10,6
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0

(1) GENERAL ELECTRIC only

The importance of the American presence in this sector in almost all European countries is demonstrated by the market shares (in value) for 1969 in the preceding table; the principal American manufacturers have a market share in all EEC countries

which is higher than 80% and reached 98% in Italy. Only in the UK, due to the presence of ICL, the market share of the American manufacturers reaches a 58% only.

The American predominance is particularly evident in that sector of the market ~~which is of prime interest to this study, i.e. that of the~~ large and extra-large computers. American manufacturers control it entirely in Belgium, Holland, France and Italy. In Germany and the UK American manufacturers dominate the market, but do not control it, because of the presence of ICL and Siemens.

The shares reached by the American manufacturers on the large and extra-large computer market are more important than those obtained for the market as a whole. This is due to the lack of competition by European manufacturers in this field, whereas in the other classes the national industries of some European countries have begun to offer strong competition to the American manufacturers supported also by their governments.

1.5. Computers installed by industry

The informations concerning the distribution of computers per sector of utilization vary greatly from country to country.

These differences depend largely on the availability of up-to-date data, on the different ways of classifying the individual sectors and on their degree of reliability.

An attempt was made in 1966 by W.K. De Bruijn to compare the position of computers in the European market, but unfortunately it referred to only one type and to a time when computer installations were little more than the half of the 1969 ones (table IV.a.).

In the table IV.b. the most recent informations from each country concerning the number of installed computers per large sectors of the economy have been summarized. Using the recommended caution in interpreting data which are rather heterogeneous like the ones listed, one can however conclude that the industrial sector is the most important one concerning the number of installed computers with a percentage of around 40% of all the installations in the countriesconsidered here.

Central and local governments are important users of computers only in England (28% of all installations), while their importance is by far smaller in other countries.

The third sector in order of importance regarding the employment of computers is that of banks and insurance companies whose importance in the various countries varies between the UK minimum of 9.1% to the maximum of 21.1% in Holland.

TABLE IV.1.a/

COMPUTERS INSTALLED BY INDUSTRY

INDUSTRY	EEC		ITALY		FRANCE		GERMANY		BENELUX		UNITED KINGDOM	
	N.	%	N.	%	N.	%	N.	%	N.	%	N.	%
UNIVERSITIES, R&D INSTITUTES	475	12.6	53	8.8	196	19,0	162	11,0	64	9.5	210	11.8
GOVERNEMENT DEPARTMENTS	201	5.3	52	8.7	58	5.6	51	3.5	40	5.9	105	5.9
LOCAL GOVERNMENT	333	8.8	55	9.2	68	6.6	176	12.0	34	5.0	234	13.1
INSURANCE	330	8.7	30	5.0	95	9.0	135	9.2	70	10.4	115	6.4
BANKING	464	12.3	105	17.6	145	14,1	130	8.8	84	12.4	116	6.5
BUREAU	362	9.6	35	5.7	114	11,0	131	8.9	82	12.1	133	7.4
MANUFACTURING:	1,614	42.6	270	45,0	375	34,7	684	46.5	303	44,8	875	48.9
* Food	251	6.7	42	7.0	64	6,2	88	6.0	57	8.4	89	5.0
* Mechanical	221	5.9	42	7.0	42	4,1	103	7.0	34	5.0	104	5.8
* Electric	176	4.7	17	2,8	28	2,7	88	6.0	43	6,4	147	8,2
* Motor	151	4.0	24	4,0	55	5,3	50	3.4	22	3,3	143	8,0
* Chemical	153	4,0	34	5,7	32	3,1	70	4,8	17	2,5	122	6,9
* Metals	165	4,4	34	5,7	15	1.5	89	6,0	27	4,0	85	4,8
* Textile	109	2,9	29	4,8	27	2,6	27	1,8	26	3.8	49	2,7
* Transportation	80	2,1	10	1,7	25	2.4	22	1.5	23	3,4	35	2,0
* Oil	77	1,8	12	2,0	26	2,5	18	1,2	21	3,1	34	1,9
* Retail	85	2,2	9	1,5	14	1,4	50	3,4	12	1,8	12	0.6
* Engeneering	57	1,5	4	0,7	7	0.7	42	2,9	4	0,6	16	0.9
* Publishing	41	1.1	8	1,3	11	1,1	15	1,0	7	1,0	20	1,1
* Mining	48	1.3	5	0,8	11	1,1	22	1,5	10	1,5	19	1,1
TOTAL	3,779		600		1,033		1,469		677		1,788	

SOURCE: W.K. DE BRUIJN - Computers in Europe in 1966.

PERCENTAGE OF COMPUTERS INSTALLED BY INDUSTRY IN THE EEC COUNTRIES AND THE UNITED KINGDOM (1)

	FRANCE 1968 (2)	GERMANY 1967 (3)	ITALY 1968 (4)	NETHERLANDS 1967 (5)	UK 1967 (6)
MANUFACTURING INDUSTRIES	36.7	45.6	47.9	44.3	44.4
BANKS AND INSURANCE COMPANIES	15.8	20.8	20.2	21.1	9.1
PUBLIC UTILITIES	5.4	6.5	5.0	3.8	6.9
GOVERNMENT	17.1	5.0	17,0	19.6	28.2
SERVICE BUREAUX	-	8.3	-	10,2	8,7
OTHER AND RETAIL	21.3	13,8	9,9	1,0	2,7
TOTAL	100.0	100.0	100.0	100.0	100.0

(1) Information for BELGIUM not available

(2) BIPE

(3) Institut für Angewandte Reaktorphysik.

(4) Cassa di Risparmio delle Province Lombarde

(5) W.K. De Bruijn - Computers use in Netherlands

(6) Computer Survey

2. THE BENELUX

2.1 Sources

The statistics about computer installations refer in most cases to Benelux as a whole, instead of examining separately Belgium and Holland.

For the years 1962 to 1969 data disaggregated per model are available only for Benelux; whereas, from 1965 to 1969 it is possible to analyze separately the installations per model in Belgium and Holland.

Data, both aggregated for the Benelux countries and disag - gregated for Belgium and Holland, have been supplied by the Diebold Group.

The Diebold statistics have been controlled and integrated by the exhausting information supplied by SOBEMAP, the Belgian Society of Economics and Applied Mathematics.

2.2. Development of computer installations

The actual hardware situation in the Benelux countries and its development trends depend from the trends, in number and value, of computer installations in Belgium and Holland.

Trend of the Computers installed in the Benelux (number and value)

Years	Number	Value (000$ annual rental)
1962	175	13,238
1963	270	19,550
1964	422	29,625
1965	600	39,872
1966	861	58,998
1967	1,277	82,093
1968	1,741	113,251
1969 (30/6)	1,964	127,601

In June 1969, the Benelux countries account for a seventh of the EEC installations.

The Benelux installation has recorded an average annual growth rate of +45.5% in number and +41.9% in value from 1962 to 1969; these figures demonstrate that the Benelux have developed at a rate higher than the EEC countries (+39.0 in number and +35.8% in value).

INSTALLATIONS IN BELGIUM, HOLLAND AND BENELUX, 1965 AND 1969

(number and value)

	NUMBER				VALUE (annual rental)			
	1965		1969		1965		1969	
	N.	%	N.	%	000 $	%	000 $	%
BELGIUM	288	48.0	903	43.6	17,636.8	44.2	54,101.0	41.7
NETHERLANDS	312	52,0	1,167	56.4	22,235.4	55.8	75,528.2	58.3
TOTAL	600	100.0	2,070	100.0	39,872.2	100,0	129,629.2	100.0

Making a detailed examination of the Belgian and Dutch computer installation for the years of which the equipment of both countries is known, one notes that there are always more installations in Holland.

Besides, considering the percentage of the two countries, the Dutch percentage, between 1965 and 1969, has increased in number and value.

In Belgium as well as Holland the years which saw the major developments were 1964 and 1967, a fact which demonstrates that also these countries have shown the effects of the introduction on the market of the second and third computer generations.

In Holland the first computer employed dates back to 1952 and the first computer for scientific use was put in operation in the second half of 1954. The real computer diffusion, however, began in 1957 when the first installations for commercial purposes were made.

The ratio number and value of computers installed per number

of extra-agricultural employees allows to make an evaluation of the diffusion of the hardware in the two countries as compared to the Common Market as a whole.

NUMBER OF COMPUTERS PER MILLION EXTRA-AGRICULTURAL EMPLOYEES

	1962	1963	1964	1965	1966	1967	1968
BELGIUM				85	119	168	220
NETHERLANDS				78	112	176	245
BENELUX	25	38	58	81	115	173	234
EEC	28	38	61	85	110	155	200
U.K.	20	36	51	59	79	105	138

HARDWARE INVESTMENT PER EXTRA-AGRICULTURAL EMPLOYEE

(dollars)

	1962	1963	1964	1965	1966	1967	1968
BELGIUM				5.2	8.0	11.5	16.4
NETHERLANDS				5.5	7.7	10.7	14.2
BENELUX	1.8	2.7	4.0	5.3	7.8	11.0	15.2
EEC	2.3	3.0	4.5	5.9	7.6	10.9	14.2
U.K.	1.4	2.6	4.1	4.9	7.2	8.3	12.3

During the period 1962 - 1965 the average EEC ratio number of computer installations per number of extra-agricultural employees was higher than the one of Benelux; however, later it improved its position in the comparison with the other countries.

The intensity of the computer installations development in the Benelux countries between 1962 and 1969 is confirmed by the fact that the hardware expenditure shows, when compared to

the Gross National Product, a rather high elasticity. In fact the regression analysis gives the following result:

$$y = 0.363 \cdot 10^{-67} \; x^{7.084}$$

$$(s_b = 0.466) \qquad (r = 0.989)$$

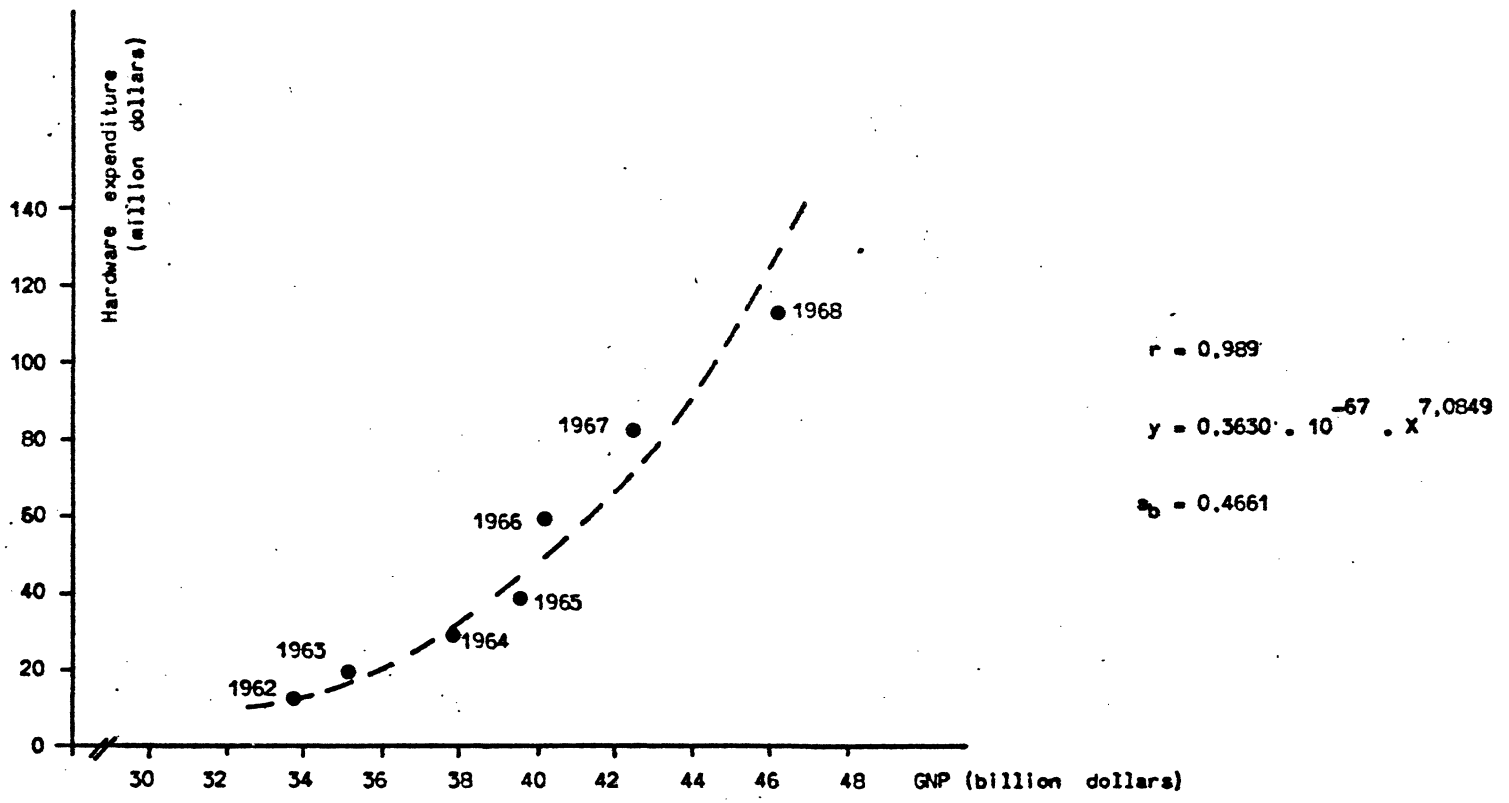
where x = GNP

and y = value of annual rental of installed hardware (Fig. IV/5).

The elasticity (7.0849) is inferior only to the Italian one for the same period. The hardware expenditure accounts in 1968 for 2.58°/oo of the Dutch Gross National Product and for 2.31°/oo of the Belgian one.

FIG. IV/5 EDP EXPENDITURE (1) IN RELATION TO GNP

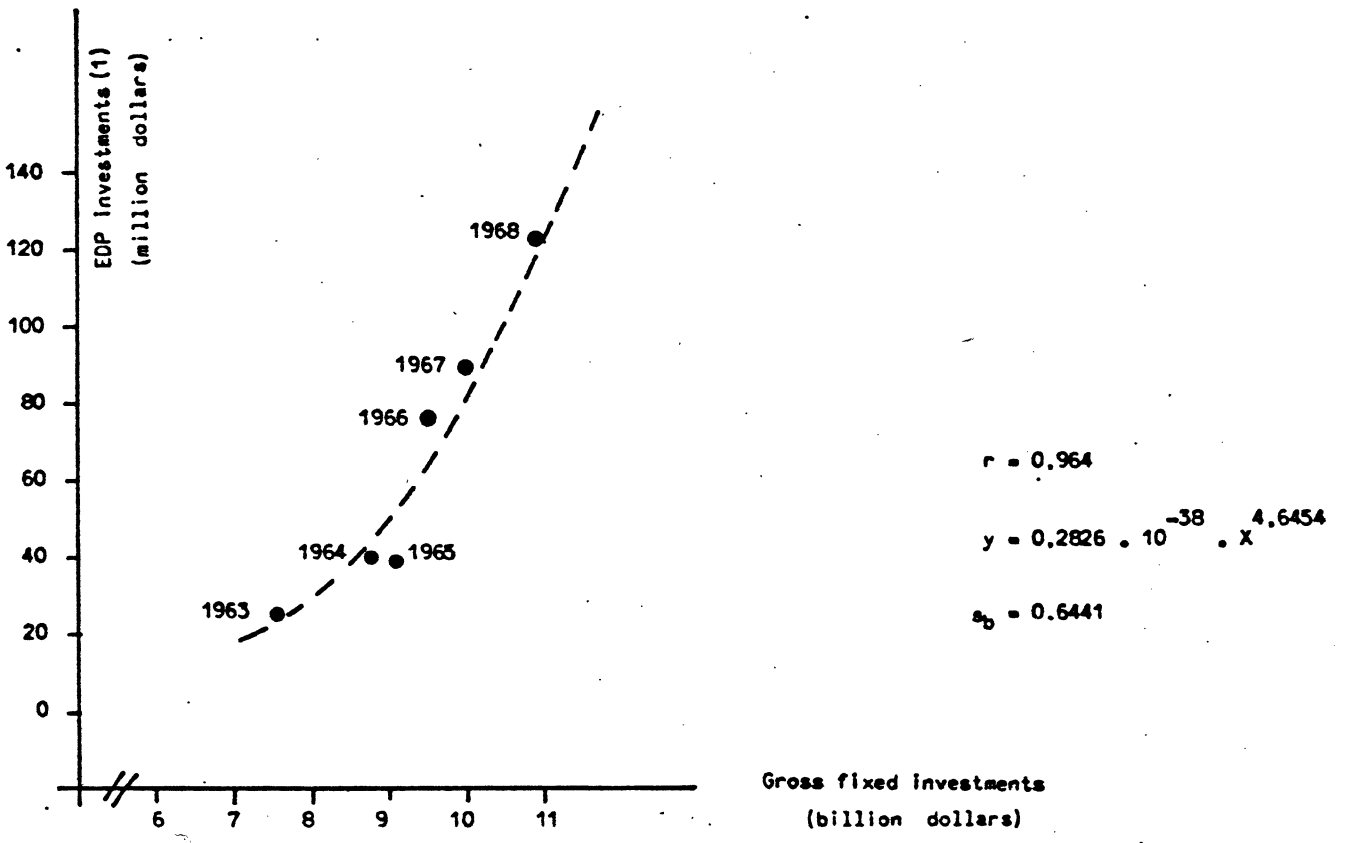
(1962 - 1968)



(1) Annual rental of hardware installed

FIG. IV/6 EDP INVESTMENTS (1) IN RELATION TO GROSS FIXED INVESTMENTS

(1963 - 1968)



(1) Annual increase of EDP installations estimated on the purchase price

2. 3 Computers installed by size classes

A breakdown of the computer equipment according to size classes permits an examination of the computers installed in Benelux as compared with the EEC, with special emphasis on large computers.

NUMBER AND VALUE OF COMPUTERS INSTALLED IN THE BENELUX BY SIZE

	1962		1969 (30/6)	
	N.	Value (000 $)	N.	Value (000 $)
DESK	15	324.0	495	8,816.8
SMALL	151	10,102.8	1,250	67,014.3
MEDIUM	4	651.6	174	35,133.8
LARGE	5	2,160.0	29	12,103.5
EXTRA-LARGE	-	-	6	4,532.7
UNCLASSIFIED	-	-	10	-
TOTAL	175	13,238.4	1,964	127,601.1
TOTAL (excluding Desk)	160	12,914.4	1,469	118,784.3

In total the Benelux countries have a computer equipment which is larger than that of other European countries; however, as far as extra-large computers are concerned, they possess the smallest number, and all of them are located in Holland.

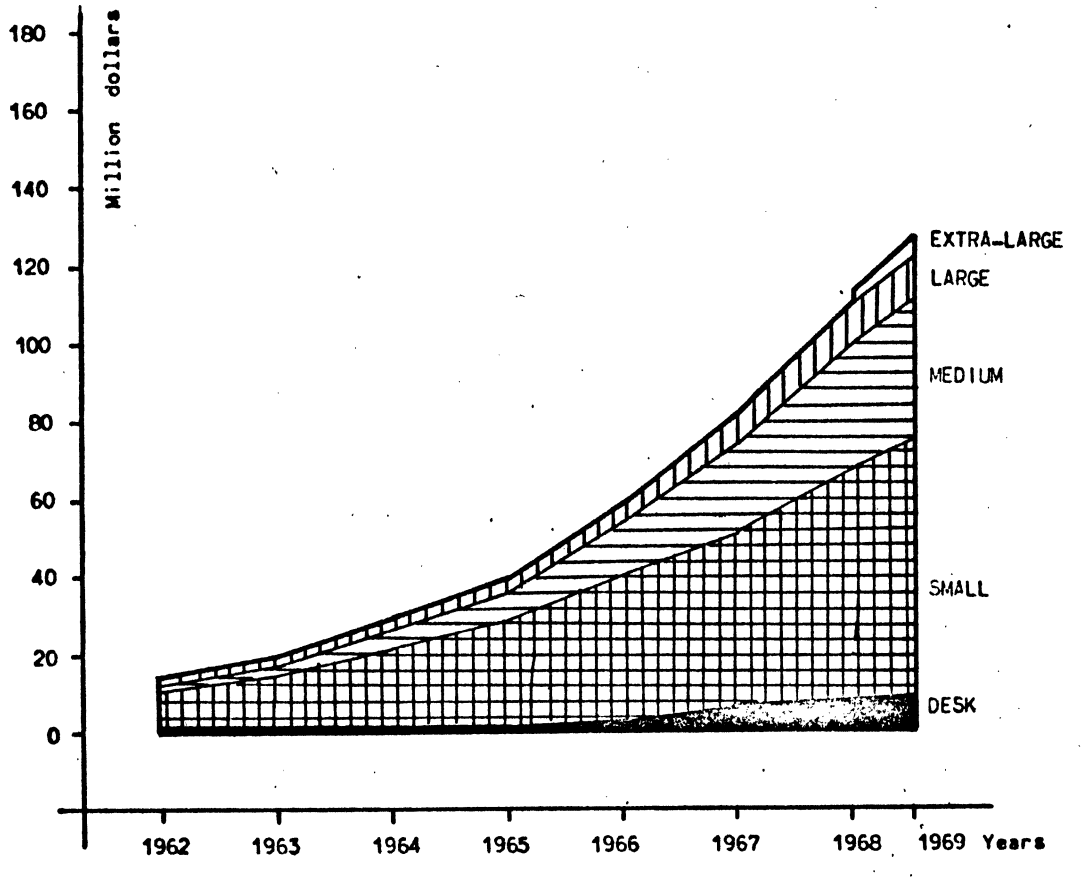
Holland have also a higher number of large computers than Belgium. (fig. IV.7 - IV.9.)

BENELUX

FIG. IV/7

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEARS, BY SIZE CLASSES

(1962 - 1969)

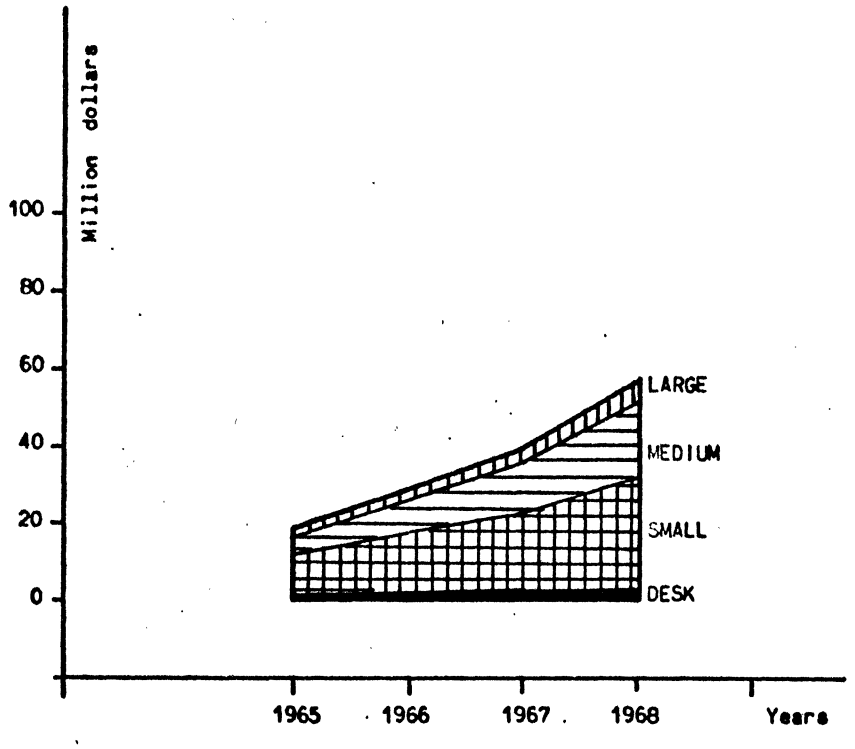


BELGIUM

FIG. IV/8

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEARS, BY SIZE CLASSES

(1965 - 1968)

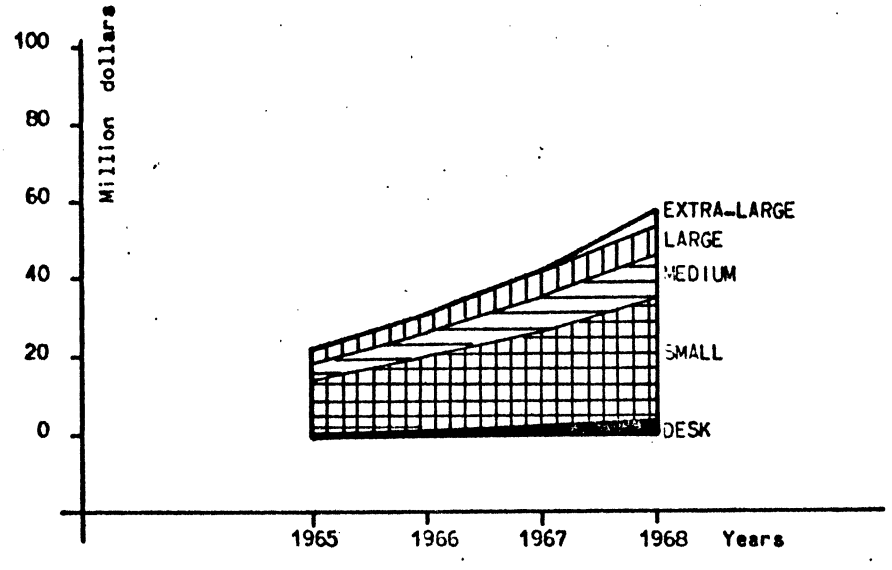


NETHERLANDS

FIG. IV/9

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEARS, BY SIZE CLASSES

(1965 - 1968)



The Benelux installations, with the exception of extra-large computers, have developed during the period 1962 ÷ 1969 at an average annual growth rate which was always higher than the one of the EEC countries, as can be seen in the following table:

AVERAGE ANNUAL RATE OF GROWTH OF THE INSTALLATIONS IN THE BENELUX AND THE EEC COUNTRIES (1962-1969)

	BENELUX		EEC	
	Number	Value	Number	Value
DESK	+85,7	+81,0	+79,6	+81,7
SMALL	+37,1	+32,7	+33,7	+31,7
MEDIUM	+73.5	+80.9	+44.5	+47,8
LARGE	+32,9	+34.0	+19,5	+20,2
EXTRA-LARGE	-	-	+188.9	+151,2
TOTAL	+45,5	+41.9	+39.0	+35,8

Noteworthy in the Benelux countries is the rate of growth of the medium size computers which increases at an average annual rate of 73.5% in number and of 80.9% in value, as against the average EEC rate of 44.5% in number and 47.8% in value. In fact, in 1962 there were only four computers of this size in Benelux, and by the middle of 1969 there were already 174 of them for about 35 million US Dollars of annual rental, roughly equal to 1/3 of the total value of the installations.

PERCENTAGE OF THE BELGIAN AND DUTCH INSTALLATIONS ON THE BENELUX TOTAL

	1965			1968		
	BELGIUM	HOLLAND	BENELUX	BELGIUM	HOLLAND	BENELUX
	Number					
DESK	40.0	60.0	100,0	44.6	55.4	100.0
SMALL	51.2	48.8	100,0	43.6	56,4	100,0
MEDIUM	35.0	65,0	100.0	37.7	62.3	100,0
LARGE	42,9	57.1	100,0	34.6	65,4	100,0
EXTRA LARGE	-	-	-	-	100,0	100,0
	Value					
DESK	38,3	61,7	100.0	46.4	53.6	100,0
SMALL	47.4	52.6	100,0	46,9	53.1	100,0
MEDIUM	36,6	63.4	100,0	39.4	60,6	100,0
LARGE	36,3	63.7	100.0	33.1	66,9	100.0
EXTRA LARGE	-	-	-	-	100,0	100,0

Holland absorbs, in number as well as in value, the major share of each size class of the installations in the Benelux countries.

Between 1965 and 1968 the installations have followed a different course in each of the two countries. In fact, the Belgian percentage of desk and medium computers has increased slightly, whereas it has decreased in the other classes.

2.4. The Computer Market

Also in Benelux, like in the other EEC countries, the major part of the installed computers are from IBM which in 1969 had a market share of 47.6% in number and of 59.0% in value. IBM dominates especially the market of large and extra-large computers, while in the desk and small classes it faces strong competition from Bull/GE. On the hardware market of the Benelux countries Bull/GE has, in fact, a share of 59.6% in number and of 63.6% in value in the desk class as against a total share of 23.6% (and of 13.1% in value). In the class of small computers the market shares attributed to Bull/GE are 9.9% in number and 8.6% in value (table IV.C).

Numerous, but with shares of little importance, are the other manufactures on the Benelux market. The national Dutch industry, Philips, arrives at only 5.6% of the total number of installations in the Benelux countries (and at 5.5% of the value), and the major part of its installations are concentrated on the Dutch market.

At present, the government of this country does not follow a specific policy in the EDP field and grants no direct subsidies to this sector of industry. It does, however, supply aid to the institutions which occupy themselves fully or partially with EDP and whose services can be made use of by anyone, either without charge or at reduced rates.

The purchase of computers for the government agencies and sponsored institutes are coordinated by the "Rijkskantoor-machine Central".

BENELUX

TABLE IV.C MARKET SHARES PER MANUFACTURERS, ACCORDING TO THE SIZE OF THE COMPUTERS (1962-1969)

	NUMBER						VALUE					
	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL
	1962						1962					
BULL/GE	-	14.6	-	40.0	-	13.5	-	10.2	-	46.1	-	15,2
CDC	-	-	-	-	-	-	-	-	-	-	-	-
CII	-	-	-	-	-	-	-	-	-	-	-	-
HONEYWELL	-	-	-	-	-	-	-	-	-	-	-	-
IBM	-	64.9	75.0	60.0	-	58.4	-	59.9	66,9	53,9	-	57. 6
ICL	-	4.6	-	-	-	3.9	-	4,0	-	-	-	3, 2
PHILIPS /EL	-	9.3	-	-	-	7.9	-	-	-	-	-	12. 6
SIEMENS	-	-	-	-	-	-	-	-	-	-	-	-
UNIVAC	-	6,0	-	-	-	5.1	-	8.6	-	-	-	6.5
OTHERS	100.0	0.6	25,0	-	-	11.2	100.0	17,3	33.1	-	-	4.9
TOTAL	100.0	100.0	100.0	100.0	100.0	100,0	100.0	100,0	100.0	100,0	100.0	100.0
	1969						1969					
BULL/GE	59.6	9,9	11,5	6,5	-	23,6	63,6	8,6	12.6	7,9	-	13.1
CDC	-	1,2	6,7	6.5	-	1,4	-	1,0	6.8	7,7	-	3.0
CII	2.1	2,2	0.6	-	-	2,0	2,6	1,7	0,4	-	-	1.2
HONEYWELL	1,3	2,2	-	-	-	1.7	0,8	3,1	-	-	-	1.7
IBM	22,0	57,4	50,3	87.0	85.7	47,6	26.7	58.6	54,3	84.4	86,4	59.0
ICL	0.9	2,5	-	-	-	1,8	1,0	5,7	-	-	-	3,1
PHILIPS /EL	-	7,7	9,7	-	-	5.6	-	6,8	7,2	-	-	5.5
SIEMENS	2,1	1,0	6.7	-	-	1,8	2,5	1,1	6.7	-	-	2.5
UNIVAC	-	12.5	1,2	-	14,3	8,0	-	5,7	1.5	-	13,6	5.9
OTHERS	12,0	3,4	13,3	-	-	6,5	2.8	7.7	10.5	-	-	5.0
TOTAL	100.0	100.0	100,0	100.0	100,0	100,0	100,0	100.0	100,0	100.0	100,0	100.0

BELGIUM

TABLE IV.C (bis) MARKET SHARES PER MANUFECTURERS, ACCORDING TO THE SIZE OF THE COMPUTERS jaar

	NUMBER						VALUE					
	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL
BULL/GE	61.0	12.8	15.6	15.4	-	27.2	59.3	10.9	16.2	18.9	-	17.2
CDC	-	0.2	1.6	-	-	0.2	-	0.1	-	-	-	0.4
CII	3.8	4.3	-	-	-	3.8	4.5	2.8	-	-	-	2.0
HONEYWELL	-	1.4	-	-	-	0.9	-	2.1	-	-	-	1.2
IBM	29.0	63.6	64.1	84.6	-	53.8	34.4	65.8	66.6	81.1	-	64.9
ICL	0.4	1.8	-	-	-	1.2	0.3	4.5	-	-	-	2.6
PHILIPS / EL	-	1.3	1.6	-	-	0.9	-	1.0	1.1	-	-	0.8
SIEMENS	2.3	1.4	7.8	-	-	2.1	0.3	1.4	7.5	-	-	2.9
UNIVAC	-	9.5	-	-	-	5.9	-	6.6	-	-	-	3.8
OTHERS	3.5	3.7	9.3	-	-	4.0	1.2	4.8	8.6	-	-	4.2
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NETHERLANDS

TAB. IV.C (1er) MARKET SHARES PER MANUFECTURERS, ACCORDING TO THE SIZE OF THE COMPUTERS

	NUMBER						VALUE					
	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL
BULL/GE	58.4	7.7	8.9	-	-	20,8	67.5	6.8	10.1	-	-	10.4
CDC	-	1.9	9,9	11,1	-	2.3	-	1,6	10.7	13.2	-	4.9
CII	0.7	0.6	1,0	-	-	0,6	0.8	0.8	0,7	-	-	0,6
HONEYWELL	2.3	2.8	-	-	-	2.4	1,5	3,9	-	-	-	2.0
IBM	15.8	52.6	41,6	88.9	85.7	42.8	19.5	52.6	45.9	86.8	86,4	54,8
ICL	1.3	3.0	-	-	-	2.3	1.5	6.7	-	-	-	3.4
PHILIPS /EL	-	12.6	14.9	-	-	9.2	-	11.6	11.4	-	-	8.7
SIEMENS	2.0	0.7	5.9	-	-	1.5	2.2	0.9	6,2	-	-	2.2
UNIVAC	-	14.8	2,0	-	14,3	9.6	-	11,3	2,5	-	13,6	7.4
OTHERS	19.5	3.3	15.8	-	-	8.5	7.0	3.8	12.5	-	-	5,6
TOTAL	100.0	100.0	100.0	100.0	100,0	100.0	100.0	100.0	100,0	100,0	100,0	100.0

2.5 Computers installed by industry

A research published in September 1969 (1) indicates the principal sectors of utilization from 1952 to 1967 and points out that, as Holland maintains the highest percentage of all Benelux installations, the results which are valid for that country can also be extended to the Benelux countries.

The table IV.d. records the percentage of the computer installations for the 26 sectors considered, during different years.

The University sector was the one to install the first computer and to maintain for at least ten years the highest percentage of installations. In 1963/1964 the sector Banks and Insurance Companies possessed the highest number of computers and maintained this position until 1967.

The sectors of the manufacturing industries, each of which accounts for only a modest percentage of the total number of installations, taken as a whole represent instead almost half of the installations. Small is also the number of installations in central and local governments, representing only 10.3% of the total equipment.

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(1) W.K. De Bruijn - Computer Use in the Netherlands.

NETHERLANDS

TABLE IV.D PERCENTAGE OF COMPUTERS INSTALLED BY INDUSTRY

	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
UNIVERSITIES	100.0	100.0	66.7	50.0	50.0	33.3	44.4	27.6	21.7	18.1	16.5	14.5	11.6	10.7	9.7	9.3
OIL			33.3	25.0	25.0	16.7	16.7	20.8	16.2	13.9	7.3	5.3	3.9	2.6	3.5	3.4
CARS				25.0	25.0	16.7	5.6	3.4	5.4	4.2	4.6	5.3	3.4	2.9	2.3	2.8
SERVICE CENTRES						33.3	16.7	10.4	13.5	12.5	12.8	12.6	12.1	12.4	11.8	10.2
INSURANCE COMPANIES							11.0	17.3	18.9	12.5	11.0	9.3	9.2	9.1	9.1	8.8
FOOD							5.6	3.4	2.7	5.6	8.2	7.9	7.7	7.5	8.1	7.8
BANKS								3.4	2.7	8.3	11.0	15.2	18.8	16.2	15.3	12.3
ELECTRIC MACHINES								6.9	8.1	8.3	9.2	7.3	9.6	9.1	7.0	7.7
GOVERNMENT								3.4	5.4	5.6	5.5	6.0	5.8	5.8	4.9	3.8
TRANSPORTATION								3.4	2.7	2.8	2.8	3.3	1.9	1.9	1.9	2.2
METALS, STEEL									2.7	5.6	4.6	5.3	4.3	5.8	5.8	6.6
LOCAL GOVERNMENT										1.3	2.8	3.3	3.9	4.2	4.7	6.5
TEXTILES										1.3	2.8	3.3	2.9	4.9	4.5	5.4
MAIL ORDER											0.9	0.7	1.9	1.9	1.4	1.2
WOOD AND PAPER												0.7	0.5	1.3	1.0	1.3
GLASS AND CERAMICS													0.5	0.3	0.2	0.3
AGRICULTURE													0.5	0.7	0.6	1.1
OPTICS													0.5	0.7	0.5	0.5
PHARMACEUTICAL, CHEMICAL													1.0	0.7	2.7	2.3
CONSTRUCTIONS														0.3	1.0	1.3
PUBLISHING														1.6	2.1	2.6
LEATHER															0.6	0.5
RUBBER															0.4	0.5
RESEARCH, CONSULTING															0.4	0.7
OTHER														0.3	0.4	1.1
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: W.K. DE BRUIJN - COMPUTER USE IN NETHERLANDS.

3. FRANCE

3.1 Sources

The following table lists the available sources of information concerning the installations of computers in France during the last ten years.

Not all of them are original. The Lhermitte's study, for example, though making minor changes, uses information collected by Diebold and published in the ADP Newsletter. The De Little's study uses data from other sources, completing them, however, with information received by manufacturers. (Table IV.c.)

There is also a difference in the degree of these sources reliability. In this respect the most satisfying are the data of the "Syndicat des Industries de matériel professionnel électronique et ratiotechnique" which were collected directly from the manufacturers. Unfortunately however, they are published in aggregated form withholding indications as to model which are the only one to allow an identification of that segment of the market which is the purpose of this study. For this reason, our analysis is based essentially on data supplied by the ADP Newsletter which have been duly corrected wherever other more reliable sources permitted to do so.

The SORIS estimates for the period 1962-1969 are systematically lower than those of the SPER study, this being due, above all, to the fact that the latter includes many processing computers which have been constructed by firms operating only marginally in the field of computers and which have not been included in the SORIS research (1).

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(1) The firms in question are the following: Alcatel, Compagnie des Compteurs, Jemont Schneider, Schlumberger, SINTRA, Télémécanique, Thompson-CSF.

TABLE IV.a.3

NUMBER OF COMPUTERS INSTALLED, ACCORDING TO VARIOUS SOURCES (1958 - 1968)

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
K. DE BRUIJN	35	65	165	275	520	790	1.050	1.250	1.850	2.600	
LHERMITTE	20	60	125	285	510	775	1.043	1.578	2.008		
DE LITTLE						750	1.050	1.400	1.800		
EDP						791	1.090	1.320	2.025	2.975	
SPER					524	778	1.058	1.624	2.323	3.430	5.010
ADP					445	556	1.043	1.578	2.008	3.959	
SORIS					382	588	998	1.548	1.935	3.036	4.079

3.2 Development of computer installations.

The first computers introduced in France at the end of 1955 were the IBM 650, followed the year after by the Gamma ET of Bull.

By the end of 1958 there were 20 computers installed, ten years later there were 4,000, the equipment had multiplied 20 times.

The French installations trend follows an exponential law with a tendency to doubling itself every year until 1964 and every two years thereafter.

The comparison between the average annual rate of increase of the French equipment (in number and value) and the EEC and US reveals the following results:

Annual rate of Increase (1962 -1969)

Country	Number	Value
France	+ 46.5	+ 40.9
EEC	+ 39.0	+ 35.8
US	+ 30.2	+ 29.4

The equipment in 1962 (382 computers) was limited, whereas the development of desk computers after 1963 was considerable, the growth of the French installations has taken place at a higher average rate when compared with the other countries mentioned.

However, despite the rapid growth, there is a considerable

difference in the diffusion of EDP between France and the US which can be proved by some indicators.

In the ratio computer extra-agricultural employee, France has managed to reduce, between 1964 and 1968, the gap with the US from 6 to 5 years.

In the same period, however, the gap has increased from 5 to 6 years when the parameter of annual hardware expenditure per extra-agricultural employee is considered.

The following factors can be mentioned for having caused a delay in value following the employment in France of computers of smaller dimensions and capacity:

- the switching of a certain number of firms from accounting machines to computers of low singular values;
- the size of French firms;
- the lower cost of manpower than in the US, which sometimes makes the installation of a computer unnecessary;
- the delay in training personnel specialized in EDP.

Compared to the EEC countries France records higher figures for the two indexes referring to extra-agricultural employment.

When related to the gross national product the annual hardware expenditure which is equal in France and the EEC countries is about half of that of the US as illustrated by the following table:

COMPUTER DIFFUSION IN FRANCE, THE EEC COUNTRIES AND THE US

	1962			1969		
	FRANCE	EEC	US	FRANCE	EEC	US
Number of Computers installed per million extra-agricultural employees	26	28	179	250	200	757
Hardware expenditure per extra-agricultural employee ($)	2,6	2,3	18,5	18,1	14,3	70,8
Hardware expenditure per 1,000 $ GNP	0,400	0,480	1,730	2,310	2.300	5.84

The ratio value of hardware / gross national product is statistically very significant Fig. IV.10. and shows the following results:

$$y = 0.107 \cdot 10^{-65} \cdot x^{6.70} \qquad (r = 0.99)$$

$$(s_b = 0.23)$$

where y = value of the investment in EDP (annual rental)

and x = gross national product (at market constant prices).

The elasticity of the investments in computers in relation to the gross national product reaches values comparable to the average ones for the EEC countries (6.6) and the USA (6.5).

The net variations of the installations (valued at purchase price) are significantly related to the course of fixed investments, but show, compared to the latter, a smaller growth rate than the average ones for the EEC countries and the USA.

The regression analysis Fig. IV.11. shows the following results:

$$y = 0.168 \cdot 10^{-41} \cdot x^{4.78}$$

$$(s_b = 0.91) \qquad (r = 0.93)$$

where y = net annual increase of the computers installed (at purchase price)

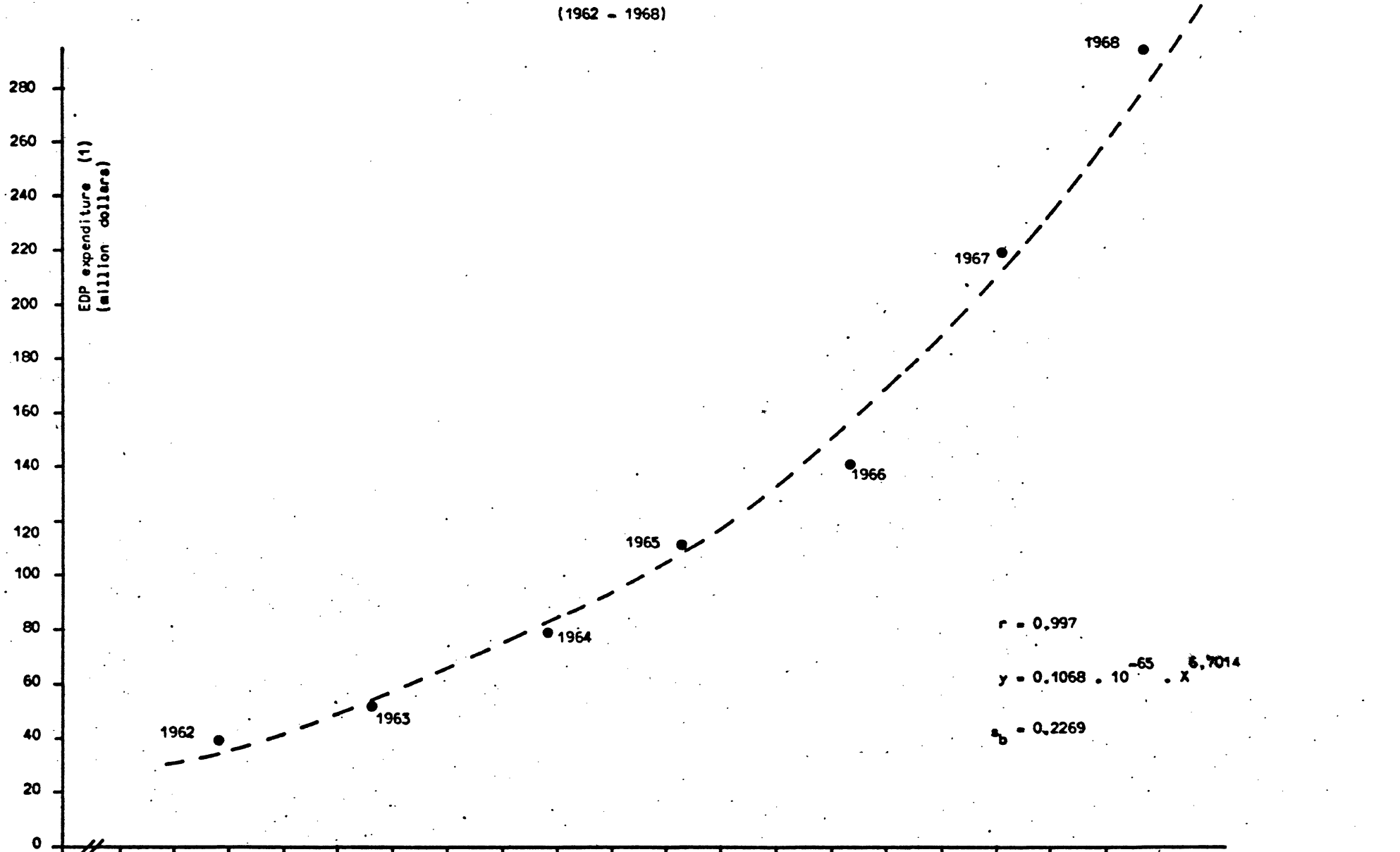
and x = gross fixed investments at constant prices.

FIG. (W/10)

FRANCE

EDP EXPENDITURE (1) IN RELATION TO GNP

(1962 - 1968)



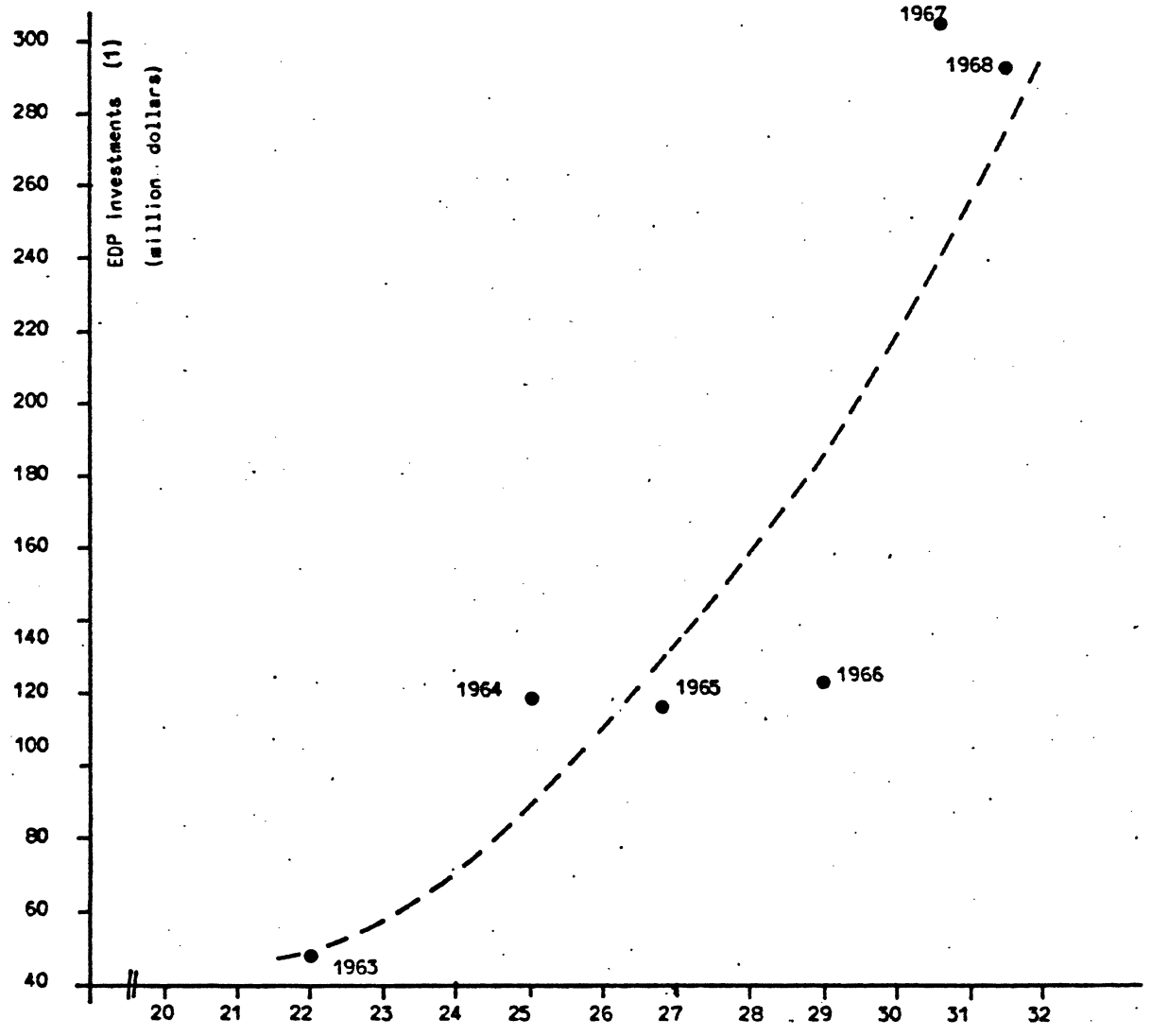
(1) Annual rental of hardware installed.

FIG. IV/11

FRANCE

EDP INVESTMENTS (1) IN RELATION TO GROSS FIXED INVESTMENTS

(1963 - 1968)



(1) Annual of EDP installations estimated on the basis of purchase price

3.3 Computers installed by size classes

A percentual breakdown of the equipment per sizes of the computers between the years 1962 and 1969 is given in the following table:

	NUMBER		VALUE		ANNUAL RATE OF INCREASE	
	1962	1969	1962	1969	number	value
DESK	-	29.4	-	7.7	+ 86.8	+ 86.1
SMALL	83.7	59.1	53.8	50.8	+ 37.9	+ 37.8
MEDIUM	7.9	8.3	11.4	16.1	+ 46.7	+ 50.8
LARGE	7.9	1.7	34.8	11.0	+ 15.8	+ 16.3
EXTRA-LARGE		1.1		14.4	+152.1	+ 119.1
UNCLASSIFIED	0.5	0.4				
TOTAL	100.0	100.0	100.0	100.0	+ 46.5	+ 40.9

Comparing the percentage of the two years one notes the importance of the share (in number) of desk computers and the considerable decrease of the large computers share.

Concerning the distribution of value, we may notice that the increase in the medium and extra-large classes takes place at the cost of the small and large computers, confirming thus the tendency, already pointed out in other countries, to replace a computer with more powerful one (Fig. IV.12.).

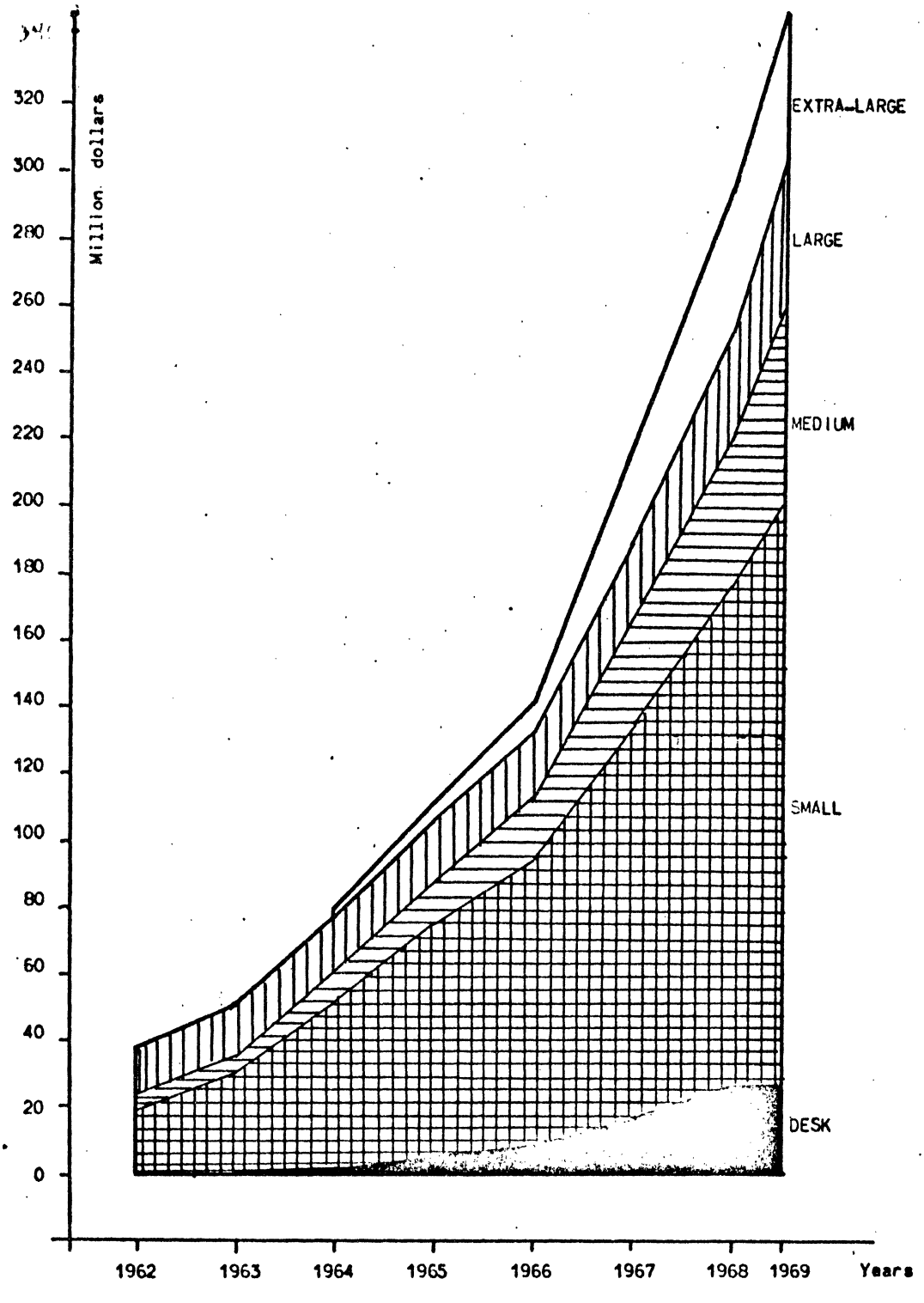
In particular the percentage of extra-large computers is higher than that estimated for the EEC countries (in number 1.1% against 0.7% and in value 14.4% against 8.7%); on the other

FIG. IV/12

FRANCE

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEARS, BY SIZE CLASSES

(1962 - 1969)



hand the relative importance of extra-large computers is almost identical in France and in the US at the end of the period considered.

Extending the comparison to other size classes, a considerable difference between the percentage of large computers in the two countries can however be noticed: in the US the percentages are 4.1 in number and 19.5 in value whereas in France they are only 1.7 and 11.0 in number and in value respectively.

The French trend toward the employment of high capacity computers is the result of multiple factors, but principally of the mergers and concentrations promoted among others by the Fifth National Plan.

These mergers increase the firms dimensions and hence the volume of information to be processed.

For these and other reasons such as the enlargement of the applications within each firm the extra-large computers have been present in the French equipment only since 1964 and almost all of them belong to the third generation.

3.4 The computer market

The number of computer manufacturers present on the French market has increased considerably between 1962 and 1969.

While in 1962 IBM and Bull/GE controlled about 98% of the market, their relative importance fall to 82% in number of computer installed and to about 78% in value in 1969. However, despite the assertion of other manufacturers' products, IBM is still maintaining its dominant position with shares in value which are always above 60% in all classes with the exception of desk (Table IV.f.).

Bull/GE dominates only in the desk class with market shares above 78% in number as well as in value; in total its relative importance in value is, however, considerably lower (14.5%) than its quantitative importance (30.3%). In 1962 Bull/GE accounted for about a third of the market value.

In 1969 CDC and UNIVAC have a market share of 0.7% and 1.5% in number, and 3.1% and 4.5% in value.

After the American purchase of Bull, about 90% of the present French market is still in the hands of the American manufacturers, notwithstanding in 1966 the government action with the purpose of the national computer industry development.

From this action was originated the Plan Calcul whose realization was planned in two phases: first the creation of a national computer industry and later the production of component parts, terminals and accessory apparatus.

A "Délégation à l'informatique" was created: a special delegate chooses some production programs and determines the financial

FRANCE

MARKET SHARES PER MANUFACTURERS, ACCORDING TO THE SIZE OF COMPUTERS

	NUMBER						VALUE					
	1962						1962					
	DESK	SMALL	MEDIUM	LARGE	EXTRA LARGE	TOTAL	DESK	SMALL	MEDIUM	LARGE	EXTRA LARGE	TOTAL
BULL/GE	-	20,0	-	53,3	-	21,1		22,8	-	60,0		33,1
CDC	-	-	-	-	-	-						
CII	-	-	-	-	-	-						
HONEYWELL	-	-	-	-	-	-						
IBM	-	79,1	93,3	46,7	-	77,6		75,7	93,3	40,0		65,3
ICL	-	0,9	-	-	-	0,8		1,3				0,7
SIEMENS	-	-	-	-	-	-						
UNIVAC	-	-	-	-	-	-						
OTHERS	-	-	6,7	-	-	0,5		0,2	6,7			0,9
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0		100,0	100,0	100,0	100,0	100,0
	1969 (June)						1969 (June)					
BULL/GE	78,1	10,0	14,2	11,3	-	30,3	78,4	9,6	14,4	12,4	-	14,5
CDC	-	0,5	1,7	11,2	7,5	0,7		0,3	1,9	15,5	9,1	3,1
CII	8,2	6,1	6,4	-	-	6,5	9,2	6,4	0,3			4,0
HONEYWELL	-	3,6	-	-	-	2,2		5,3				1,7
IBM	7,3	71,4	59,1	72,5	64,2	51,7	7,6	69,9	67,8	67,7	64,7	62,6
ICL	-	3,7	-	-	-	2,2		3,5				1,7
SIEMENS	-	0,6	2,4	-	-	0,5		1,0	2,6			1,0
UNIVAC	-	1,8	-	3,8	28,3	1,5		1,0		4,4	26,2	4,5
OTHERS	6,4	2,3	16,2	1,2	-	4,4	4,8	3,0	19,3			6,9
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

requirements for their realization and the procedures of intervention by the government.

Furthermore, indications about the possibility of sales are supplied and research programs are decided in order to avoid technological gap.

Based on the Plan Calcul the government obliges itself to make contributions to R & D and to the French firm CII; it guarantees preference of CII materials for the installations of EDP systems in government and semi-government institutions and it exerts its influence on services and firms under its control so that they acquire,instead of rent,the CII systems. The company of CII owes its existence to government impetus under the Plan Calcul, and is the result of the merger of the companies CAE (Compagnie Européenne d'Automatisme élec - tronique) and SEA (Société d'électronique et d'automatisme); it accounts for only 4.0% in value and 6.5% in number of the French market, and operates almost exclusively in the desk and small computers field.

3.5 Computers installed by industry.

There is little literature available for the France referring to the distribution of computers per branch of utilization, and when available, it is not homogeneous.

BIPE (1) in a recent study about the EDP situation in France in 1968 supplies the data reported in the following table which are, however, of little significance because they refer only to the number of installations without breaking them down according to size.

Percentage of computers installed by industry (1968)

Agriculture	0.8
Electricity, gas, water, oil, natural gas	5.4
Metallurgy	3.7
Mechanical and electrical industries	15.9
Building	1.9
Chemical and food	11.3
Other industries	7.6
Services	20.5
Banks and insurance companies	15.8
Public Administration	17.1

(1) BIPE: Bureau d'Informations et de Prévisions Economiques.

As it results from the table the branch Services has the greatest number of installations, followed by the Public Administration and, with almost the same percentage, the mechanical industry, the electrical industry and the banks and insurance companies.

More significant because they include the hardware expenditures are the data reported in the COPEP study (1) in 1968, which, refers to only some industry group. According to this research the Public Administration accounts for 25 to 30% of the total EDP expenditure. Public Administration is a user of large computers and networks of data transmission . When, hopefully before 1972 the network of regional computers will be completed the percentage of the Public Administration in the total EDP expenditures will increase. Until now the industrial sector has used computers for the classic applications. In the next years with production control , there will be a more intensive use of computers.

The main branches of utilization will probably be oil, automobile, aerospace industries and electrical constructions.

Since the less important firms, or rather those with a turnover of less than 60 million US Dollars, have been only scarsely equipped until now, they will probably undergo a strong development during the next years.

For these reasons it can be expected that the industry which now reaches 40% of the EDP expenditure will arrive at 45% in 1971.

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(1) Jean-Michel Treille, "L'industrie de l'informatique française à la veille du VI Plan", in "Economie Appliquée", n. 4, 1969.

The two mentioned studies report only the data about the number (the first study) or the value (the second) of the installations per branch of utilization.

A preceding BIPE study takes into consideration the different applications and gives a more complete picture, though not a very recent one, of the French situation.

The table IV.g.shows the diffusion of scientific applications in the government research institutes and the importance of the management applications in commercial and financial companies.

INDUSTRY	MANAGEMENT	SCIENTIFIC CALCULUS	PROCESSING CONTROL	TOTAL
* Water, gas, electricity, coal and similar	4.70	6.25	-	6.30
* Oil, natural gas, gasoline	3.65	5.25	-	4.00
* Steel and iron mines	2.25	0.25	-	1,65
* Minerals and non-ferrous metals	-	0.65	-	0.30
* First transformation and working of metals	1.30	-	-	0.90
* Mechanical and electrical industries	12.00	8.25	-	10.95
especially:				
Aeronautical constructions	(2.05)	(5.30)	-	(3.00)
Automobile constructions	(4.40)	(0,15)	-	(3.15)
Electrical constructions	(3.25)	(1.60)	-	(2.75)
* Construction materials, glass, building and public works	0.50	0,15	-	0.40
* Chemical and rubber	4,60	0.65	-	3.75
* Agricultural and food industries	1,55	0.15	-	1,15
* Textiles, clothing, leather	1,55	-	-	1,10
* Wood, paper, carton and publishing industries	2,40	-	-	1,70
Total Industries	34.50	21.60	84,00	32,20
* Transportation and telecommunications	4,90	0,65	-	3,35
* Trade	9.40	-	-	6.70
* Services	5.90	18,40	-	9,15
especially:				
Service Bureaux	(2,50)	(11.35)	-	(4,85)
* Banks and Stockmarkets	16,20	-	-	11.40
* Insurances	9,85	-	-	6.95
* Other services	0.75	0.45	-	0,85
Total Services	47,00	19,50	-	38,40
* Defense	2.55	3.95	2.8	2,85
* National Education	1.50	15.35	-	5,40
* Finances and Economic affairs	2.05	-	-	1,45
* Others,	3,80	33.20	-	11,90
especially:				
Atomic Energy Commission	-	(31.35)	-	(9,0)
Total Administration	9-90	52.50	16,00	21,60
* Constructors and others	8.60	6.40	-	7,80
T o t a l e	100.00	100.00	100,00	100.00

SOURCE: Research BIPE (December 1964)

4. GERMANY

4.1 Sources

The information available on the structure and the trends of the German computer equipment comes from analyses about the EEC countries as well as from studies on the German situation (1).

The different information in table IV.h. do not show essential differences, because the different sources did not make autonomous surveys, but all refer to the statistics supplied by the Diebold Group and published periodically in the ADP Newsletter.

Diebold statistics have been utilized too, being the only ones which supply information about the trend of the installations per model, but applying the appropriate changes based on information gathered during the direct research.

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(1) Commerzbank Branchenbericht - Elektronische Datenverarbeitung - Juni 1968

Gesellschaft für Kernforschung, Institut fuer Angewandte Reaktorphysik - Untersuchung des Einsatzes von Elektronischen Datenverarbeitungsanlagen in Deutschland - Stand und Entwicklungstendenzen - Karlsruhe, Februar 1969

TABLE IV.h.

NUMBER OF COMPUTERS INSTALLED, ACCORDING TO VARIOUS SOURCES, (1959-1969)

	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 30/6
W.K. De BRUIJN	145	190	390	640	980	1,460	1,800	2,700	3,800		
LHERMITTE (Le pari informatique)	172	308	548	734	996	1,657	2,523	2,963			
EDP					993	1,500	1,980	2,950	4,150		
GESELLSCHAFT FÜR KERNFORSCHUNG GMBH	172	308	548	690	1.019	1,657	2,291	2,963	3,862		
ADP	172	308	548	690	1.019	1,657	2,291	2,963	3,862		
ADP				789	994	1,618	2,251	2,900	3,862	4,990	5,600

4.2. Development of computer installations.

Germany with computer equipments which in June 1969 reached 5,600 installations, is the principal user of computers and is therefore surpassed only by the US; it is however, still at a considerable distance behind the latter.

The development of the installations in Germany has been summarized in the following table:

	1962		1969		AVERAGE ANNUAL RATE DE INCREASE 1962-1969	
	Number	Value (000 $)	Number	Value (000 $)	Number	Value
GERMANY	789	59,905	5,600	380,517	+ 35.9	+ 33.5
TOTAL EEC	1,647	137,289	13,871	997,919	+ 39.0	+ 35.8

As in 1962 the computer equipment in Germany had already reached a considerable size, the development during the following years took place at a rate of increase which was inferior to those of the EEC, superior, however, to the US rate (30.2% average annual rate in number and 29.4% in value).

The progress of the installations shows a considerable increase mainly in 1964, due to the general progress of the German economy, and demonstrating thus a slight anticipation regarding the start of the third generation whose first models were introduced in Europe in 1966.

In 1967 there is an important discrepancy between the rate of increase of that year and the preceding one, in number +33.2% and +40.1% in value, due to the introduction, that year, of the first 6 extra-large computers.

The development of the installations in Germany is significantly related to the progress of GNP. The regression analysis (fig. IV.13) offers in fact the following results:

$$Y = 0{,}673 \cdot 10^{-68} x^{6{,}89}$$

$$(s_b = 0{,}64) \quad (r = 0{,}98)$$

where y is the yearly rental of the total installations and x is gross national product at constant prices.

Not statistically significant, however, seems to be the ratio between the net variations of the installations' value and the trend of the gross fixed investments (r=0.31), presumably because of the trend taken by all other German gross fixed investments. In the year of depression, they have reached a lower level than during the previous year, while the investments in hardware recorded a conspicuous increase because of orders which were placed before the depression (1).

It can, however, be pointed out that the share of the total gross fixed investments dedicated to investments in hardware have recorded during the period under consideration a noticeable increase in Germany. While in 1963 0.2% of the gross fixed investments were destinated for the increase of the total computer equipment number, the rate rose to 0.4% during the three following years and reached 1% in 1967 and 1968, remaining thus in this period at a level comparable to the average EEC's.

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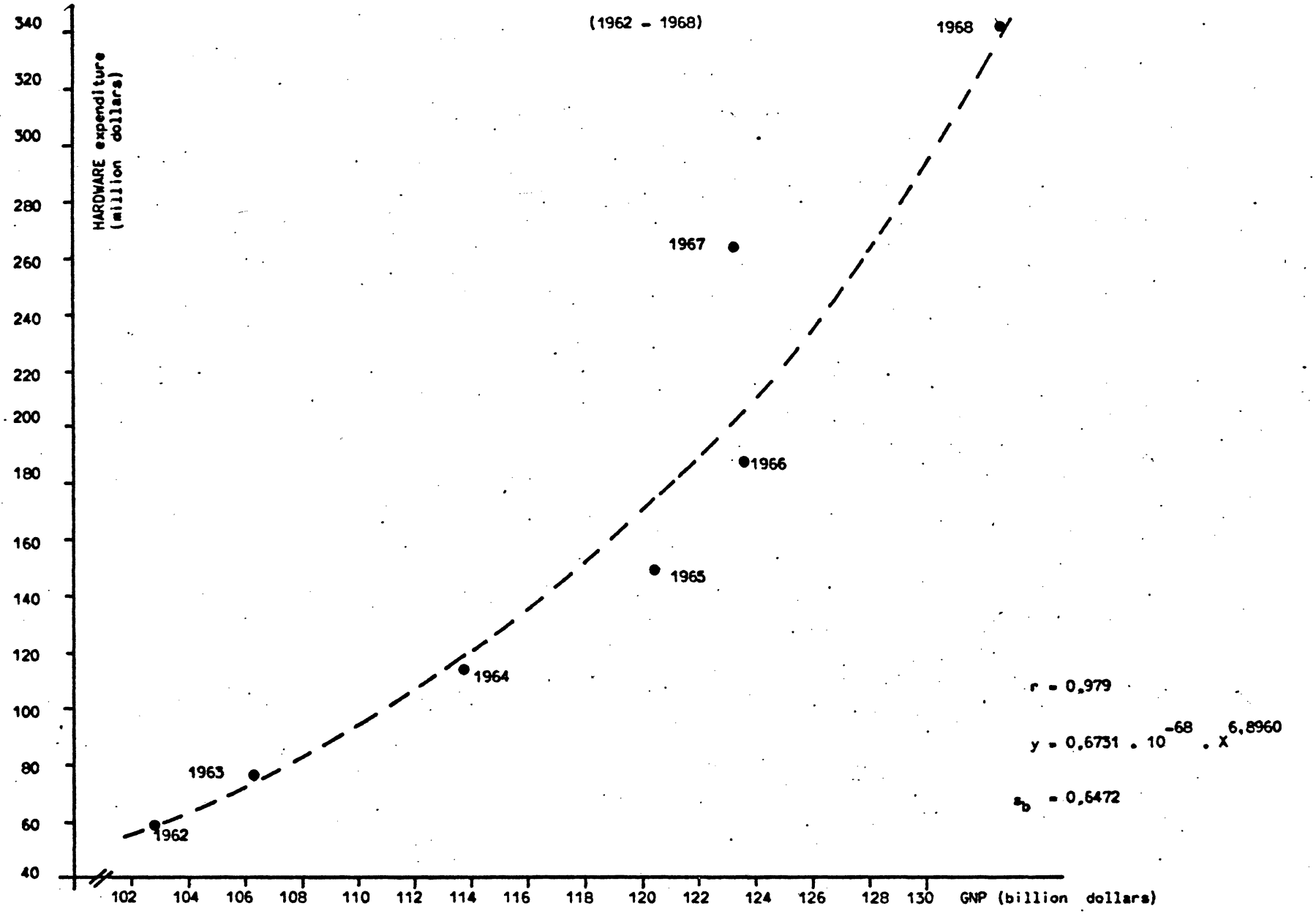
(1) It must also be remembered that the analysis has been conducted on a limited number of surveys, that is the 8 couples of data referring to the period 1962-1969.

GERMANY

FIG. IV/13

EDP EXPENDITURE (1) IN RELATION TO GNP

(1962 - 1968)



(1) Annual rental of hardware installed

A comparison between the number of computers installed in Germany and the average situation in the EEC countries and the United Kingdom can be made through some indexes which take into account the different economic-demographic dimensions of the these areas. The chosen indexes are:

- number of installed computers per extra-agricultural employee, considering not only the employment, but also the industrialization degree of the considered areas;
- value of hardware installed per extra-agricultural employee (expressed in yearly rental of the total installations), taking into account also the different structure of the installations according to size of the computers;
- ratio between investments in EDP (expressed in yearly rental for the total installations) and the gross national product, in order to compare the expenditure for EDP to the total available resources.

The results of the comparison are reported in the following table:

DIFFUSION OF COMPUTERS IN GERMANY, IN EEC AND IN THE U.S.

	1962			1968		
	GERMANY	EEC	US	GERMANY'	EEC	US
Number of computers installed per million extra-agricultural employees	34	28	179	214	200	757
Hardware investment per extra-agricultural employee ($)	2.6	2.3	18.5	14,7	14,3	70,8
Dollars of hardware investment 1,000 $ GNP	0.580	0.480	1,730	2,570	2.300	5,840

From the reported data emerges the advanced position of Germany as compared to the average of the EEC countries regarding the density of computer installed.

In fact, all indexes which have been considered show Germany, in 1962 as well as in 1969, in a higher position than the EEC average and inferior only to the US position.

During this period Germany has demonstrated a great capability for closing the gap between herself and the USA concerning the density of computers installed, with respect to the number and value of installations per extra-agricultural employee.

However, as far as the distribution of value is concerned, one notices in 1969 as compared to 1962 a decrease in the share of small computers as against an increase in medium computers, and a decrease in large computers in favour of extra-large ones which did not previously exist in the installations.

Given the fact that in this period the substitution of models of the first generation with those of the third generation took place, these changes in the equipment structure reflect also the tendency of the users who already possess a computer, to replace it, not only with a technologically more advanced model, but also with a more powerful one; this is due, among other reasons, to the constant reduction of the ratio performance/price.

The extra-large computers have been installed in Germany only since the beginning of 1967, and there exist today already 16 of them, 12 of which are IBMs.

Comparison between the percentage of large and extra-large computers and the total number of installations in Germany, the EEC countries and in the USA shows the following results in June 1969:

PERCENTAGE OF LARGE AND EXTRA-LARGE COMPUTERS ON THE TOTAL (June 1969)

	NUMBER		VALUE	
	LARGE	EXTRA-LARGE	LARGE	EXTRA-LARGE
GERMANY	1,4	0,3	9,3	3,7
EEC	0,7	0,7	10,2	8,7
US	4,1	1,7	18,1	15,7

4. 3 Computers installed by size classes

The changes which have taken place in the computer equipment structure between 1962 and 1969 have been summarized in the following table:

DISTRIBUTION OF THE GERMAN COMPUTER INSTALLATIONS ACCORDING TO SIZES

	Number		Value		Average Annual Rate of frowth	
	1962	1969 (30/6)	1962	1969 (30/6)	Number	Value
DESK	7.7	18.5	1.6	4.6	+ 61.7	+ 64.7
SMALL	83.9	73.5	73.4	62.4	+ 32.2	+ 29.7
MEDIUM	5.0	6.3	11.5	20.0	+ 43.6	+ 49.8
LARGE	2.9	1.4	13.5	9.3	+ 20.1	+ 22.7
EXTRA-LARGE	0.5	0.3		3.7	+ 96.8	+ 94.5
TOTAL	100.0	100.0	100.0	100.0	+ 35.9	+ 33.5

In the comparison of the percentage of the number of installations a substantial reduction in the imporcance of small computers becomes apparent, while, at the same time, the percentage of desk computers has increased. This can be attributed, in part, to the fact that now small and medium size users have access to EDP, and, in part, to the more exact survey of desk computers in the last year.

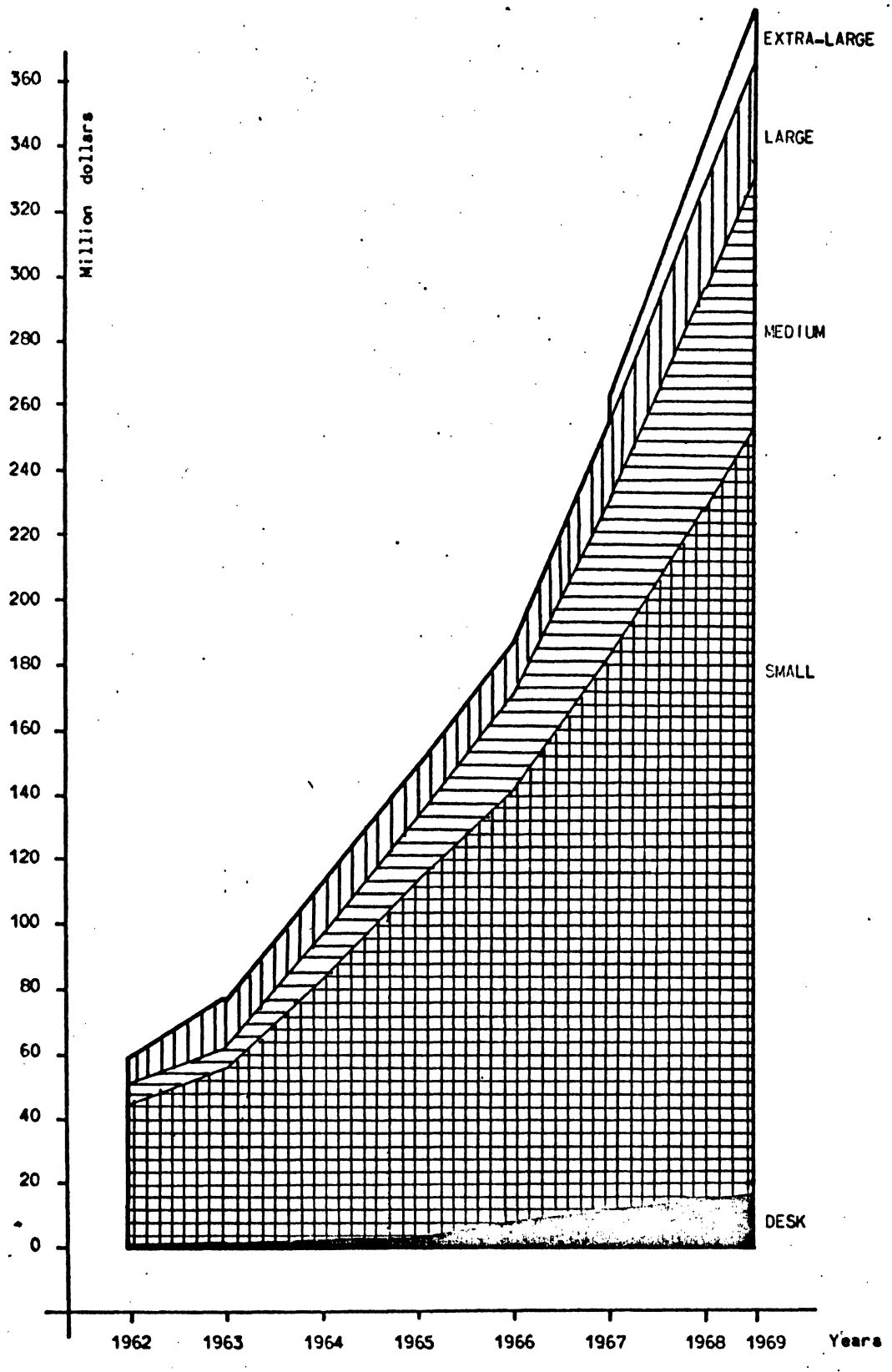
The percentage of large and extra-large computers is therefore smaller in Germany, not only as compared to the USA, but also to the EEC countries, even if it shows a higher growth of EDP.

This can be partly ascribed to the relatively recent introduction of computers of these sizes in Germany, whereas in the other countries the installations of extra-large computers are less recent (fig. IV.14.).

GERMANY

FIG. IV/14 ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEARS, BY SIZE CLASSES

(1962 - 1969)



4.4 Computer Market

For a long time already Germany has had a national computer industry which operates on the German market and, to a lesser extent, on the European one.

The changes which have taken place in the market shares, in number and value, of the principal manufacturers operating in Germany are illustrated in the table IV. i.

European manufacturers as a whole maintained a share of above 15% on the German market in 1969. To this share Siemens-Zuse has contributed to a great extent; its incidence has risen from 9% to 13% during the last seven years; on the other hand, more than a third of Siemens' models installed by June 1969 are from the 4004 series which is manufatured under RCA license.

The presence of the national industry is particularly strong in the desk, small and medium classes, whereas the market of large and extra-large computers is clearly dominated by US manufacturers: in the first place is IBM, followed at some distance by UNIVAC and CDC.

From 1962 CDC has increased the market share, while IBM's predominance has decreased in number of computers installed (from 68.8% to 57.4%) as well in the their value (from 69.2% to 63.3%).

To maintain and increase their position on the national and international market the two German firms (Siemens-Zuse and AEG-Telefunken) have strengthened their cooperation in the EDP branch in order to make large computer. Double research

TABLE IV.1.

MARKET SHARES PER MANUFACTURERS, ACCORDING TO SIZE OF THE COMPUTERS

(1962 and 1969)

MANUFACTURE	VALUE						NUMBER					
	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL
	1962						1962					
BULL/GE	-	3,1	-	-	-	2,3		2,7				2,3
CDC	24,4	-	-	-	-	0,4	24,6					1,9
CII	-	-	-	-	-	-	-	-	-	-	-	-
HONEYWELL	-	-	-	-	-	-	-	-	-	-	-	-
IBM	-	67,7	52,6	100,0	-	69,2		74,8	64,1	100,0		68,8
ICL	-	1,9	-	-	-	1,4		2,4				2,0
SIEMENS ZUSE	73,3	10,6	-	-	-	9,0	73,8	8,9				13,2
UNIVAC	-	10,0	25,5	-	-	10,3		6,9	17,9			6,7
OTHERS	2,3	6,7	21,9	-	-	7,4	1,6	4,3	18,0			5,1
TOTAL	100,0	100,0	100,0	100,0	-	100,0	100,0	100,0	100,0	100,0	-	100,0
	1969 - 30/6						1969 - 30/6					
BULL/GE	41,0	3,1	3,7	-	-	4,6	35,2	2,9	3,7			8,9
CDC	6,3	0,4	5,5	9,1	7,3	2,7	8,5	0,5	5,7	6,1	6,3	2,4
CII	1,1	0,3	-	-	-	0,3	1,6	0,2	0,3			0,4
HONEYWELL	1,5	3,4	1,0	-	-	2,4	3,9	3,5	1,1			2,7
IBM	26,0	66,2	58,8	68,1	74,6	63,3	21,7	66,0	57,4	70,7	75,0	57,4
ICL	1,5	0,8	-	0,9	-	0,7	1,6	0,7		1,2		0,9
SIEMENS ZUSE	13,7	13,6	17,1	7,0	-	13,2	12,0	11,6	18,2	9,8		12,1
UNIVAC	-	7,9	3,6	9,2	18,1	7,1		11,6	3,1	8,5	18,7	8,9
OTHERS	8,9	4,3	10,3	5,7	-	5,2	15,5	3,0	10,5	3,7		6,3
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

and investments is avoided in this way.

This operation is part of the German government's policy which already in the five-year plan now under way (valid until 1971) has provided support to the EDP industry.

On the one hand financial support has been planned for firms with long term loans to be reimbursed without interest (or at reduced interest); on the other hand, a credit of 75 million US Dollars has been appropriated (period 1967-1971) for scientific research in the EDP industry. In addition, local and "Land" Governments, universities and public bodies have been invited to use the nationally produced computers.

4.5 Computers installed by industry

The study about the diffusion of computers in Germany which was conducted by the Institut für Angewandte Reaktorphysik allows us to analyze the distribution of computer installations in Germany according to size classes and to utilization sectors at the end of 1967. (Tables IV.1.and IV.m.) Almost half of the computers installed in the Federal Republic are used by the manufacturing industries, and approximately 20% by the Banks and Insurance Companies.

The computer equipment of government agencies, consists of 209 computers of 5.5% of the total German equipment in number and 5.2% in value. However 227 computers are employed in public institutes of research, equivalent to 5.9% of the total installations in number and 9.4% of the value. Even if the EDP installations seem to be much more widespread among private users than among the Government, it is to be noted that the largest single user is the Federal Post Office with more than 37 installations.

Within the manufacturing industries the most important users are, in order, the mechanical one (347 computers), the electric and electronic with 261 installations and the chemical activities with 214 installations.

Considering the large and extra-large computers, the importance of the manufacturing industry is a little reduced, with only 39.1% of large computers installed and 25.8% of the extra-large in value and, respectively, 43.2% and 28.6% in number. On the contrary the importance of the service bureaux and public institutes of research increases: these two branches

have 30.7% in number and 36.1% in value of large computers installed, while their share of the extra-large computer installations rises to 50.1% in number and 55.0% in value.

The above mentioned distribution of installed computers in Federal Germany per sectors of utilization finds confirmation in the analogous distribution mentioned by the research of the Commerzbank which, while using data from different sources and referring to the situation as it was in March 1968, does not show, however, significant differences in the evaluation of the relative importance of the various sectors of utilization.

TABLE IV.1. NUMBER OF COMPUTERS INSTALLED BY INDUSTRY (1967)

INDUSTRY \ CLASS	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL	TOTAL excluding Desk
MANUFACTURING INDUSTRIES	136	1,375	159	38	4	1,712	1,576
- Mining	6	48	7	-	-	61	55
- Chemical	11	169	22	10	2	214	203
- Oil	4	23	3	3	1	34	30
- Rubber, Glass	7	46	4	-	-	57	50
- Ceramics	6	36	2	-	-	44	38
- Metals	8	164	25	4	1	202	194
- Mechanical	20	275	42	10	-	347	327
- Electric, Electronic	23	198	33	7	-	261	238
- Ferrous Metals	6	61	4	-	-	71	65
- Wood	-	39	1	-	-	40	40
- Paper, Press	20	49	3	-	-	72	52
- Cloths, Leather	5	106	5	3	-	119	114
- Food	18	125	7	1	-	151	133
- Construction	2	36	1	-	-	39	37
TRADE	31	261	16	8	1	317	286
BANKS AND INSURANCES	44	642	68	8	-	762	718
- Banks	39	438	39	3	-	519	480
- Insurances	5	204	29	5	-	243	238
PUBLIC UTILITIES	14	210	11	2	1	238	224
- Electricity, Gas, Water	8	117	5	1	-	131	123
- Transportation	6	93	6	1	1	107	101
GOVERNMENT	35	147	24	3	-	209	174
SERVICE CENTERS	69	194	60	27	7	357	288
- Calculation Centers	5	87	31	5	2	130	125
- Public Institutes of Research	64	107	29	22	5	227	163
OTHER	42	180	7	2	1	232	190
- Agriculture	-	3	-	-	-	3	3
- Services	36	140	7	2	1	186	150
- Non-professional Organizations	6	37	-	-	-	43	37
TOTAL	371	3,009	345	88	14	3,827	3,456

TABLE IV.1.bis. PERCENTAGE OF THE COMPUTERS INSTALLED BY INDUSTRY (1967)

CLASS / INDUSTRY	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL	TOTAL
MANUFACTURING INDUSTRIES	36,7	45,7	46,2	43,2	28,6	44,7	45,6
- Mining	1,6	1,6	2,0	-	-	1,6	1,6
- Chemical	3,0	5,6	6,4	11,4	14,4	5,6	5,9
- Oil	1,1	0,8	0,9	3,4	7,1	0,9	0,9
- Rubber, Glass	1,9	1,5	1,2	-	-	1,5	1,4
- Ceramics	1,6	1,2	0,6	-	-	1,1	1,1
- Metals	2,2	5,4	7,2	4,6	7,1	5,3	5,6
- Mechanical	5,4	9,2	12,2	11,3	-	9,1	9,4
- Electric, Electronic	6,2	6,6	9,6	8,0	-	6,8	6,9
- Ferrous Metals	1,6	2,0	1,2	-	-	1,9	1,9
- Wood	-	1,3	0,3	-	-	1,0	1,2
- Paper, Press	5,4	1,6	0,9	-	-	1,9	1,5
- Cloths, Leather	1,3	3,5	1,4	3,4	-	3,1	3,3
- Food	4,9	4,2	2,0	1,1	-	3,9	3,8
- Construction	0,5	1,2	0,3	-	-	1,0	1,1
TRADE	8,4	8,7	4,6	9,1	7,1	8,3	8,3
BANKS AND INSURANCES	11,8	21,4	19,7	9,1	-	19,9	20,8
- Banks	10,5	14,6	11,3	3,4	-	13,6	13,9
- Insurance	1,3	6,8	8,4	5,7	-	6,3	6,9
PUBLIC UTILITIES	3,8	7,0	3,2	2,2	7,1	6,2	6,5
- Electricity, Gas, Water	2,2	3,9	1,4	1,1	-	3,4	3,6
- Transportation	1,6	3,1	1,8	1,1	7,1	2,8	2,9
GOVERNMENT	9,4	4,9	6,9	3,4	-	5,5	5,0
SERVICE CENTERS	18,6	6,4	17,4	30,7	50,1	9,3	8,3
- Calculation Center	1,3	2,9	9,0	5,7	14,4	3,4	3,6
- Public Institutes of Research	17,3	3,5	8,4	25,0	35,7	5,9	4,7
OTHER	11,3	5,9	2,0	2,3	7,1	6,1	5,5
- Agriculture	-	0,1	-	-	-	0,1	0,1
- Services	9,7	4,6	2,0	2,3	7,1	4,9	4,3
- Non-professional Organizations	1,6	1,2	-	-	-	1,1	1,1
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0

TABLE IV.m.

ESTIMATED VALUE (1) OF COMPUTER INSTALLED BY INDUSTRY (1967)

INDUSTRY \ CLASS	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL	TOTAL excluding Desk
MANUFACTURING INDUSTRIES	9,057.6	356,726.4	130,089.6	58,459.2	13,440.0	567,772.8	558,715.2
- Mining	392.4	14,419.2	5,524.8	-	-	20,336.4	19,944.0
- Chemical	835.2	45,561.6	18,312.0	15,216.0	6,720.0	86,644.8	85,809.6
- Oil	259.2	5,448.0	2,073.6	4,464.0	3,360.0	15,604.8	15,345.6
- Rubber, Glass	424.8	11,904.0	3,648.0	-	-	15,976.8	15,552.0
- Ceramics	370.8	8,577.6	1,824.0	-	-	10,772.4	10,401.6
- Metals	450.0	41,409.6	19,968.0	5,760.0	3,360.0	70,947.6	70,497.6
- Mechanical	1,220.4	74,956.8	34,545.6	14,976.0	-	125,698.8	124,478.4
- Electric, Electronic	1,904.4	54,144.0	26,606.4	12,283.2	-	94,938.0	93,033.6
- Ferrous Metals	396.0	15,998.4	3,076.8	-	-	19,471.2	19,075.2
- Wood	-	8,616.0	912.0	-	-	9,528.0	9,528.0
- Paper, Press	1,310.4	11,136.0	2,736.0	-	-	15,182.4	13,872.0
- Cloths, Leather	313.2	26,726.4	4,228.8	4,176.0	-	35,444.4	35,131.2
- Food	1,090.8	29,630.4	6,052.8	1,584.0	-	38,358.0	37,267.2
- Construction	90.0	8,198.4	580.8	-	-	8,869.2	8,779.2
TRADE	1,965.6	60,974.4	14,836.8	11,520.0	3,360.0	92,656.8	90,691.2
BANKS AND INSURANCES	2,851.2	177,710.4	58,128.0	11,952.0	-	250,641.6	247,790.4
- Banks	2,530.8	118,795.2	32,956.8	4,320.0	-	158,602.8	156,072.0
- Insurances	320.4	58,915.2	25,171.2	7,632.0	-	92,038.8	91,718.4
PUBLIC UTILITIES	928.8	52,488.0	9,744.0	2,736.0	3,360.0	69,256.8	68,328.0
- Electricity, Gas, Water	543.6	28,348.8	4,560.0	1,440.0	-	34,892.4	34,348.8
- Transportation	385.2	24,139.2	5,184.0	1,296.0	3,360.0	34,364.4	33,979.2
GOVERNMENT	2,444.4	36,600.0	20,985.6	6,576.0	-	66,606.0	64,161.6
SERVICE CENTERS	3,337.2	49,636.8	47,798.4	54,115.2	28,704.0	183,591.6	180,254.4
- Calculation Centers	324.0	21,705.6	25,003.2	8,448.0	6,720.0	62,200.8	61,876.8
- Public Institute of Research	3,013.2	27,931.2	22,795.2	45,667.2	21,984.0	121,390.8	118,377.6
OTHER	2,509.2	43,406.4	6,254.4	4,464.0	3,360.0	59,994.0	57,484.8
- Agriculture	-	1,027.2	-	-	-	1,027.2	1,027.2
- Services	2,127.6	33,537.6	6,254.4	4,464.0	3,360.0	49,743.6	47,616.0
- Non professional Organisations	381.6	8,841.6	-	-	-	9,223.2	8,841.6
TOTAL	23,094.0	777,542.4	287,836.8	149,822.4	52,224.0	1,290,519.6	1,267,425.6

(1) ON THE BASIS OF PURCHASE PRICE

TABLE IV.m.bis.

PERCENTAGE OF THE COMPUTERS INSTALLATIONS' VALUE (1)

INDUSTRY \ CLASS	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL	TOTAL excluding DESK
MANUFACTURING INDUSTRIES	39,2	45,9	45,3	39,1	25,8	44,0	44.1
- Mining	1,7	1,9	1,9	-	-	1,6	1,6
- Chemical	3,6	5,9	6,4	10,2	12,9	6,7	6,8
- Oil	1,1	0,7	0,7	3,0	6,5	1,2	1.2
- Rubber, Glass	1,8	1,5	1,3	-	-	1,2	1,2
- Ceramics	1,6	1,1	0,6	-	-	0,8	0.8
- Metals	1,9	5.3	6,9	3,8	6,4	5,5	5,6
- Mechanical	5,3	9,7	12,0	10,0	-	9,7	9,8
- Electric, Electronic	8,3	6,9	9,3	8,2	-	7,4	7,3
- Ferrous Metals	1,7	2,1	1,1	-	-	1,5	1,5
- Wood	-	1,1	0,3	-	-	0,8	0,8
- Paper, Press	5,7	1,4	1,0	-	-	1,2	1,1
- Cloths, Leather	1,4	3,4	1,5	2,8	-	2,7	2,8
- Food	4,7	3,8	2,1	1,1	-	3,0	2,9
- Construction	0,4	1,1	0,2	-	-	0,7	0,7
TRADE	8,5	7,8	5,1	7,7	6,4	7,2	7,2
BANKS AND INSURANCES	12,4	22,9	20,1	8,0	-	19,4	19,5
- Banks	11,0	15,3	11,4	2,9	-	12,3	12,3
- Insurance	1,4	7,6	8,7	5,1	-	7,1	7,2
PUBLIC UTILITIES	4,1	6,8	3,4	1,7	6,4	5,3	5,4
- Electricity, Gas, Water	2,4	3,7	1,6	0,7	-	2,7	2,7
- Transportation	1,7	3,1	1,8	0,8	6,4	2,6	2,7
GOVERNMENT	10,6	4,7	7.3	4,4	-	5,2	5,0
SERVICE CENTERS	14,4	6.4	16,6	36,1	55.0	14,2	14,2
- Calculation Center	1,4	2,8	8,7	5.6	12,9	4,8	4,9
- Public Institutes of Research	13,0	3,6	7,9	30,5	42,1	9,4	9,3
OTHER	10,8	5,5	2,2	3,0	6,4	4,7	4,6
- Agriculture	-	0,1	-	-	-	0,1	0,1
- Sevices	9,2	4,3	2,0	3,0	6,4	3,9	3,8
- Non-professional Organizations	1,6	1,1	-	-	-	0,7	0,7
T O T A L	100,0	100,0	100,0	100,0	100,0	100,0	100,0

(1) ON THE BASIS OF PURCHASE-PRICE

5. ITALY

5.1 Sources

Numerous series of data have been published concerning the number of computers installed or ordered for Italy: however, a closer analysis of the publication dates shows that the original sources are somewhat smaller in number.

As illustrated by the table IV.n. these sources differ considerably in their contents because different criteria have been adopted for the definition and survey of computers (1).

Among the examined sources, apart from those including computers installed and ordered, the most important differences exist between the data Diebold and those of De Bruijn.

Both statistics have been compiled by consulting companies on the basis of the information received directly from users. It can be reasonably assumed, therefore, that they are slightly

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(1) The data reported in the ADP News letter have been taken from the Diebold statistics which have also been reported since 1959 by Mondo Economico (1966), by the Rapport Lhermitte (1968) and by Expansion (White Paper 1969). These statistics take into consideration digital and analogic computers, including microcomputers installed, excepting only those for military use.
The De Bruijn study reports two kinds of statistics: one, reported later by De Little (1963-1967) and by AICA Studio (1964-1967), examines installed computers; the other, reported by "Centri Meccanografici ed Elettronici" (1960-1967) refers to computers installed and ordered.
EDP (1968) considers only installed digital computers above a certain size.
ISTAT (1968) examines computers installed per users of industry group, except the computer manufactures' installations.

ITALY

TABLE IV. n° NUMBER OF COMPUTERS INSTALLED OR ORDERED ACCORDIND TO VARIOUS SOURCES

FONTI	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
EXPANSION (1968-1969)	16	38	78	165	302	429	712	920	1,360	2,100	3,200	4,300
CONGIUNT. ECONOMICA LOMBARDA (1969) (1)	40	110	240	380	510	760	930	1,170	1,400	1,750	2,120	2,300(2)
DE BRUIJN (1966-1967)	25	55	90	200	340	510	650	850	1,200	1,700	-	-
NOTIZIE IRI (1968)	19	45	90	185	320	470	620	750	1,000	1,200	-	-
RAPPORTO LHERMITTE (1966)	16	38	78	165	302	429	712	920	1,360	-	-	-
MONDO ECONOMICO (1966)	19	38	78	165	302	429	712	827	-	-	-	-
DIEBOLD (1965)	16	38	78	165	302	429	712	-	-	-	-	-
RIVISTA DI ORGANIZZAZIONE AZIENDALE (1961)	19	43	93	119	-	-	-	-	-	-	-	-
CENTRI MECCANOGRAFICI ED ELETTRONICI (1968) (1)	-	-	256	365	560	750	940	1,200	1,800	2,000	-	-
DE LITTLE (1967)	-	-	-	-	-	510	650	850	1,200	1,700	-	-
EDP (1968)	-	-	-	-	-	592	882	-	1,200	1,710	-	-
ISTAT (1968)	-	-	-	-	-	421	-	665	-	1,176	-	-
STUDIO AICA (1968)	-	-	-	-	-	-	650	850	1,200	1,700	2,100	2,600

(1) Installed and ordered

(2) At 31/10.

underestimated, because the observed universe might be smaller than the actual one, and besides, not all users are willing to indicate the adoption of a computer.

The difficulties encountered with researches in Italy, as well as in other countries, are confirmed by the fact that only until 1965, the specialized publications gave a survey on the computer market in Italy.

In order to outline a trend of the installations in Italy, it has been necessary, to apply to the other sources (data Diebold, Organizzazione Aziendale, Mondo Economico, EDP) and, when necessary, to give estimates based on the opinions of the manufacturers interviewed.

5.2 Development of computer installations.

The present situation and development trends of EDP in Italy are indicated in the following table giving approximate estimates (1). The table shows, in number and value, the trend of the computer installations since 1962:

Year	Number	Value (000$, annual rental)
1962	301	26,010
1963	429	38,160
1964	679	55,502
1965	781	60,831
1966	(1,072)	82,638
1967	1,270	106,264
1968	1,519	129,296
1969(30/6)	1,644	142,124

While in the USA and in the United Kingdom the first computer was installed in 1951, Italy introduced the first only 3 years later when the Polytechnic School of Milan was equipped with a 102 - A from NCR. The second computer was a Mark I (Ferranti) installed in the Istituto Nationale di Applicazioni del

(1) The total number of installations is invalidated by a systematic underestimation of desk computers, due to difficulties of their survey. In this category the discrepancy between actual installations and data available on them is probably considerably greater in Italy than in the other countries.

Calcolo in Roma.

The years of major development were the early sixties due to the introduction on the Italian market of IBM's 1401 which has since then constituted the major part of the installa - tions.

By the end of 1962 the Italian installations as compared to the total EEC one accounts for about 14% in number and for about 19% in value.

During the following years the rates of increase remained rather high until 1964 (introduction of IBM's 1440) after which more modest rates were registered: the computer installations felt, in fact, the effects of the generally depressed situation of the national economy and were affected by a slowdown in orders because the third generation of computers was being awaited.

The average annual rate of increase of the Italian installations between 1962 and 1969 is 29% in number and 28.7% in value, whereas for the EEC countries 39% and 35.8% respectively were recorded.

Looking at the development which integrated data processing underwent the stagnation in the use of Unit Records becomes apparent, due to the trend to substitute these with electronic computers.

The ratio between computers, in number and value, and the number of the extra-agricultural employees offers a criterium of evaluation which serves to place the Italian EDP potential in its right position within the framework of the countries under consideration.

Number of computers per 1 million extra-agricultural employees

Country	1962	1963	1964	1965	1966	1967	1968
Italy	22	30	47	56	76	88	104
EEC	28	38	61	85	110	155	200
UK	20	36	51	59	79	105	138
US	179	249	333	420	585	746	757

Hardware investment per extra-agricultural employees ($)

Country	1962	1963	1964	1965	1966	1967	1968
Italy	1.861	2.691	3.848	4.328	5.883	7.397	8.846
EEC	2.334	3.077	4.571	5.906	7.659	10.966	14.261
UK	1.475	2.670	4.160	4.937	7.299	8.375	12.301
US	18.520	22.243	29.287	34.780	48.141	65.688	70.818

Even if the present use of EDP in Italy is still quite modest, great efforts were being made between 1962 and 1969 in the field of automation when one considers the increased elasticity of investments in hardware compared with the gross national product.

The correlation between these two quantities is statistically significant ($r = 0.97$) and for the period 1962 to 1969 the regression analysis fig. IV.15 shows the following result:

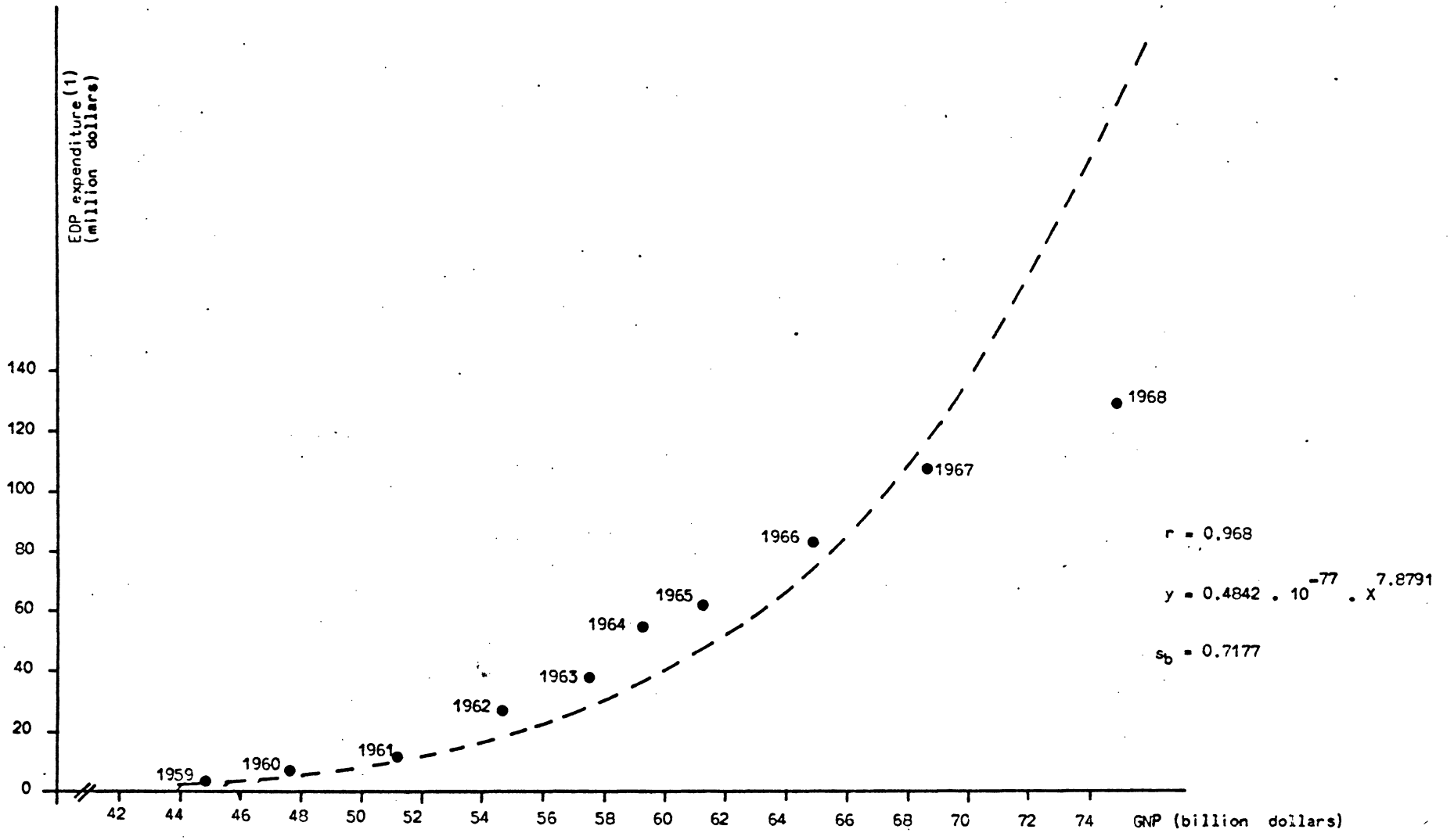
$$y = 0.48 \cdot 10^{-77} \cdot x^{7.88} \quad (r=0.97)$$
$$(s_b = 0.72)$$

where y = investment in computers (price of the annual rental)

FIG. IV/15

EDP EXPENDITURE (1) IN REATION TO GNP

(1959 - 1968)



(1) Annual rental of hardware installed

and x = gross national product (at constant prices)

The elasticity of these investments compared with the gross national product takes on consequently a value (7.8%) which is higher than that for the total EEC countries (6.56) and for the US (6.5) and lower only than the one for the UK (11.4) (fig.IV.16).

A further confirmation of the high rate of increase of computers derives from the examination of the ratio between the net annual increase in the computers installed (at purchase price) and all the investments of the country during the same year. Through a regression analysis for the period 1962 to 1969 one arrives, in fact, at the following ratio which shows a rather satisfying level of statistic significance:

$$y = 0.49 \cdot 10^{-63} \cdot x^{7.02} \quad (r = 0.80)$$
$$(s_b = 1.93)$$

where y = net annual increase in the computers installed (expressed in purchase price)

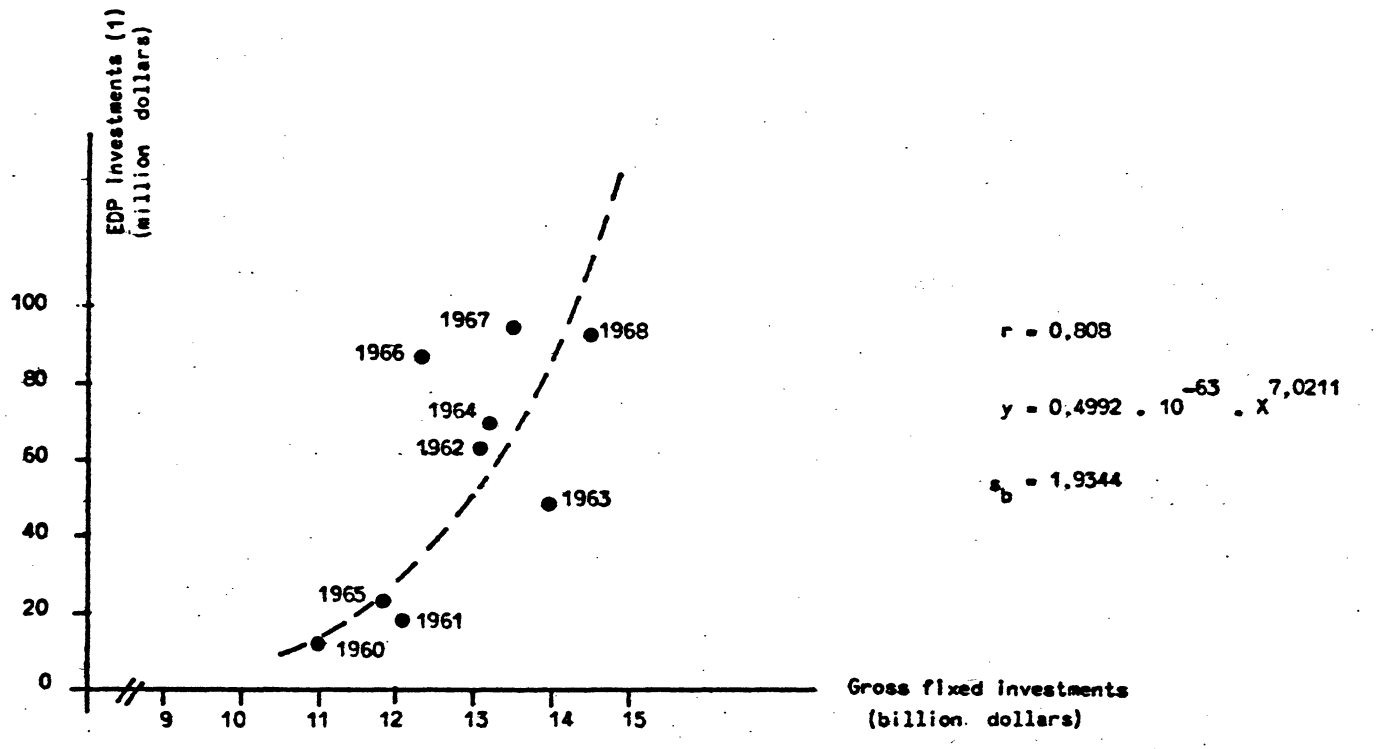
and x = gross fixed annual investments (at constant prices)

The annual investment in computers is growing at a rate which is 7.0 times higher than the one of all other investments, or at a rate which is just about equal to the one of the EEC countries (7.0) and inferior, among the countries considered, only to France (7.8).

FIG. IV/16

EDP INVESTMENTS (1) IN RELATION TO GROSS FIXED INVESTMENTS

(1960 - 1968)

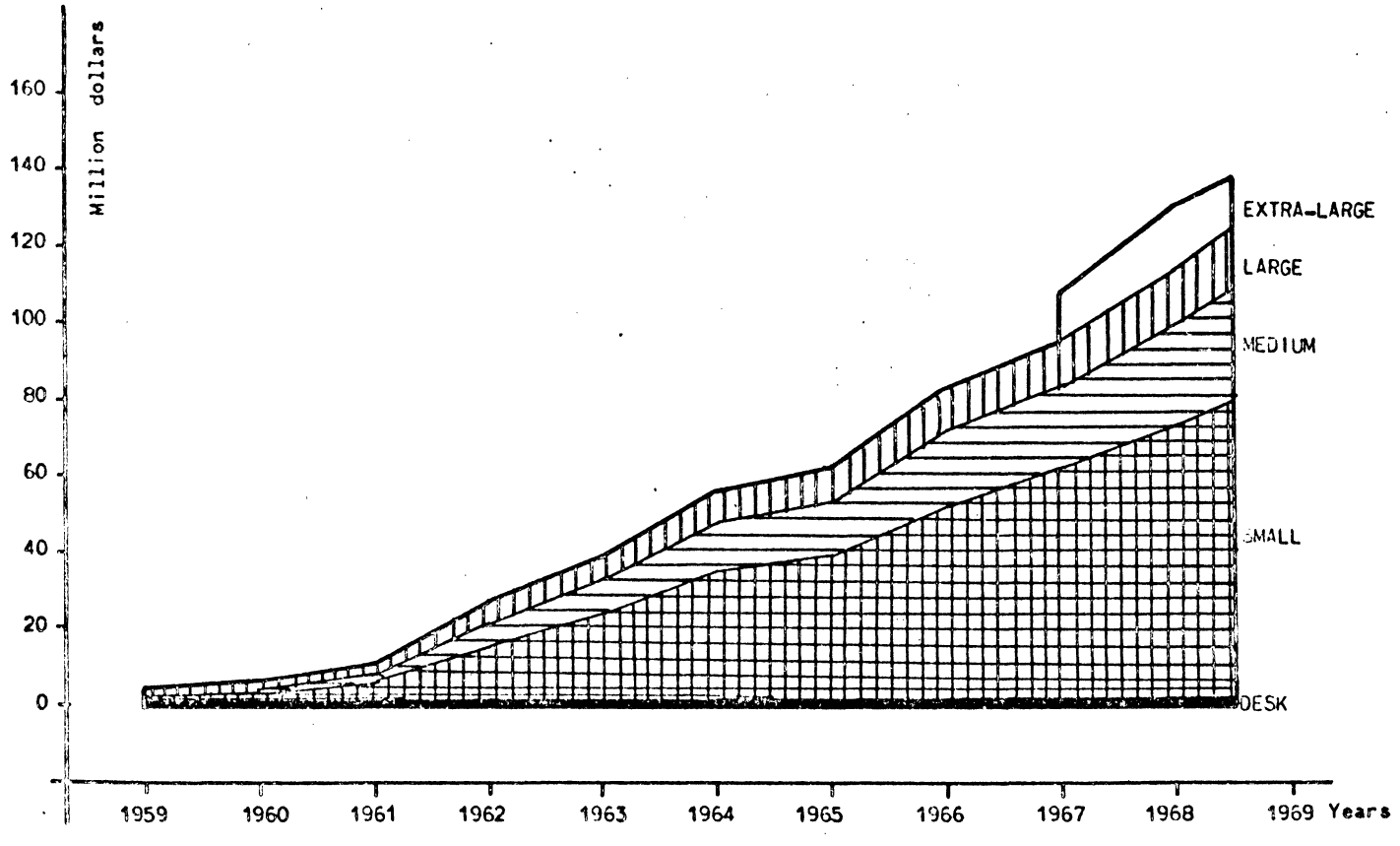


(1) Annual increase of EDP installations estimated on the basis of purchase price

ITALY

FIG. IV/17 ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEARS, BY SIZE CLASSES

(1959 - 1969)



5.3 Computers installed by size classes

The structure of the Italian installations can be correctly evaluated analyzing its composition per sizes of installed computers, in number as well as in value. (fig. IV. 17)

Computers installed by size classes

	1962		1969(30/6)	
	Number	Value (000$)	Number	Value (000$)
Desk	2	38	34	705
Small	263	15,900	1,397	77,316
Medium	22	4,464	149	30,394
Large	14	5,608	40	15,648
Extra-large	-	-	21	18,060
Unclassified	-	-	3	-
Total	301	26,010	1,644	142,124
Total (excluding desk)	299	25,972	1,610	141,418

Comparison between the above data and those of the other countries shows that Italy, though having quintupled its computers in the last years, occupies the last position considering the total number of installations and second to last place, surpassing only Benelux, considering their value.

If, however, only high performance computers are taken into consideration, the Italian situation appears less negative: in fact, on June 30, 1969, Italy possessed in the extra-large class more than a fifth of the computers installed in all the EEC countries together (21 against 96), that is more than

Germany (16) and the Benelux countries (6) possess. Also, concerning the value of the investment Italy maintains in this computer class an intermediate position, even if at an incidence slightly lower than the total for the EEC countries (about 14%).

A further confirmation of this fact can be obtained by looking at the percentage of extra-large and large computers on the total number of installations in different contries (1):

Percentage of large and extra-large computers on the number of installations excluding Desk (June 1969)

	Italy		EEC		U.K.		U.S.	
	Number	Value	Number	Value	Number	Value	Number	Value
Extra-large	1.3	12.7	0.8	10.0	1.4	12.5	2.2	16.2
Large	2.4	11.0	2.2	11.4	3.5	13.0	5.3	18.8

The introduction of extra-large computers in Italy dates back to 1967; with the exception of this event the installations per size classes does not seem to have undergone substantial variations in the period (see Table IV.26 bis).

Some interesting points emerge instead from a comparison between the rates of increase of the different computer classes in Italy and the other countries under consideration.

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(1) Due to the anomaly in the "desk" class observed in Italy, the percentual incidence has been computed for the total number of installation excluding "desk".

Average annual rate of increase of the computers installed (1962-1969).

	Italy	EEC	UK	US
Desk	+63.3	+79.6	+51.9	+44.7
Small	+28.7	+33.7	+28.4	+25.9
Medium	+29.5	+44.5	+51.3	+50.7
Large	+18.0	+19.5	+49.2	+14.8
Extra-Large	-	+188.9	+61.8	+45.7
Total	+29.0	+39.0	+33.7	+30.2
Total excluding Desk	+28.7	+34.2	+31.2	+27.5

The rates of increase for the small and medium computer classes in Italy do not differ significantly from the total average rates; this is contrary to what has been observed in the other countries considered and also in the UK and the US.

In particular, the growth rate of the medium class is by far slower in Italy than in other countries. This indicates that the general tendency to replace small computers with not only technically more advanced models, but also with models of higher capacity, finds little echo with Italian users.

5.4 The Computer Market.

The EDP development in Italy, as well as in other countries, has been influenced by the policy of the manufacturers and of the Government.

As can be deduced from the table IV. o.., there are today only non-national manufacturers present on the Italian market and among those few are European.

The comparison between the market shares, in number and value, of the principal manufacturers between 1962 and 1969 does not reflect the exact situation existing at the beginning of this period. For comparative reasons it has been necessary to credit Bull/GE with those computers installed by Olivetti because its production was merged subsequently with that of the Italian branch of General Electric (1).

An examination of the table shows:

- a very limited number of manufacturers on the Italian market in 1962 (IBM, Bull/GE, UNIVAC, CDC, ICL) whereas later Honeywell, Siemens, CII, Burroughs, NCR intervened;
- the substantial stability of IBM's position on the market which absorbed in 1962 as well as in 1969 about 66% of the value of the installations, while its share concerning the number of the installations has decreased from 72% in 1962 to 52% in 1969;
- the particular importance of IBM on the market of medium,

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(1) General Electric Information System

TAB. IV-o- MARKET SHARES PER MANUFECTURERS ACCORDING TO THE SIZE OF COMPUTERS

	VALUE						NUMBER					
	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL
	1962						1962					
BULL/GE	-	13.2	79.6	8,9	-	23,6	-	16,0	72,7	7.1	-	19,6
CDC	100.0	-	4,2	-	-	0.9	100,0	-	4:6	-	-	1,0
HONEYWELL	-	-	-	-	-	-	-	-	-	-	-	-
IBM	-	74,8	16.3	83.6	-	66,5	-	76.0	22.7	85,7	-	72.1
ICL	-	0.6	-	-	-	0.3	-	0.8	-	-	-	0,7
SIEMENS	-	-	-	-	-	-	-	-	-	-	-	-
UNIVAC	-	11.5	-	7.5	-	8,7	-	7.2	-	7:2	-	6,6
OTHERS	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100,0
	1969 (30/6)						1969 (30/6)					
BULL/GE	30,6	25.1	19,0	16.1	6.0	20.4	29.4	38.1	18,8	12.5	4,8	35.1
CDC	-	0,1	3.2	-	5,6	1.5	-	0.1	2,7	-	4,8	0,4
HONEYWELL	-	4.0	-	-	-	2,2	-	4,3	-	-	-	3,6
IBM	57,8	62,4	70,3	74.3	69,8	66.3	58.8	48.2	73,8	77,5	71,4	51.8
ICL	8.2	0.3	-	-	-	0.2	8,8	0.2	-	-	-	0.4
SIEMENS	3,4	1.1	0,7	-	-	0.8	3.0	0.9	1.4	-	-	0,9
UNIVAC	-	5,9	4.1	9.6	18.6	7.5	-	7.4	3,3	10.0	19,0	7.1
OTHERS	-	1.1	2.7	-	-	1,1	-	0.8	-	-	-	0,7
TOTAL	100.0	100.0	100.0	100,0	100.0	100.0	100.0	100.0	100.0	100,0	100,0	100.0

large and extra-large computers where, in number as well as in value, IBM absorbs more than 70% of the installations;

- the considerable presence of Bull/GE on the market of desk and small computers where its shares are 30.6% and 25.1% respectively in value and 29.4% and 38.1% in number.

The judgment of the principal manufac turers operating in Italy, inverviewed (1) about their respective positions, is in agreement with the data recorded in the table IV. p.
especially as far as the shares of the value are concerned. There are, however, some differences of opinion among some manufacturers about the shares concerning number, perhaps because our estimates of the installations of desk computers might be too low or perhaps because these manufacturers refer to different estimates of the total number of installations.

While the EDP industry was not an object of particular interest in the Plan of economic development 1966-1970, the government has recently become aware of the imporcante of the problem and has assigned it, within the framework of the country development, a priority position in the economic-industrial area as well as in the scientific one.

In order to be able to formulate precise proposals two commissions have been founded:

- the first one concerning computers and their components at the Ministero della Ricerca Scientifica e Tecnologica;
- the second one concerning the electronic field at the

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(1) IBM, Bull/GE, UNIVAC, Honeywell, CDC.

Committee for Economic Planning in the Ministero del Bilancio e della Programmazione Economica.

The second commission will follow primarily the guide-lines of the Plan for national economic development.

Government interventions which have been considered for the "Progetto 80" in the field of EDP can be divided into:

- interventions of infrastructural and istitutional character:
  * personnel training
  * creation of an integrated communicationssystem
  * promotion and orientation of basic research;
- interventions in demands:
  * enlargement and orientation of public demands
  * support to private demands;
- interventions in offers:
  * policy of software
  * industrial policy in order to support research and development in specific fields of production which might be negative factors in a competitive Italian offer of software and hardware.

5.5. Computers installed by industry

The lack of documentation concerning Italy does not permit to make a meaningful analysis, especially one concerning the trend, in the distribution of computers per user branches.

"L'indagine sugli elaboratori elettronici in Italia al 31 marzo 1968" which was compiled by the Istituto Centrale di Statistica allows, however, to give an idea of the break-down of data processing systems in the economy.

COMPUTER EQUIPMENT BY INDUSTRY (1968)

	EQUIPMENT		COMPUTERS		AVERAGE NUMBER OF COMPUTERS
	number	%	number	%	
MANUFACTURING INDUSTRIES	407	45.8	486	41.3	1.2
MINING AND OIL INDUSTRIES, CONSTRUCTION UTILITIES	33	3.7	57	4.8	1.7
TRADE AND TRANSPORTATION	117	13.2	174	14.8	1.5
BANKS, INSURANCE, FINANCIAL SERVICES	210	23.6	290	24.7	1.4
PUBLIC ADMINISTRATION	122	13.7	169	14.4	1.4
TOTAL	889	100.0	1,176	100.0	1.3

The manufacturing industry shows the highest percentage of installations followed by the financial sector; the percentage of Public Administration is rather modest.

Considering the average number of computers per user the branches Oil and Mining, Construction and Utilities show the highest ratio, whereas the lowest is recorded by the manufacturing industries.

COMPUTER EQUIPMENT ACCORDING TO THE PERIOD OF THE FIRST INSTALLATION

	PERCENTAGE					
	Before 1960	1960-1961	1962-1963	1964-1965	After 1965	Total
MANUFACTURING INDUSTRIES	4.9	8.8	18.7	21.9	45.7	100.0
MINING AND OIL INDUSTRIES, CONSTRUCTION UTILITIES	21.2	6.1	24.2	18.2	30.3	100.0
TRADE AND TRANSPORTATION	4.3	17.1	16.2	14.5	47.9	100.0
BANKS, INSURANCE, FINANCIAL SERVICES	5.3	9.5	18.1	21.4	45.7	100.0
PUBLIC ADMINISTRATION	4.1	14.8	27.9	22.9	30.3	100.0
TOTAL	5.4	10.8	19.7	20.8	43.3	100.0

Except for Government, Oil Mining, Construction and Utilities, all other branches have relatively recent equipment. 40 to 50% of their installations were, in fact, made in the years after 1965.

The following table takes into consideration the principal uses of computers per industry group.

COMPUTER INSTALLATIONS ACCORDING TO THEIR USE

	PERCENTAGE						
	Uses scientific	Uses statistic	Acctg. and Administration	Production control	Other	Undefined uses	Total
MANUFACTURING INDUSTRIES	1.5	1.2	58.0	11,3	2,2	25.8	100.0
MINING AND OIL INDUSTRIES, CONSTRUCTION UTILITIES	3.0	-	75,8	-	3,0	18,2	100,0
TRADE AND TRANSPORTATION	0,9	0,9	51.3	7.7	15.3	23.9	100.0
BANKS, INSURANCE, FINANCIAL SERVICES	0,5	0.9	82,9	-	4.3	11,4	100.0
PUBLIC ADMINISTRATION	24,6	9,8	37,7	-	4.9	23.0	100,0
TOTAL	4,4	2,2	60,9	6,2	4.8	21,5	100.0

In all sectors, Accounting and Administration make the greatest use of computers, only in Public Administration scientific uses are prevalent thanks to the Universities.

The ISTAT data which concern only quantity and not value, do not classify computers according to size, and do not allow an evaluation of the EDP investments in the different users.

6. UNITED KINGDOM

6.1 Sources.

Also for the United Kingdom, as for the EEC countries, there exist different sources on the computer installations, but in contrast to the other countries, one of these sources is without any doubt much more reliable than the others.

We are speaking of the bi-monthly publication "Computer Survey" which publishes every year all data about the cumulative number of computers delivered by the end of each year, listing manufacturer and model (1). Furthermore, it publishes a survey of all installations in hands of English users naming not only the user, but also the model of the installed computer, the date of installation and the purpose for which the system has been destinated (2).

But even the information supplied by "Computer Survey" have required some adjustments in order to be useful in the deduction of the trend of the installations in the United Kingdom.

In fact, in the trend of the "Cumulative Total of Computers delivered Year by Year" are not included computers now taken out of service; for this reason only the final figure of the previous year indicates the state of the installations.

Besides, in these statistics computers are listed by series: as it is known, a series can include models of different sizes and cannot therefore supply information about the trend of a single size class. Since it would have been necessary to

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(1) Normally in the July-August issue.

(2) Normally in the March issue of each year.

disaggregate these series and to use data which concern the installations, it was preferable to use the statistics deduced from the survey of the users because they list installed computers per models.

The information gathered in this way refers to the end of each calendar year, even if the original source refers to the situation at the end of each March.

Since reliable information on the installation date is always most difficult to obtain, the mistake of comparing the English situation at the end of March with that of other European countries is acceptable, even if it leads to a certain overestimation of the number of the computers operating in the UK.

6.2 Development of computer installations.

Among all countries under examination the UK was the first to initiate activities in the EDP field, under the form of R & D by the Universities of London, Manchester and Cambridge, which started back as far as the Fourties, as well as by private entreprises such as Elliot Automation, English Electric and Ferranti.

In the UK the first computers were employed around 1951 - the EDSAD at Cambridge and the Ferranti Mark I at Manchester - thus, thanks to the development of English studies and industries, anticipating by two years the first installations in the EEC countries. But the first computers were constructed primarily for scientific use and only in 1953 the first computer for commercial purposes was installed, the model LEO from Lyons, whereas the first commercial computers installed on the continent at the end of 1956 and the beginning of 1957 were IBM's 650s.

The structure of today's equipment, according to age of installation, is illustrated by the following table:

Computer equipment in June 1969 per year of installations (1).

1960	1.0
1961	0.1
1962	2.1
1963	3.3
1964	6.5
1965	9.9
1966	14.7
1967	23.3
1968	29.1
1969	9.1
Totale	100.0

The subdivision of the installations per installation date does not include machines out of service and obviously does not reflect the presence of computers of the first generation which were installed in the Fifties and have been replaced since then once at least by computers of subsequent generations.

The trend of the installations between 1962 and 1969, in number and value, is illustrated by the following table:

(1) SORIS on the basis of Computer Survey, June/July 1969.

Trend of computer installed in the U.K. and the EEC countries

(number and value)

	1962	1969 (30/6)	Average annual rate of increase
United Kingdom			
Number	489	3,575	+ 33.7
Value (000 $)	36,861	320,443	+ 37.2
EEC			
Number	1,647	13,871	+ 39.0
Value (000 $)	137,289	997,919	+ 35.8

According to the table, 3,575 computers have been installed in England by the middle of 1969 at a total annual rental of US $ 320 million.

While the number of installations has shown for the period 1962-1969 an average annual rate of increase for England which is lower than the one for the EEC, the contrary has happened to the trend concerning value which shows for the UK a higher figure than for the EEC countries, due to the installation in England of computers with a higher average power than in the EEC countries.

The development of the UK installations has proceded along a rather irregular course, because of the stop and go characteristics of the economy, and not at high growth rates, to the extent that the UK finds itself today in a position of gap as compared with the EEC countries.

Another confirmation of England's secondary position, as far

as diffusion of computers is concerned, comes from an examination of the ratio computer/extra-agricultural employees and value of installations (per annual rental)/extra-agricultural employees.

In this way it is possible to present an index of the diffusion of computers which allow a comparison between heterogeneous countries regarding their demographic-economic dimension as well as their degree of industrialization.

DIFFUSION OF COMPUTERS IN THE EEC COUNTRIES AND THE U.K.

	1962			1968		
	U.K.	EEC	U.S.	U.K.	EEC	U.S.
NUMBER OF COMPUTER INSTALLED PER MILLION EXTRA-AGRICULTURAL EMPLOYEES	20	28	179	138	200	757
EDP INVESTMENT (1) PER EXTRA - AGRICULTURAL EMPLOYEE ($)	1.5	2.3	18.5	12.3	14.3	70,6
EDP INVESTMENT (1) PER 1,000 $ GNP	0.370	0.480	1.730	3.030	2,300	5.830

(1) Annual rental of hardware installed.

The data in the preceding table show that United Kingdom is relatively behind the EEC countries.

In 1962 and in 1969 as far as the number of installed computers per million extra-agricultural employees

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(1) Yearly rental for all installations.

is concerned it seems, however, to be less relevant when one considers the value of the investment per employee and reflects therefore an equipment which is characterized by a larger presence of medium and large computers.

Relating the value of the investment to the economic dimensions of the countries under consideration, through the ratio between the total investment in EDP and the gross national product, England's position, between 1962 and 1968, appears to be considerably improved: from a figure of 0.37 Dollars of investments in computers per each thousand Dollars of gross national product (as against 0.48 for the EEC) the UK has reached in 1968 3.03 (as against 2.30 for the EEC countries).

Obviously greater is England's gap when compared to the US, even if the gap has become smaller during the period 1962-1968.

While the computers installed per employee in England were approx. 1/8 of the US in 1962, they were 1/5 in 1968.

Even more noticeable is the reduction of the discrepancy between the value of the investments per capita and the ratio investments in EDP/gross fixed investments.

The value of the UK computer installations in the period 1958-1967 is related, to a high degree of significance, to the gross national product. A regression analysis shows (fig. IV.18) the following result:

$$y = 0.552 \cdot 10^{-118} \cdot x^{11.44}_{(s_b = 0.25)} \qquad (r = 0.99)$$

where y = value of investment in hardware (annual rental)
and x = gross national product at market constant prices

The elasticity of the investments in EDP as compared to the gross national product reaches thus the figure of 11.4 which seems rather high when compared both to the average figure for the EEC countries (6.6) and the USA (6.5).

Also the analysis of the ratio net annual increase of the computer investments (in purchase prices) in the UK has great statistical meaning,(Fig. IV.19) and shows the following results:

$$y = 0.242 \cdot 10^{-47} \cdot x^{5.41}_{(s_b = 1.31)} \qquad (r = 0.84)$$

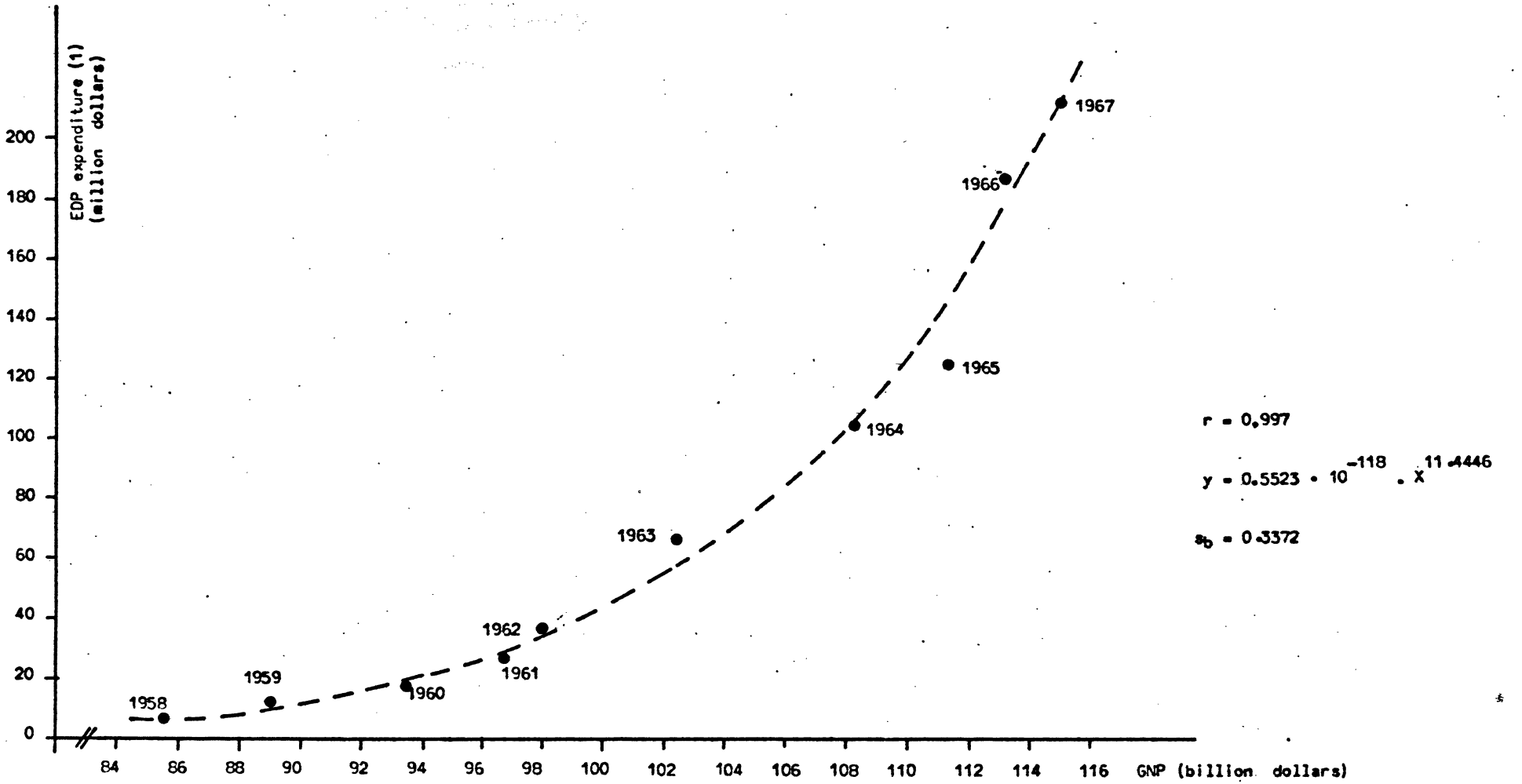
where y = net annual increase of the computer equipment (at purchase prices)
and x = gross fixed investment at constant prices.

UNITED KINGDOM

FIG. IV/18

EDP EXPENDITURE (1) IN RELATION TO GNP

(1958 - 1967)



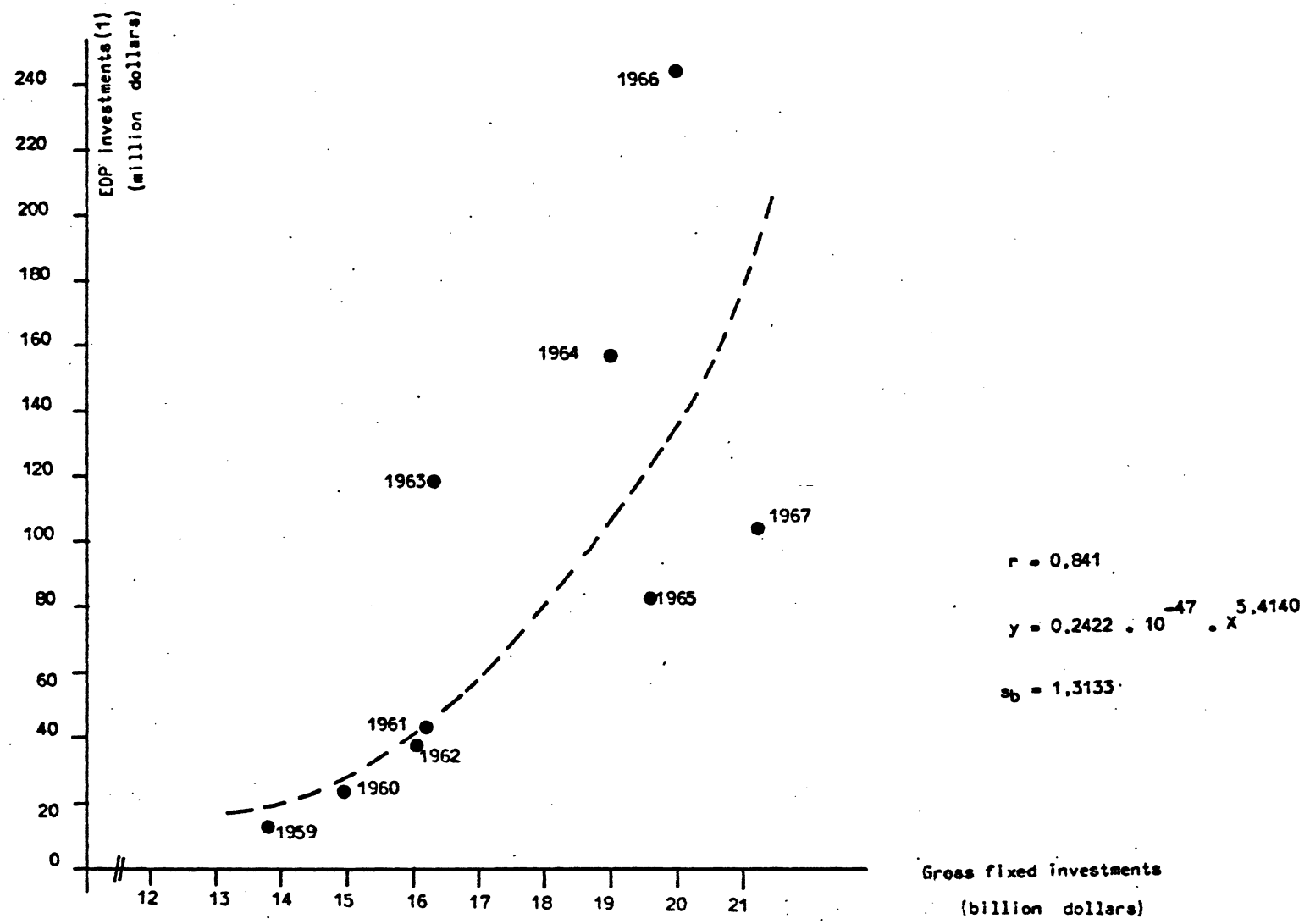
(1) Annual rental of hardware installed

UNITED KINGDOM

FIG. IV/19

EDP INVESTMENTS (1) IN RELATION TO GROSS FIXED INVESTMENTS

(1959 - 1967)



$r = 0,841$

$y = 0,2422 \cdot 10^{-47} \cdot X^{5,4140}$

$s_b = 1,3133$

(1) Annual increase of EDP installations estimated on the basis of purchase price

6.3 Computers installed by size classes

The structure in 1962 and 1969 of the English computer installations in number and value according to size is illustrated by the following table and in the fig. IV.20:

PERCENTAGE OF COMPUTERS INSTALLED PER SIZE CLASSES

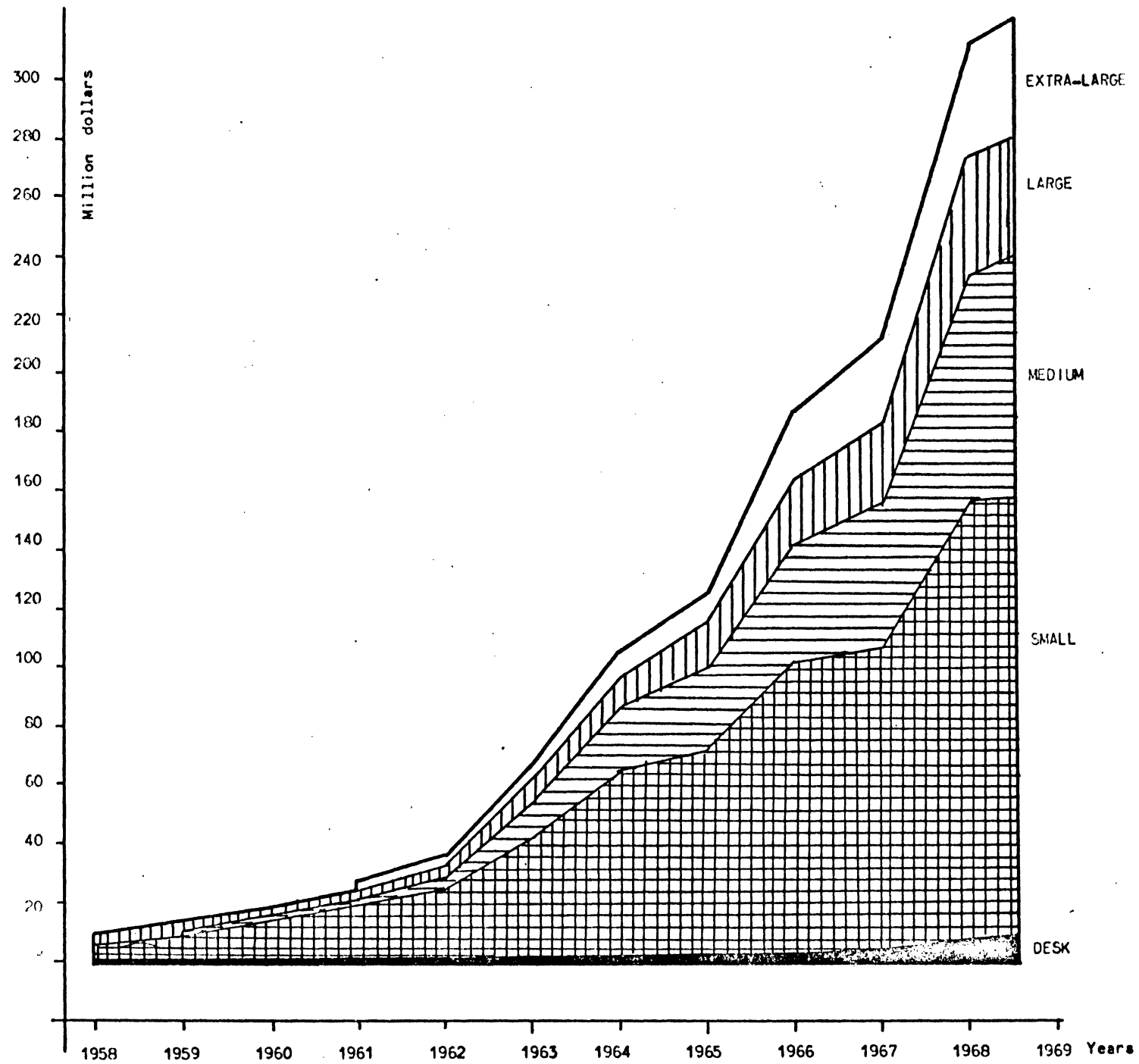
	NUMBER		VALUE		AVERAGE ANNUAL RATE OF INCREASE	
	1962	1969	1962	1969	Number	Value
DESK	8,0	19,3	2,1	3,1	+51,9	+43.5
SMALL	85.5	64.3	68,1	46,2	+28,4	+29.2
MEDIUM	3,9	12,0	9,3	25,9	+51,3	+53,9
LARGE	1,2	2,8	12,3	12,7	+49.2	+41,6
EXTRA-LARGE	0,4	1,2	8,2	12,1	+61,8	+50,4
UNCLASSIFIED	0,4	0,4	-	-	-	-
TOTAL	100.0	100.0	100.0	100,0	+33,7	+37.2

In the period between 1962 and 1969 substantial changes have occurred in the importance of desk computers which have increased considerably their percentage in the total number of all installations as well as in the importance of small computers whose percentage has decreased in favour of the next higher class. Concerning value the most substantial changes in the installations' structure are due to the considerable reduction in small computers in favour of the medium ones; a considerable increase during the period 1962-1969 shows also the extra-large computers which from 8.2% of all the installations value rose to 12.1%.

UNITED KINGDOM

FIG. IV /20 ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEARS, BY SIZE CLASSES

(1958 - 1969)



As far are the large and especially the extra-large computers are concerned, we may notice that in the UK they reach, within the total of the installations, but excepting desk computers, a percentage which is higher than the one for the EEC and lower than the US one.

Large and extra-large Computers in June 1969

Country	Large		Extra-large	
	Number	%	Number	%
United Kindom	100	3.5	42	1.4
EEC	237	2.2	90	0.8
US	2,445	5.3	1,011	2.2

6.4 The Computer Market

Among the extra-large computers which have been installed in England the most common are the IBM 360/65 (21); followed by UNIVAC's 1108 (8); also existing in this segment of the market are the ICL and the CDC.

The importance of the manufacturers in the extra-large market differs considerably from their respective position in the market as a whole, as is shown by the table.

In fact, IBM which represents more than 60% of the extra-large computer installations, disposes, in June 1969, of less than 30% of the total installations in number, also if, due to its preponderant position on the market of extra-large computers, its market share is more than 40%(Table IV.p.)

The predominance which IBM enjoys in almost all European countries, is contested in the UK by the conspicuous presence of the national industry whose production, presently concentrated on the ICL, accounts for 48.9% of all installations in 1969 and has a market share of 42% in value.

The success of the national computer production in the UK can be partly ascribed to the English government support policy which has taken a number of decisions since 1965:

- a series of measures in support of the industrial activities;
- the appointment of a "Computer Advisory Unit" which gives advice to the administrations and the public firms about the acquisition and installation of EDP systems;
- the appointment of a Computer Commission at the University of Technology with the task of exploring the needs of

TABLE IV. p. MARKET SHARES PER MANUFACTURERS, ACCORDING TO THE SIZE OF COMPUTERS (1962 and 1969)

	Number						Value					
	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	TOTAL
	1962						1962					
BULL/GE	-	1,7	-	-	-	1.4	-	1.4	-	-	-	0,9
BURROUGHS	-	0,5	-	-	-	0.4	-	-	-	-	-	-
CDC	-	-	-	-	-	-	-	-	-	-	-	-
HONEYWELL	-	0,5	5,3	-	-	0.6	-	0,6	7,7	-	-	1,1
IBM	-	25.8	10,5	100,0	50,0	24,7	-	26,5	8,5	96.8	63.4	36.0
ICL	33.3	69,1	68.4	-	50,0	64.9	33.2	66.6	71,1	-	36.6	55.6
UNIVAC	-	1,2	-	-	-	1.0	-	1.9	-	-	-	1.3
OTHERS	66.7	1,2	15.8	-	-	7.0	66.8	3,0	12,7	3,2	-	5.1
TOTAL	100.0	100,0	100,0	100.0	100.0	100.0	100.0	100,0	100.0	100,0	100.0	100.0
	1969 (30/6)						1969 (30/6)					
BULL/GE	7.2	1,5	2.3	-	-	2.7	10,6	1,1	2.8	-	-	1.5
BURROUGHS	1,7	2 5	-	-	-	1.9	-	-	-	-	-	-
CDC	-	0.1	0,7	-	4.8	0.2	-	0,1	0,7	-	5,3	0.9
HONEYWELL	-	7,9	3,0	2.0	-	5.5	-	8,4	3,3	2,2	-	5,0
IBM	-	32,6	32,1	61,0	61,9	27,3	-	33,4	37,3	62,7	60,1	40,3
ICL	48,9	50,7	47,0	31,0	14,3	48,9	45,3	51,6	42,8	28,6	17,1	42,0
UNIVAC	-	2,7	-	6,0	19,0	2,2	-	1,9	-	6,5	17,5	3,8
OTHERS	42,2	2,0	14,9	-	-	11,3	44,1	3,5	13,1	-	-	6,5
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

English universities and research centres;

- the development of a research and development policy secured by university contracts for the study of products for industrial purposes, and by financial help to the Council for Scientific Research for studies in the EDP field;
- the creation of the National Computing Centre which puts at the disposal of manufacturers and users a program files and takes care of the training of analysts.

Due to the incentive of the Ministry of Technology the national computer industry concentrated on ICL.

6.5 Computers installed by industry

A census of the computers in the UK which is published regularly each year in "Computer Survey" allows to analyze the distribution of the computer installations in the UK according to size and to branch of users.

In order to analize in addition to the equipment structure per industries also the trend within each sector those data referring to the years 1962 and 1968 have been examined.

The tables (IV.p,IV.q) demonstrate clearly that almost half of all installations is employed in the manufacturing industries whose relative importance as user of computers has increased from 39.7% of the total number of installations in 1962 to 44.4% in 1969.

The branch employing the second largest number of computers is the Public Administration which in 1962 accounted for 18.7% of the total number of installations and for 20.2% in 1968.

Between these and the other industries considered exists a considerable gap: in fact, banks and insurance companies which follow in the ranking account for only 9.1% of the total number of installations.

The percentage per industry group does not show substantial changes between 1962 and 1968, also if during this period the manufacturing branches, banks and insurances and government have increased their per cent share whereas the relative importance of the other branches has decreased somewhat.

Within the manufacturing industries the most important

activities, as far as the use of computers is concerned, are engineering (325 computers), food including tobacco, beverages and retail sales (249) and chemical, pharmaceutical, rubber and glass (236).

In 1962 the situation within the manufacturing industries was different: the largest number of installations (32) belonged to the aeronautical activities, followed by the electrical contructions (31) and chemicals (26).

As far as the use of large and extra-large computers is concerned, the manufacturing industries are their principal users with 29.4% and 26.8% respectively of the total number of installations of the aforementioned classes. Government follows in the large class with 24.2% of the installations and banks and insurances with 17.9%.

Besides the manufacturing industries which in 1968 had 11 extra-large computers at its disposal, important branches of employment for this class of computers are the service bureaux (autonomous or those of the manufacturing companies) with 9 extra-large computers, universities and schools with 6, banks and insurances and public utilities, each having five extra-large computers and finally government with 4.

In 1962 the only two existing extra-large computers were installed in the universities and atomic energy field.

TABLE IV. q. NUMBER OF COMPUTERS INSTALLED BY INDUSTRY (1962)

CLASS	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	UNCLASSI-FIED	TOTAL	TOTAL EXCLUD-ING DESK
MANUFACTURING INDUSTRIES	15	172	4	3	-	-	194	179
- Aircraft	-	31	-	1	-	-	32	32
- Food, Drink, Tobacco	1	20	1	-	-	-	22	21
- Chemicals, Rubber, Glass	4	25	1	-	-	-	30	26
- Publishing, printing, paper	-	-	-	-	-	-	-	-
- Electrical Engineering	5	31	-	-	-	-	36	31
- Ferrous and non ferrous metals	2	13	-	1	-	-	16	14
- Motor	-	15	-	-	-	-	15	15
- Oil	-	17	1	1	-	-	19	19
- Gen. & constructional Engineering	3	20	1	-	-	-	24	21
- Textiles, clothing, Furniture	-	-	-	-	-	-	-	-
BANKS AND INSURANCES	-	32	3	-	-	-	35	35
- Banks	-	15	2	-	-	-	17	17
- Insurances	-	17	1	-	-	-	18	18
PUBLIC UTILITIES	3	29	1	1	-	-	34	31
- Electricity, gas, water	-	17	1	1	-	-	19	19
- Transport	3	12	-	-	-	-	15	12
	7	76	4	2	-	2	91	84
- Government Departments	-	22	1	-	-	2	25	25
Public Bodies	-	5	-	-	-	-	5	5
- Government & Other Research Establishments	5	22	1	1	-	-	29	24
- Local Government	2	18	1	-	-	-	21	19
- Armed Services	-	9	1	1	-	-	11	11
ATOMIC ENERGY	-	15	-	2	1	-	18	18
UNIVERSITIES & OTHER EDUCATIONAL ESTABLISHMENTS	8	30	-	-	1	-	39	31
COMPUTER MANUFACTURERS & SERVICE BUREAUS	6	44	7	1	-	-	58	52
MISCELLANEOUS	-	20	-	-	-	-	20	20
TOTAL	39	418	19	9	2	2	489	450

TABLE IV.q.bis.

PERCENTAGE OF THE COMPUTERS INSTALLED BY INDUSTRIES (1962)

CLASS / INDUSTRY	DESK	SMALL	MEDIUM	LARGE	EXTRA-LARGE	UNCLASSIFIED	TOTAL	TOTAL EXCLUDING DESK
MANUFACTURING INDUSTRIES	38.5	41.1	21.0	33.3	-	-	39.7	39.8
- Aircraft	-	7,4	-	11,1	-	-	6,5	7,1
- Food, Drink, Tobacco	2.6	4,8	5,25	-	-	-	4.5	4,7
- Chemicals, Rubber, Glass	10.3	6,0	5,25	-	-	-	6.1	5.8
- Publishing, printing, paper	-	-	-	-	-	-	-	-
- Electrical Engineering	12.8	7.4	-	-	-	-	7.4	6,9
- Ferrous and non ferrous metals	5.1	3,1	-	11,1	-	-	3.3	3,1
- Motor	-	3.6	-	-	-	-	3.1	3.3
- Oil	-	4,0	5.25	11,1	-	-	3.9	4.2
- Gen. & constructional Engineering	7.7	4,8	5,25	-	-	-	4.9	4,7
- Textiles, clothing, Furniture	-	-	-	-	-	-	-	-
BANKS AND INSURANCES	-	7.7	15,8	-	-	-	7.1	7,8
- Banks	-	3.6	10.5	-	-	-	3,5	3,8
- Insurances	-	4.1	5.3	-	-	-	3.6	4,0
PUBLIC UTILITIES	7.7	6.9	5.3	11,1	-	-	6.9	6,9
- Electricity, gas, water	-	4.1	5.3	11,1	-	-	3.9	4.2
- Transport	7.7	2.8	-	-	-	-	3.0	2.7
PUBLIC ADMINISTRATION	17,9	18.2	21.0	22.2	-	100.0	18.6	18.7
- Government Departments	-	5.3	5,25	-	-	100,0	5.1	5.6
- Public Bodies	-	1.2	-	-	-	-	1.0	1,1
- Government & Other Research Establishments	12.8	5,3	5,25	11,1	-	-	5.9	5,3
- Local Government	5,1	4,3	5,25	-	-	-	4.3	4,2
- Armed Services	-	2.1	5,25	11,1	-	-	2,3	2,5
ATOMIC ENERGY	-	3.6	-	22.2	50.0	-	3,7	4,0
UNIVERSITIES & OTHER EDUCATIONAL ESTABLISHMENTS	20.5	7.2	-	-	50,0	-	8,0	6,9
COMPUTER MANUFACTURERS & SERVICE BUREAUS	15,4	10.5	36,9	11,1	-	-	11,9	11,5
MISCELLANEOUS	-	4,8	-	-	-	-	4,1	4,4
TOTAL	100,0	100.0	100.0	100,0	100.0	100,0	100,0	100,0

NUMBER OF COMPUTERS INSTALLED BY INDUSTRY (1968)

INDUSTRY \ CLASS	DESK + SMALL (1)	MEDIUM	LARGE	EXTRA LARGE	UNCLASSIFIED	TOTAL
MANUFACTURING INDUSTRIES	1,370	137	28	11	7	1,553
- Aircraft	63	11	3	-	1	78
- Food, Drink, Tobacco	215	32	2	-	-	249
- Chemical, Rubber, Glass	213	14	8	1	-	236
- Publishing, Printing, Paper	83	4	1	1	-	89
- Electrical Engineering	144	21	2	-	2	169
- Ferrous and non-ferrous metals	119	15	1	-	1	136
- Motor	64	12	5	4	-	85
- Oil	40	7	2	5	2	56
- General and constructional Engineering	303	18	4	-	-	325
- Textile, Clothing, Furniture	126	3	-	-	1	130
BANKS AND INSURANCES	229	68	17	5	-	319
- Banks	123	50	12	5	-	190
- Insurance	106	18	5	-	-	129
PUBLIC UTILITIES	195	33	8	5	-	241
- Electricity, Gas, Water	111	22	6	2	-	141
- Transport	84	11	2	3	-	100
PUBLIC ADMINISTRATION	620	54	23	4	7	708
- Government Departments	95	13	9	-	2	119
- Public Bodies	61	16	7	-	-	84
- Government and Other Research Establishments	91	6	2	4	-	103
- Local Government	182	13	1	-	-	196
- Armed Services	191	6	4	-	5	206
ATOMIC ENERGY	34	4	3	1	-	42
UNIVERSITIES & OTHER EDUCATIONAL ESTABLISHM.	197	32	4	6	-	239
COMPUTER MANUFACTURERS & SERVICE BUREAUS	217	69	11	9	-	306
MISCELLANEOUS	88	7	1	-	-	96
TOTAL	2,950	404	95	41	14	3,504

(1) Excluding desk computers such as NCR 500

TABLE IV.r bis PERCENTAGE OF THE COMPUTERS INSTALLED BY INDUSTRY (1968)

INDUSTRY \ CLASS	DESK + SMALL	MEDIUM	LARGE	EXTRA LARGE	UNCLASSIFIED	TOTAL
MANIFACTURING INDUSTRIES	46.4	33.9	29.4	26.8	50,0	44.4
- Aircraft	2,1	2,7	3.2	-	7.2	2.2
- Food, drink, Tobacco	7,3	7,9	2.1	-	-	7,1
- Chemical, Rubber, Glass	7.2	3,5	8,4	2,4	-	6,8
- Publishing, Printing, Paper	2.8	1,0	1,0	2,4	-	2.6
- Electrical Engineering	4,9	5.2	2,1	-	14,2	4,8
- Ferrous and non-ferrous metals	4.0	3,7	1.0	-	7.2	3,9
- Motor	2,2	3,0	5,3	9,8	-	2,4
- Oil	1,3	1,7	2.1	12,2	14,2	1,6
- General and constructional engineering	10.3	4,5	4,2	-	-	9,3
- Textile, Clothing, Furniture	4.3	0,7	-	-	7.2	3,7
BANKS AND INSURANCES	7.8	16,8	17,9	12,2	-	9.1
- Banks	4,2	12,4	12,6	12,2	-	5,4
- Insurance	3,6	4,4	5,3	-	-	3,7
PUBLIC UTILITIES	6.6	8.2	8,4	12,2	-	6,9
- Electricity, Gas, Water	3,8	5,5	6,3	4,9	-	4,0
- Transport	2,8	2,7	2.1	7,3	-	2,9
PUBLIC ADMINISTRATION	21,0	13,4	24.2	9.8	50,0	20,2
- Government Departments	3,2	3,2	9,5	-	14,2	3,4
- Public Bodies	2,0	4,0	7,4	-	-	2,4
- Government and Other Research Establishments	3,1	1,5	2,1	9,8	-	2,9
- Local Government	6,2	3,2	1,0	-	-	5,6
- Armed Services	6.5	1,5	4,2	-	35,8	5.9
ATOMIC ENERGY	1.1	1.0	3,2	2.4	-	1,2
- Universities and Other Educational Establishm.	6,7	7,9	4,2	14.6	-	6,8
- Computer Manufacturers & Service Bureaus	7,4	17,1	11,6	22,0	-	8,7
- Miscellaneous	3,0	1,7	1,1	-	-	2.7
TOTAL	100,0	100,0	100.0	100,0	100,0	100,0

CHAPTER V

Forecast of computer installations in the EEC countries and the United Kingdom (1970-1980)

1. Foreword

As no information reliable enough is available on the trends of computer replacement demand, an analysis of the global demand (new installations plus replacement demand) is possible in an indirect way only, that is on the basis of an assumed average lifetime of a computer.

The object of said analysis therefore will be the trend of the installations.

Differing from other investment goods, most computers are rented The annual expenditure for hardware is function of the number and types of the computers installed.

Our analysis has been performed utilizing data concerning the value of installations (1), as in our opinion they are more meaningful than the ones concerning the number, though within the limits of the evaluation method of such a value.

When forecasting, indications will be supplied on the number of computers installed, starting from value data and assuming a unit average value of a computer.

In time-series extrapolation, desk computers have not been considered (2), as their detection grew accurate enough in recent times, and in some European countries only.

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(1) That is, the annual rental fees.

(2) With monthly rental fee less than $ 2,000.

2. Factors explaining the demand trend

Computers belong to investment goods of an innovative kind. The large and still widening range of applications in all productive sectors and services have determined their booming development. Among the factors which have conditioned and will condition the development of computer installations may be mentioned the following:

- offer pressure: in the computer field, characterized more by leasing than by sales, the manufacturers' profit is proportioned with the number, type and unit value of the computers presently in function. Manufacturers try therefore to promote additional demand, that is to extend the users' number, and the replacement of old models with more recent and expensive ones. In this case there is a higher relation performance/price;

- preceding development: the knowledge of new computer applications (as of any new instrumental good) spreads, besides through the manufacturers:promotional activity also through informal canals. The larger the use of such a good, the more its applications spread this way (1);

- labour cost: the various levels of labour cost and its dynamics in different countries may weight on the diffusion

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(1) In other words, the number of the computers installed in a certain market in a certain period may be considered a function of the number of computers installed in preceding periods. Considering the number of the computers in function in the year t as linear function of the computers installed in the year t-1, we obtain a correlation coefficient 0.98 for the U.S. and 0.97 for EEC countries and the U.K.

degree and speed of computers, when they are employed to replace human work, chiefly clerical work.
This proves particularly true when computers are employed to replace the simplest administrative operations (accounting, wages and salaries computations and so on). But at advanced stages the computer function cannot be regarded as merely substitutive.
In this case computers have to be considered a wholly innovative instrument and the influence of labour cost on their development becomes pratically negligible;

- structure and development of the national economic system:
among the most relevant factors of the computer diffusion we must consider:
  * the industrialization of the country concerned;
  * the major or minor industrial concentration degree of said country, which contributes chiefly to determinate the major or minor diffusion of advanced models;

- variations of the relation performance/price of computers:
the difficulty to elaborate a univocal parameter for the quantification of the performances of different computer types, does not allow to draw relation performance/price reliable enough.
At any rate, said relation has doubtlessly grown with time especially as computer generations have developed and have contributed in a large degree to the development of total installations.

Beyond the technological evolution of the hardware, which allowed a steady increase in the data processing and storage speed, the evolution of the software extended and still extends the applications of computers and allowed this way to solve a widening range of problems concerning scientific calculations and information processing. From this point of view a limitation to the common use of computers may be represented by the difficulty to have available an adequate number of specialists fittingly prepared and trained;

- <u>development speed of hardware expenditure in function of the economic development level</u>

Factors such as prices, manufactures' promotional activity, evolution of applications may be considered as to act not dissimilarly in different countries.
But their influence on the development of computer installations is conditioned by the economic development of the country concerned and by its variations. The economic development determinines the major or minor speed by which the use of computers spreads in different countries.
We may check it empirically taking the GNP (in absolute value or in pro capita value, so as to allow a comparison between countries of different size) as a synthetic indicator of the economic development level of a certain country.

Considering the average annual variation of the ratio hardware/GNP as a function of the average pro capita GNP in each country, we may obtain in fact a high enough

correlation (r=0.94) coefficient (1).

The adoption of a function of this type or of a similar one allows anyway to analyze the initial development of the computers already operating (or of their value), but cannot be employed to formulate a forecast.

In fact in our opinion the demand of new installations will reach a saturation level after a period of deep growth.

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(1) The function we adopted is

$$\log y_i = 0.115 + 0.96 \log x_i$$

where:

y_i = annual average variation of the relation hardware expenditure/GNP in a country i, in the period 1962-1968.

x_i = average value of pro-capita GNP in a country i in the period 1962-1963.

3. Methodology employed in the forecast of the computer installations development

The long range development of computer installations (expressed in value) may be represented by a temporal function of a logistic type (1).

The relation hardware expenditure/GNP has been taken as a dependent variable in order to have comparable values from each country.

The use of a logistic function to interpret the cursus of said relation implies that the hardware expenditure, after an initial period of steady absolute growth, slackens its development rate, pointing to a relative saturation level. When it nears to it, the annual variation rate draws near the GNP.

In the European countries under examination (U.K. excluded) the relation $\frac{\text{hardware expenditure}}{\text{GNP}}$ will increase at a growing rate.

The development of the hardware expenditures compared with the GNP may be put in the first branch of a logistical curb. For this reason too we think it advisable to take as an interpretative model for European countries the US development model, taking into account the delay in the hardware expenditure level at a parity of GNP.

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(1) That is a function of the type: $y_t = \frac{1}{a + bc^t}$,where

y_t = a dependent variable

t = number of years

a = reciprocal of the ceiling parameters

$b;c$ = function parameters.

Such a delay may be evaluated empirically comparing the real level of the relation hardware expenditure/GNP in each country. In 1968 the lag expressed in years was as follows:

Germany	4.5
France	5.5
Italy	6
Benelux	4.5
EEC	5. (average)
UK	4
EEC+UK	4.75 (average)

The rule followed to process the interpretative functions is the following: after evaluating the logistical function of the relation hardware expenditure/GNP concerning the U.S. and after detecting this way the ceiling relation points to, we assumed that it may be the limit to which said relation will point also in the EEC countries and in the UK.
After determining on this basis an equal ceiling for all EEC countries and the UK, we found for each country the logistical function best fitting to the historical series of data.
The parameters of the functions found this way are reported in the table V.a.:

TAB. V.A PARAMETERS OF THE LOGISTICAL FUNCTION INTERPOLATING THE RELATION HARDWARE-EXPENDITURE/GNP IN THE U.S.A., EEC COUNTRIES AND U.K. - THE FUNCTION IS

$$g = \frac{1}{a + bc^t}$$

COUNTRIES	A	B	C
USA	8.9236	118.564	0.71353
GERMANY	8.9236	128.082	0.76100
FRANCE	8.9236	182.124	0.74000
ITALY	8.9236	134.986	0.80780
BENELUX	8.9236	174.037	0.71969
EEC	8.9236	149.114	0.75898
UK	8.9236	143.178	0.73390
EEC+UK	8.9236	147.600	0.75214

4. Analysis of the results of the projection

On the basis of the calculation made, the hardware expenditure (in dollars) per one million dollars GNP will change in the following way in the countries under exmanination:

Hardware expenditure per one million dollars GNP in the EEC countries, UK and US in the years 1968-1970-1975-1980 (dollars)

Countries	1968	1970	1975	1980
Germany	2,403	3,590	7,270	9,845
France	2,027	3,220	7,228	9,986
Italy	1,807	2,549	5,169	7,995
Benelux	2,351	3,798	8,141	10,447
EEC (average)	2,154	3,282	6,921	9,565
UK	2,538	3,946	8,052	10,344
EEC+UK (average)	2,245	3,436	7,169	9,727
USA	5,921	7,705	10,337	11,035

In 1980 most EEC countries and the UK should therefore reach a not very different hardware expenditure level and close to 10,000 dollars per one million dollars GNP (Italy should be placed at a lower level, as its hardware expenditure reaches about 8,000 dollars per one million dollars GNP).
The USA should overcome 11,000 dollars. The gap between EEC-UK and the USA will shrink remarkably.
The hardware expenditure per one million dollars GNP in the EEC countries and the UK was 40% that of the US in 1968 and will

reach 88% in 1980, even if the lag already appreciable in 1980 trends to increase more or less considerably in all countries considered.

As for the EEC and the UK as a whole, the lag in comparison with the USA, which was about 4.4 years in 1968, should reach 5.6 in 1975 and 6.8 years in 1980.

5. Evaluation of the annual hardware expenditure

On the basis of GNP projections for 1980 (1) of each country and considering the evaluations of the ratio hardware expenditure/GNP, we can estimate the annual expenditure for hardware in 1980 at 6.6 billion dollars in the EEC countries and at about8.4 billion dollars in the EEC countries plus the UK. In the US it will reach about 16.0 billion dollars (Table V.b.).

The values obtained do not include expenditures for desk computers, which are relatively negligible. Assuming that in

(1) Forecasts have been made on the basis of the following average annual growth rates:

	%
Germany	4.2
France	5.6
Italy	5.85
Belgium	4.3
Holland	4.6
EEC (ponderated average)	5.05
UK	3.6
EEC+UK (ponderated average)	4.73
USA	4.3

Sources employed are the following:

- for Germany, Belgium and Holland 1970-1975 forecasts have been extended to the period 1968-1980. 1970-1980 forecasts were made by the Commission des Communautés Européennes, Direction Générale des Affaires Economiques et financières, Groupe d'Etude des Perspectives Economiques à moyen terme", June 1969;
- for the United Kingdom the source was the "National Institute of Economic and Social Research";
- for Italy the source was the Ministero del Bilancio e della Programmazione Economica, Progetto '80. The rate adopted is the lowest for the period 1967-1980, hypothesizing the full employment of resources;

(next page)

TAB. V.8 ANNUAL HARDWARE EXPENDITURE (1) IN THE EEC COUNTRIES, THE UK AND THE US IN THE YEARS 1970-1975-1980 - COMPARISON WITH 1968

	EXPENDITURE (Billion $)				% GROWTH				ANNUAL AVERAGE COMPOSED GROWTH RATES			
	1968	1970	1975	1980	1968-1970	1970-1975	1975-1980	1968-1980	1968-1970	1970-1975	1975-1980	1968-1980
GERMANY	0.325	0.517	1.287	2.140	+59,1	+148.9	+66.3	+558.5	+26,1	+20.0	+10.7	+17.0
FRANCE	0.270	0.458	1.349	2,447	+69.3	+195.2	+81.4	+806.3	+30,1	+24,2	+12.6	+20,2
ITALY	0,129	0.214	0,576	1.183	+65,9	+169,2	+105.4	+817.1	+28,8	+21.9	+15,5	+20.3
BENELUX	0,105	0.191	0.510	0,813	+81,9	+167.0	+59,4	+674.3	+34.9	+21.7	+9.8	+18.6
EEC	0,829	1.380	3.722	6.583	+66.5	+169,6	+76.9	+694.1	+29.0	+21.9	+12.1	+18.8
UK	0.303	0,498	1,213	1.860	+64,4	+143.6	+53.3	+513,9	+28.2	+19,5	+8,9	+16.3
EEC+UK	1,132	1,878	4.935	8.443	+65,9	+162,7	+71.1	+645.8	+28.8	+21.3	+11.3	+18.2
USA	4.950	7.351	12,173	16,039	+48,5	+65,6	+31.8	+224,0	+21.9	+10.6	+5.7	+10.3

(1) DESK COMPUTERS EXCLUDED.

TAB. V.C INDEX OF THE HARDWARE EXPENDITURES IN THE EEC COUNTRIES AND THE UK IN THE YEARS 1970-1975-1980 (US expenditure = 100)

COUNTRIES	1968	1970	1975	1980
GERMANY	6.6	7.0	10.6	13.3
FRANCE	5.5	6.2	11.1	15.3
ITALY	2.6	2.9	4.7	7.4
BENELUX	2.1	2.6	4.2	5.1
EEC	16.8	18.7	30.6	41.1
UK	6.1	6.8	10.0	11.6
EEC + UK	22.9	25.5	40.6	52.7
USA	100.0	100.0	100.0	100.0

1980 the expenditure percentage for this computer type of the total expenditure is equal to the actual US one (3.2%) the 1980 annual global expenditure for hardware in the EEC countries and in the UK will be about 8.7 billion dollars.(~~Fig. V. 1~~)
On the basis of said evaluation, the annual average growth rate of hardware expenditure for the period 1968-1980 will be 18.2% in the EEC countries and the UK and 10.3% in the US, with progressively decreasing values.

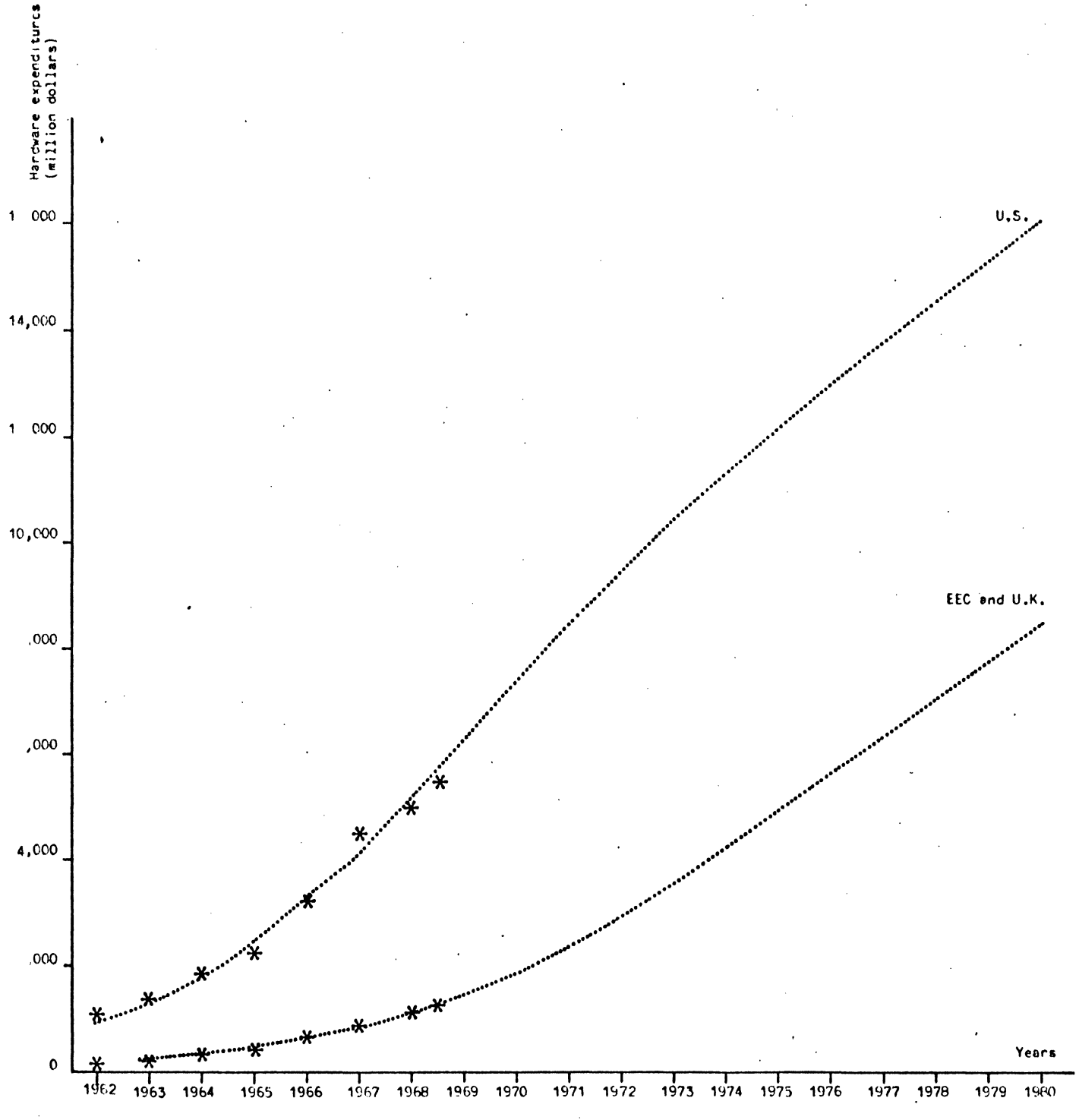
Evaluation of the annual average growth rate of annual hardware expenditure in the US, EEC countries and UK

Years	USA (%)	EEC and UK (%)
1963-1968	+29.3	+35.6
1968-1970	+21.9	+28.8
1970-1975	+10.6	+21.3
1975-1980	+5.7	+11.3
1968-1980	+10.3	+18.2

(note follows)

- the source for France is: INSEE, Economic Forecasts to 1985. Report carried out by the Programming Division INSEE and by the Studies and Economic Forecast Division of the General Committee for the Plan in the framework of the preliminary works for the 6th Plan.
  Said report is mentioned in: ISCO, Rassegna della letteratura sui cicli economici, n. 3, 1969.
  The growth rate adopted is the lowest of the hypothesized ones for the period 1970-1985, assuming a quick development;
- the source for the US is: Economic Report of the President, trasmitted to the Congress February 1970, United States Government Printing Office, Washington 1970.
  The annual average growth rate of the GNP forecast for the period 1969-1975 has been extended to 1980.

FIG. V.1 DEVELOPMENT TRENDS OF ANNUAL EXPENDITURES IN HARDWARE (million dollars) IN THE EEC COUNTRIES AND U.K. AS COMPARED TO U.S. (1)



(1) DESK types excluded.

E.E.C. and U.K. hardware expenditure as compared to the US will grow considerably high.
In fact, assuming US expenditure = 100, the relation will be 23 in 1968, 41 in 1975 and 53 in 1980.
EEC and UK hardware expenditure in 1975 and 1980 will be equal to the US one in 1968 and 1971.

It is generally considered that the purchasing price of a computer corresponds to about four annual rental
The value of computer installations in the EEC and UK as a whole and in the US can be evaluated as follows (at purchase price of new installations):

Value of the computer installations at purchase prices for the years 1968-1970-1975-1980 (billion dollars)

	1968	1970	1975	1980
EEC+UK	4.5	7.5	19.7	33.8
US	19.8	29.4	48.7	64.7

6. Evaluation of variations in the computer installations number in the EEC and the UK

The average annual rental fee for one computer (desk type excluded) in 1968 was $ 81,100 in Benelux, $ 113,900 in France, 114,400 in the US. The EEC and UK average was $ 90,800.
The number of extra-large computers whose launching has just begun in the European market, should increase considerably in the period 1970-1975 and will cause higher average rental fees. In 1975 it will be equal to the present US one, that is, about $ 114,000.
A further increase in the annual average rental fee of computers installed in the EEC and UK will be determined by the introduction of a more advanced computer type, more expensive than the present extra-large ones. The market share of both types should consolidate in the second half of the seventies.
Let us assume that the annual average rental fee between 1975 and 1980 increases at the same rate as it did between 1965 and 1968 in the EEC and the UK because of the introduction of extra-large computers. As a consequence, in 1980 the annual average rental fee of computer installations will be about $ 130,000.

Considering these values and the total expenditure, we may estimate that in 1980 about 65.000 computers will be operating in the EEC and the UK (desk type excluded).

For an indicative evaluation of the total number of computer installations, we may say that the present percentage of desk computers installed in the EEC and the UK will change at the same growth rate as did the US average percentage of this computer type in the years 1965 to 1969 compared with the average of the preceding period.

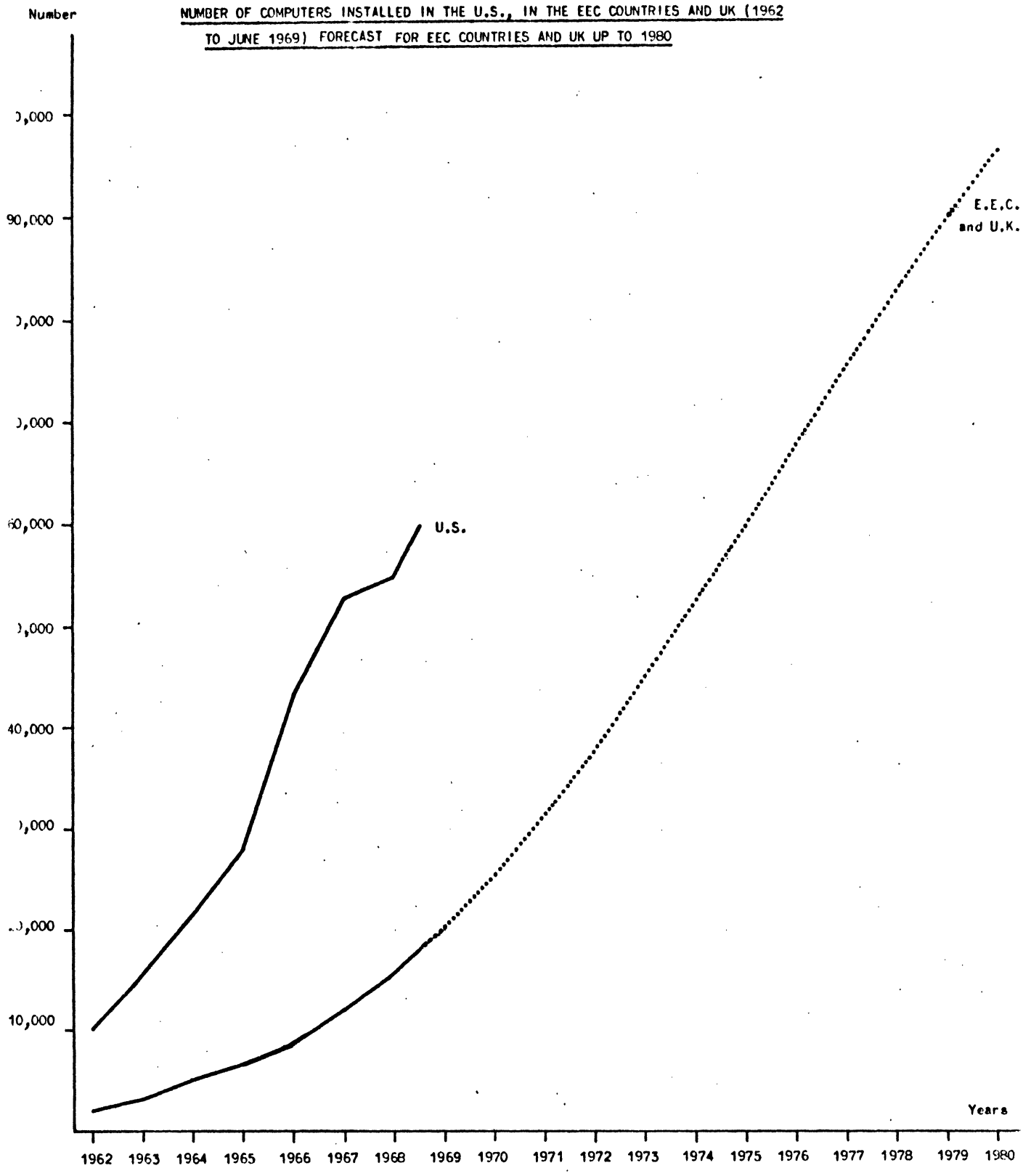
On the basis of this hypothesis, the number of computers operating in the EEC and in the UK will increase from 15,800 in 1968 to 59,900 in 1975 to 96,600 in 1980.(Fig. V.2.)

Forecast of the number of computers operating in the EEC and the UK (1968-1970-1975-1980)

Computer types	1968	1970	1975	1980
Desk	3,343	5,800	16,700	31,600
Small, medium, large, extra-large	12,466	19,400	43,200	65,000
Total	15,809	25,200	59,900	96,600

FIG. V.2

NUMBER OF COMPUTERS INSTALLED IN THE U.S., IN THE EEC COUNTRIES AND UK (1962 TO JUNE 1969) FORECAST FOR EEC COUNTRIES AND UK UP TO 1980



7. Forecast of the global demand

In order to carry out an indicative evaluation of the European computer market (at purchase prices), we assumed two average computer lifetimes, 6 and 8 years.

On the basis of these hypotheses (1), the global demand for computer installations in the EEC and the UK may be evaluated at 2.0/2.2 billions dollars in 1970, 4.1/4.4 billion dollars in 1975, 5.9/6.9 in 1980, of which 2.7 billions are for new installations and 3.2/4.1 billions for replacement.

---

(1) We assumed that the replacement demand in the year t is equal to the demand for new installations and to the replacement demand in the year t-6 (first hypothesis) or t-8 (second hypothesis). Replacement demand of 1968 and of preceding years has been evaluated approximately and considered equal to the demand for new installations of 6-8 years before.

EEC and UK computer market (at purchase price - billion dollars)

Years	Demand for new installations	Replacement demand	Total
1969	1.3	0.2-0.3	1.5-1.6
1970	1.7	0.3-0.5	2.0-2.2
1971	2.0	0.3-0.4	2.3-2.4
1972	2.3	0.5-0.8	2.8-3.1
1973	2.5	0.6-1.0	3.1-3.5
1974	2.7	0.9-1.4	3.6-4.1
1975	2.8	1.3-1.6	4.1-4.4
1976	2.8	1.5-2.2	4.35-5.15
1977	2.8	2.0-2.8	4.85-5.25
1978	2.8	2.3-3.0	5.1-5.8
1979	2.8	2.8-3.5	5.6-6.3
1980	2.7	3.2-4.1	5.9-6.8

8. Trend toward employment of more advanced computer types

The available data on computer replacement in the UK allow to draw some conclusions on the tendency of firms or bodies which already employ a computer to replace it with a more advanced type

SIZE CLASS DISTRIBUTION OF COMPUTERS REPLACED IN 1968 AND 1969 IN THE UK

CLASS OF REPLACED COMPUTERS / CLASS OF NEW COMPUTERS	SMALL		MEDIUM		LARGE	
	Number	%	Number	%	Number	%
DESK	2	0.9	-	-	-	-
SMALL	154	66.9	6	15.4	-	-
MEDIUM	60	26.1	17	3.6	-	-
LARGE	14	6.1	14	35.9	2	33.3
EXTRA LARGE	-	-	2	5.1	4	66.7
TOTAL	230	100.0	39	100.0	6	100.0

(1) SOURCE: DATA PROCESSED FROM "COMPUTER SURVEY" NOV.-DEC. 1968 AND NOV.-DEC. 1969.

It can be concluded that the larger the size of the computer is to the stronger is the tendency to replace it.

In fact 32 extra-large size computers have been replaced as against 100 small ones, 41 against 100 medium ones and 67 against 100 large ones.

9. Evaluation of the European market for extra-large computers

Introduction of extra-large computers in the European countries took place only recently, and it is not possible therefore to detect a development trend.

We may anyway formulate some hypotheses on the growth possibility of this sector of the European market. In fact we can consider the development which has already taken place in the USA and certain hypotheses on the evolution of larger computer types.

The hypotheses are the following:

a. The average size of larger computers tends still to increase. The average annual rental fee of this class will increase at the same percentage rate hipothesized for all computers (see paragraph 6) as a whole, that is from the present $ 908.000 to $ 1.100.000 in 1975 to 1.307.000 in 1980.

b. Considering the introduction of high performance computers we thought it advisable to divide the extra-large class (1) into two parts: one of them concerning computers with rental fees between 0.8 and 1.2 million dollars and the other concerning extra large computers with an annual rental fee exceeding $ 1.2. million.

The number of computers belonging to these categories in the EEC and the UK in 1980 and the annual corresponding expenditure may be estimated on the basis of the following:

---

(1) Computers with annual rental fees exceding $ 840.000.

1st hypothesis : in 1980 the percentage of extra large computers expressed in number, will be equal to the present US one (2.2%). The annual expenditure can be deduced, considering the average leasing fee mentioned above.

2nd hypothesis : in 1980 the percentage rate of hardware expenditure for extra-large computers in the EEC and the UK will be equal to the present US one (16,2%). Thus the number of the computer installations can be determined.

Finally it can be estimated that the ratio between current extra large computers and those mentioned above will be equal in 1980 to the present one between US large and extra-large computers in June 1969.

Percentage distribution in number and value of US large and extra-large computers in June 1969

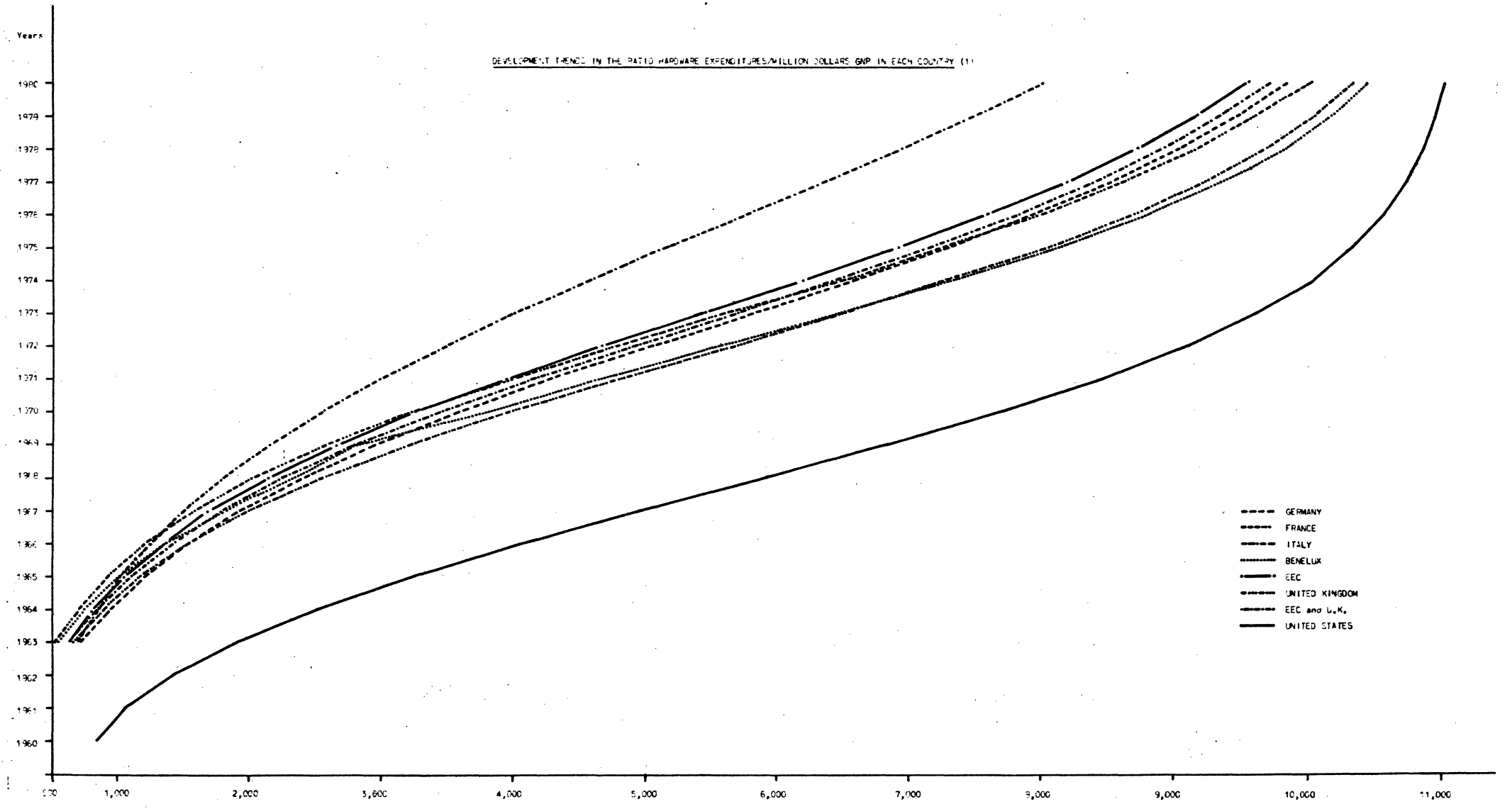
	Number %	Value %
Large	70.7	53.6
Extra large	29.3	46.4
Total	100.0	100.0

On the basis of these hypotheses and considering in 1975 intermediate values between the present ones and the ones evaluated for 1980, we can estimate that in the EEC and UK there will be operating 590/705 computers of the superior classes in 1975, 90/105 of which with an annual leasing fee higher than 2 million dollars.
In 1980 these will be 1050/1450, 310/425 of which with an annual leasing fee higher than 1.2 million dollars. The relative annual expenditure will be 635/880 million dollars.

EXTRA LARGE COMPUTER NUMBER AND RELATIVE EXPENDITURE IN THE EEC AND UK IN 1975 AND 1980

RENTAL FEE CLASSES (thousand dollars)	COMPUTER INSTALLATION NUMBER			ANNUAL EXPENDITURE (M. dollars)		
1st HYPOTHESIS						
from 0.8 to 1.2	121	600	1,025	110	595	1,015
above	-	105	425	-	180	880
TOTAL	121	705	1,450	110	775	1,895
2nd HYPOTHESIS						
from 0.8 to 1.2	121	500	740	110	500	735
above	-	90	310	-	150	635
TOTAL	121	590	1,050	110	650	1,370

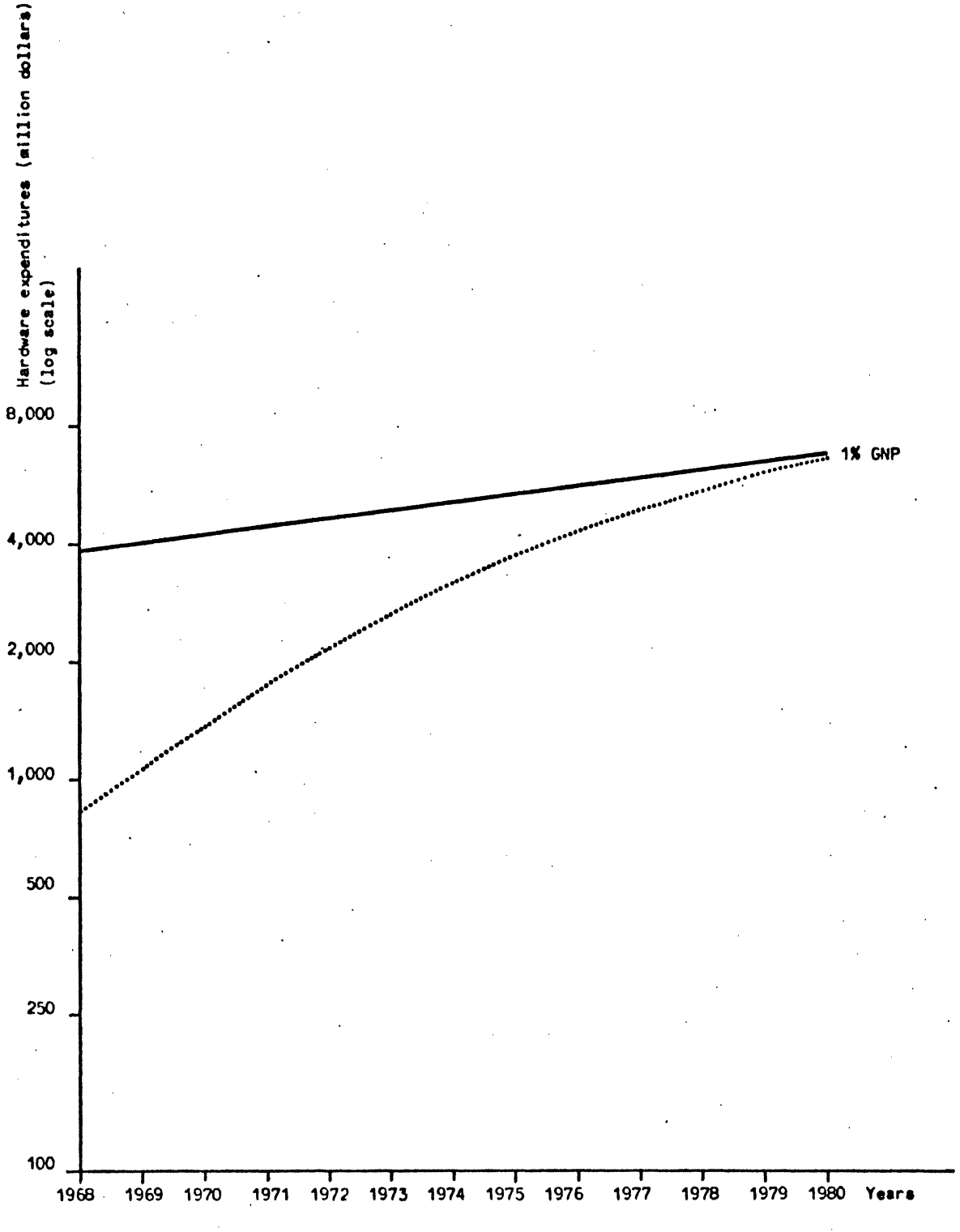
DEVELOPMENT TRENDS IN THE RATIO HARDWARE EXPENDITURES/MILLION DOLLARS GNP IN EACH COUNTRY (1)



(1) Desk types excluded.

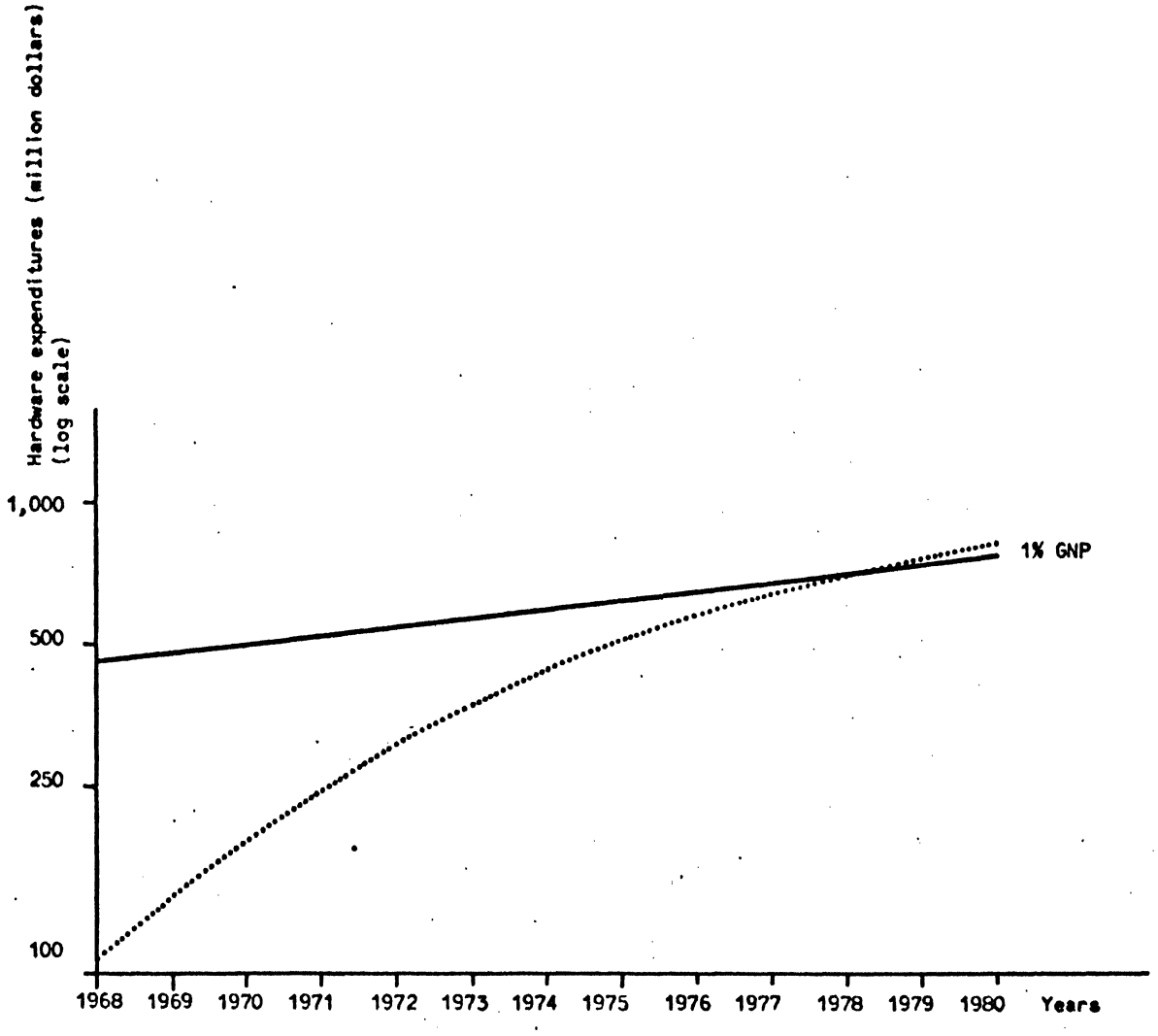
EEC

FIG. V.3 ANNUAL HARDWARE EXPENDITURES AS COMPARED TO SATURATION LEVEL (1968-1980)



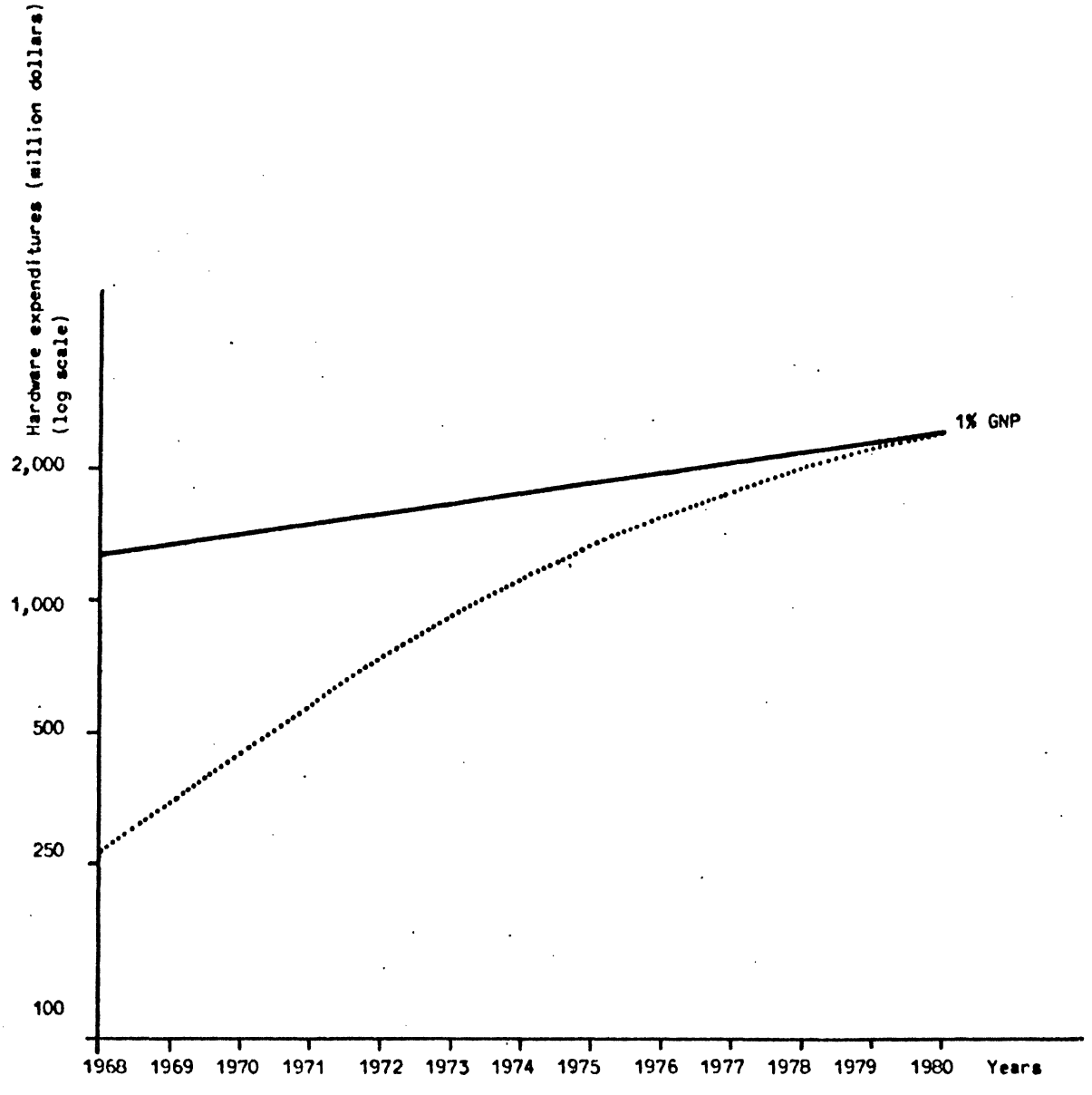
BENELUX

FIG. V.3.A ANNUAL HARDWARE EXPENDITURES AS COMPARED TO SATURATION LEVEL (1968-1980)



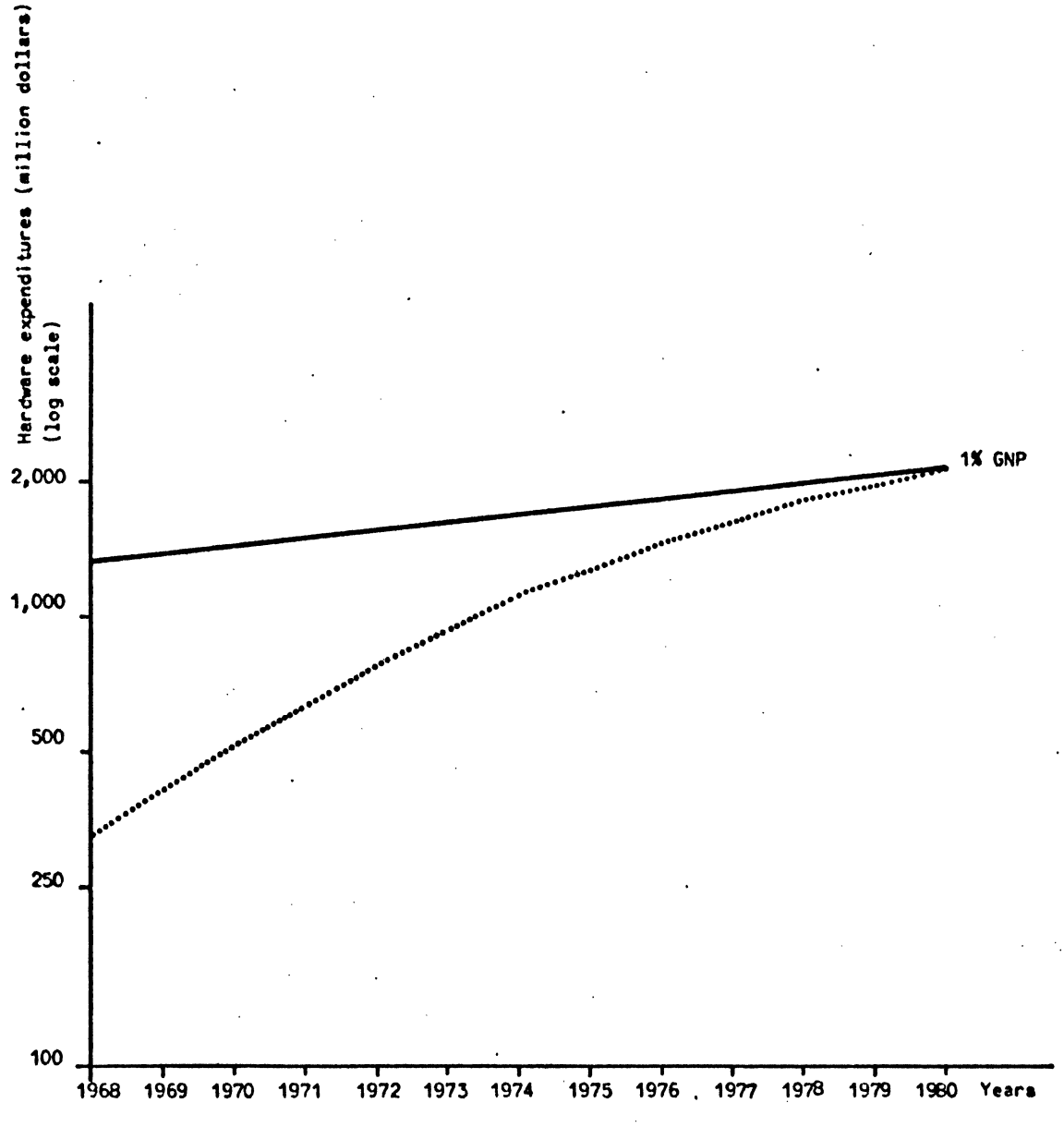
FRANCE

FIG. V.3.8 ANNUAL HARDWARE EXPENDITURES AS COMPARED TO SATURATION LEVEL (1968-1980)



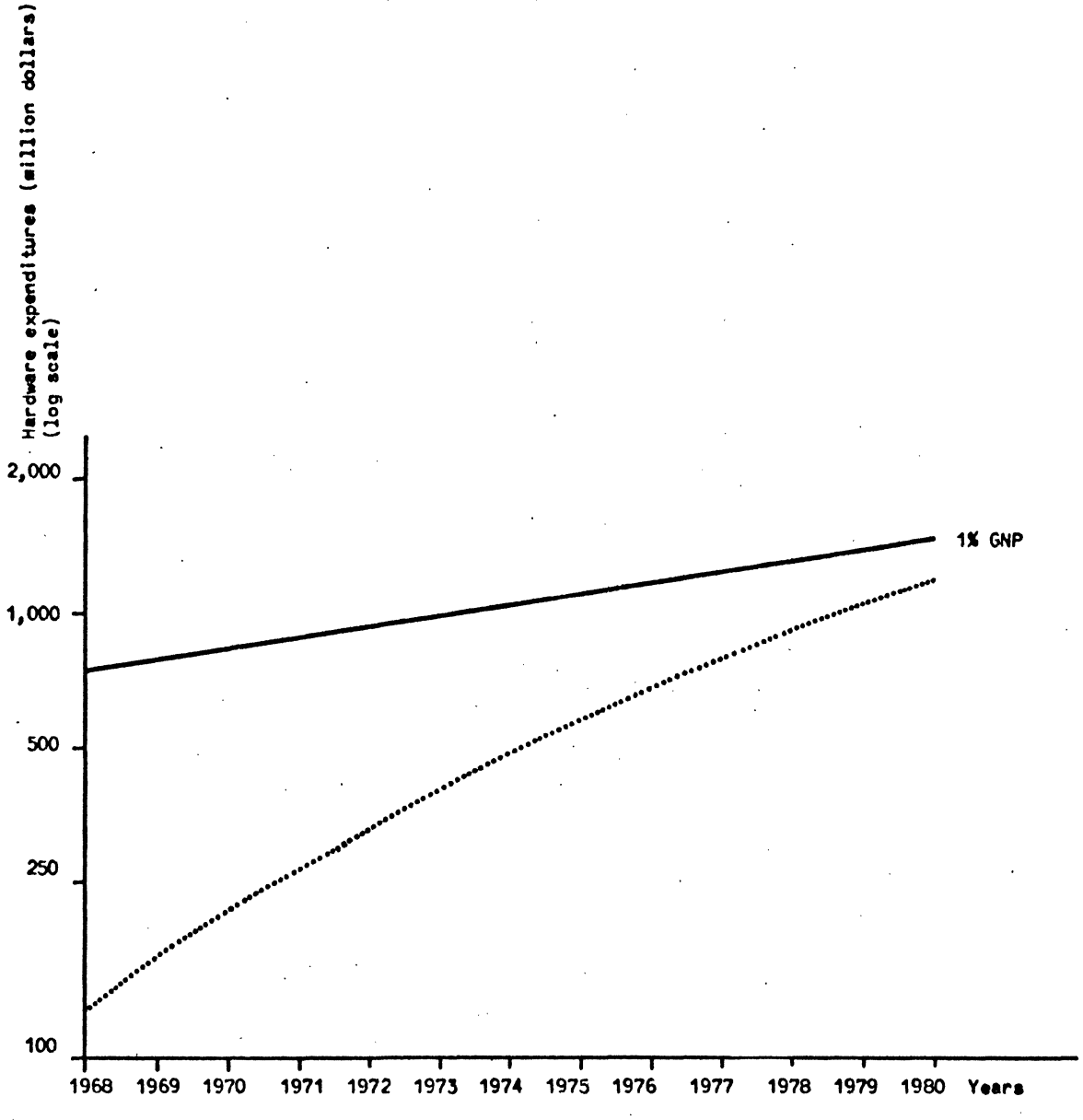
GERMANY

FIG. V.3.C ANNUAL HARDWARE EXPENDITURES AS COMPARED TO SATURATION LEVEL (1968-1980)



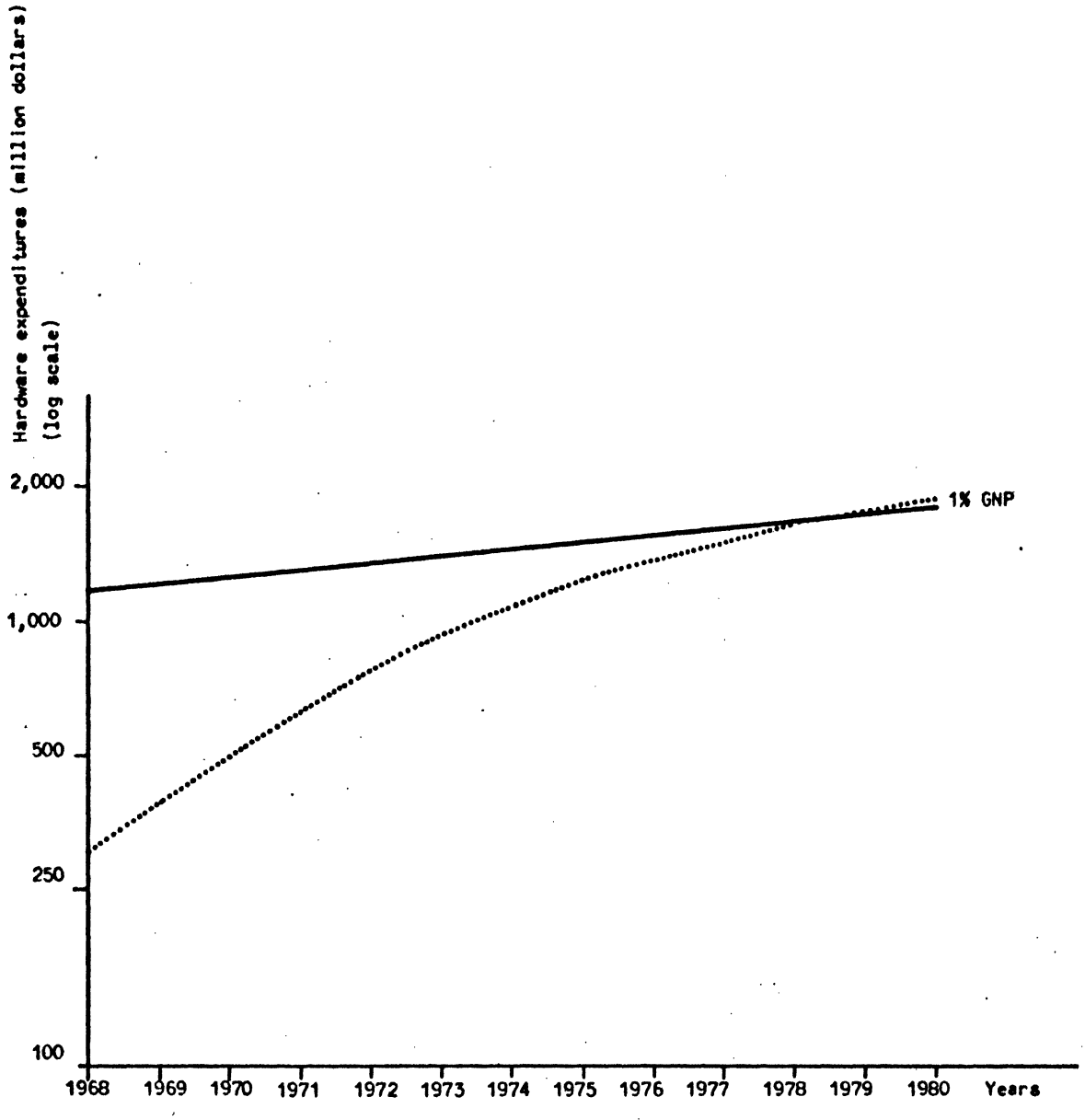
ITALY

FIG. V.3.D ANNUAL HARDWARE EXPENDITURES AS COMPARED TO SATURATION LEVEL (1968-1980)



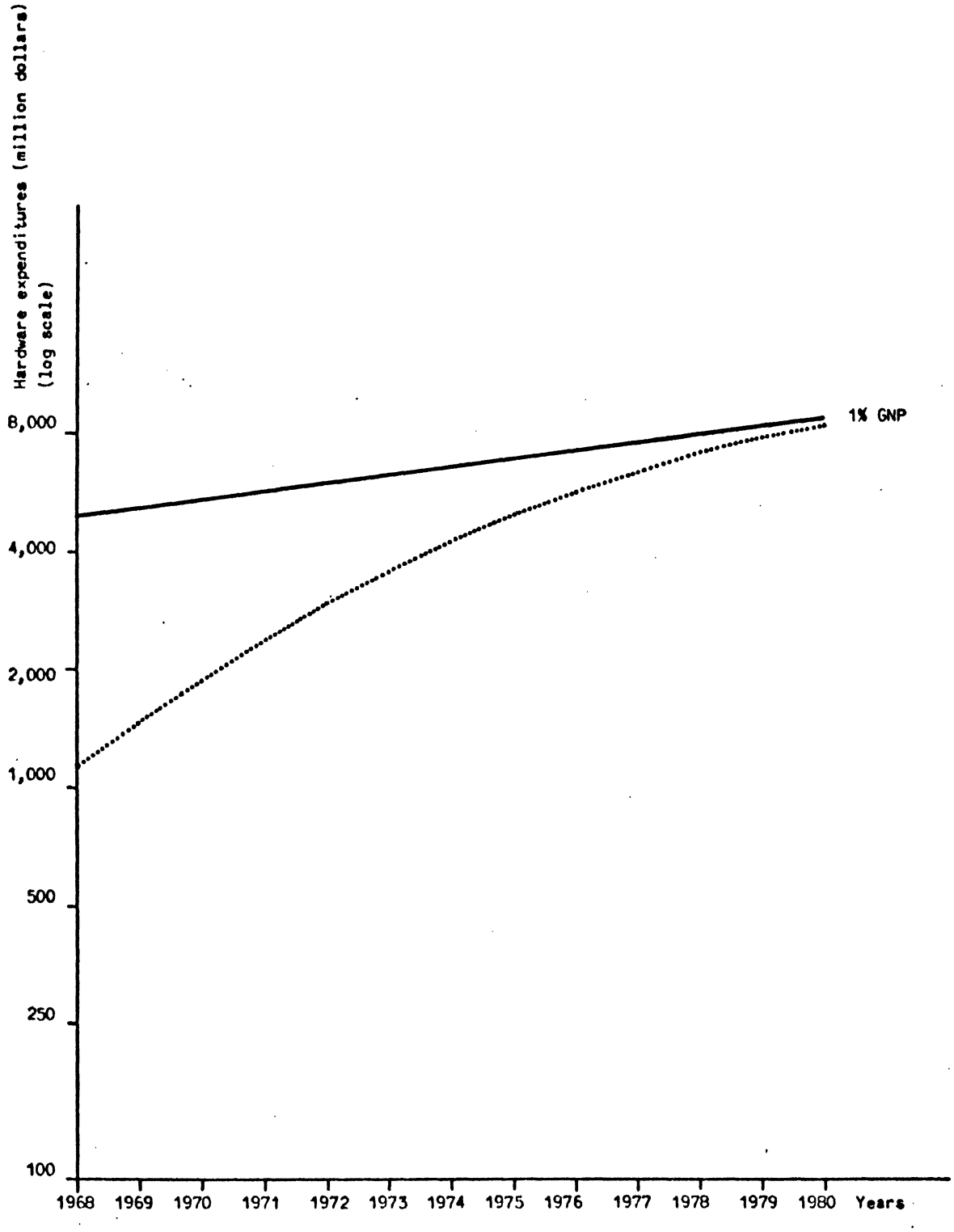
UNITED KINGDOM

FIG. V.4 ANNUAL HARDWARE EXPENDITURES AS COMPARED TO SATURATION LEVEL (1968-1980)



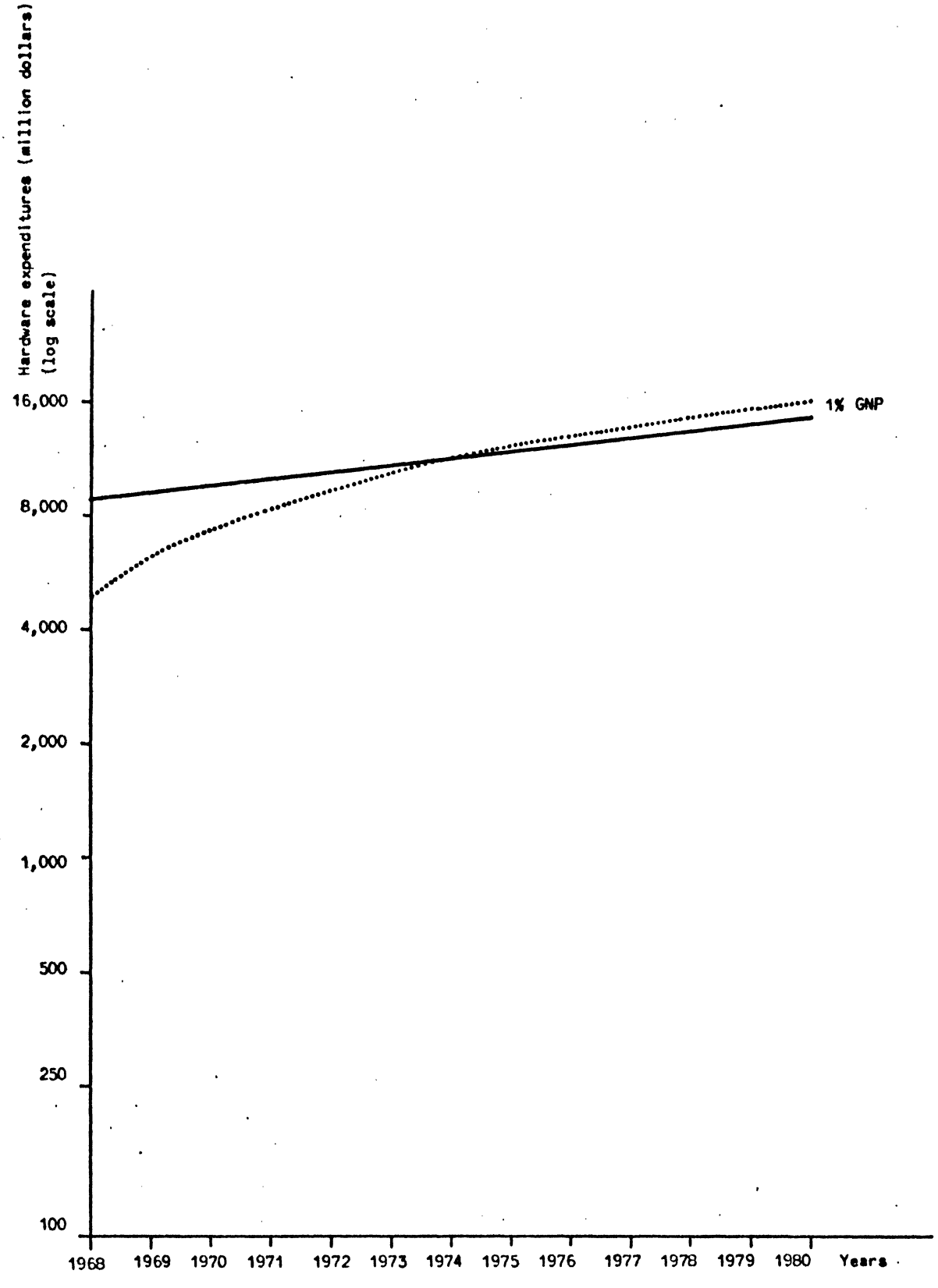
EEC + UK

FIG. V.5 ANNUAL HARDWARE EXPENDITURES AS COMPARED TO SATURATION LEVEL (1968-1980)



U.S.

FIG. V.6 ANNUAL HARDWARE EXPENDITURES AS COMPARED TO SATURATION LEVEL (1968-1980)



A N N E X E S

GUIDE FOR CLASSIFICATION OF COMPUTER SYSTEMS (1)

CLASS	MONTHLY RENTAL (dollars)	CAPACITY IN THOUSAND WORDS	PURCHASE PRICES (dollars)
DESK	up to 2.000	under 4	up to 60.000
SMALL	2.000-12.000	4-32	60.000-600.000
MEDIUM	12.000-25.000	32-256	600.000-1,2 million
LARGE	25.000-70.000	256-512	1,2 - 3,6 million
EXTRA LARGE	over 70.000	over 512	over 3,6 million

(1) SIZE CLASSIFICATION IS BASED ON THE PRICE OF A TYPICAL CONFIGURATION FOR EACH MODEL-MONTHLY RENTALS AND PURCHASE PRICES ARE QUOTED BY:

- KEYDATA CO.; COMPUTER CHARACTERISTICS, REVIEW, APRIL 1969
- COMPUTER AND AUTOMATION, WORLD COMPUTER CENSUS, JUNE 1969
- EDP EUROPA REPORT, COMPUTERS BUILT BY EUROPEAN COMPANIES, JULY 1969

TABLE IV.1.

EUROPEAN ECONOMIC COMMUNITY

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES

(1962-1969)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	78	138	252	617	1.037	1.883	2.689	2.933
SMALL	1.396	1.925	3.146	4.158	5.183	6.718	8.453	9.607
MEDIUM	95	134	224	294	414	613	852	971
LARGE	72	84	93	97	111	154	206	231
EXTRA LARGE			1	3	9	51	80	96
UNCLASSIFIED	6		1	11	14	26	25	33
TOTAL	1.647	2.281	3.717	5.180	6.768	9.445	12.305	13.871
TOTAL EXCLUDING DESK	1.569	2.143	3.465	4.563	5.731	7.562	9.616	10.938

SOURCE: SORIS, SEE TABLES: IV.13, IV.20, IV.23, IV.26

EUROPEAN ECONOMIC COMMUNITY

PERCENTAGE DISTRIBUTION OF THE NUMBER OF COMPUTERS INSTALLED BY SIZE CLASSES

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	4,7	6,0	6,8	11,9	15,3	19,9	21,9	21,1
SMALL	84,8	84,4	84,7	80,3	76,6	71,1	68,7	69,3
MEDIUM	5,8	5,9	6,0	5,6	6,1	6,5	6,9	7,0
LARGE	4,3	3,7	2,5	1,9	1,7	1,7	1,7	1,7
EXTRA LARGE				0,1	0,1	0,5	0,6	0,7
UNCLASSIFIED	0,4			0,2	0,2	0,3	0,2	0,2
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

TABLE IV.1 ter

EUROPEAN ECONOMIC COMMUNITY

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS

(number)

CLASS	1962	1963	1964	1965	1966	1967	1968	AVERAGE
DESK	-	+ 76,9	+ 82,6	+ 144,8	+ 68,1	+ 81,6	+ 42,8	+ 79,6
SMALL	-	+ 37,9	+ 63,4	+ 32,2	+ 24,7	+ 29,6	+ 25,8	+ 33,7
MEDIUM	-	+ 41,1	+ 67,2	+ 31,3	+ 40,8	+ 48,1	+ 39,0	+ 44,5
LARGE	-	+ 16,7	+ 10,7	+ 4,3	+ 14,4	+ 38,7	+ 33,8	+ 19,5
EXTRA LARGE	-	-	-	+ 200,0	+ 200,0	+ 466,7	+ 56,9	+ 188,9
TOTAL	-	+ 38,5	+ 63,0	+ 39,4	+ 30,7	+ 39,6	+ 30,3	+ 39,0
TOTAL EXCLUDING DESK	-	+ 36,6	+ 61,7	+ 31,7	+ 25,6	+ 31,9	+ 27,2	+ 34,2

TABLE IV.2

EUROPEAN ECONOMIC COMMUNITY AND UNITED KINGDOM

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES

(1962-1969)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	117	223	360	769	1.254	2.174	3.343	3.624
SMALL	1.814	2.643	4.181	5.316	6.711	8.698	10.749	11.907
MEDIUM	114	208	356	456	632	912	1.256	1.401
LARGE	81	95	112	127	160	225	301	331
EXTRA LARGE	2	4	8	12	32	83	121	138
UNCLASSIFIED	8		1	11	16	37	39	45
TOTAL	2.136	3.173	5.018	6.691	8.805	12.129	15.809	17.446
TOTAL EXCLUDING DESK	2.019	2.950	4.658	5.922	7.551	9.955	12.466	13.822

SOURCE: SORIS , SEE TABLES: IV.1, IV.29

TABLE IV.2 bis

EUROPEAN ECONOMIC COMMUNITY AND UNITED KINGDOM

PERCENTAGE DISTRIBUTION OF THE NUMBER OF COMPUTERS INSTALLED BY SIZE CLASSES

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	5,5	7,0	7,2	11,5	14,2	17,9	21,1	20,8
SMALL	84,9	83,3	83,3	79,5	76,2	71,7	68,0	68,2
MEDIUM	5,3	6,6	7,1	6,8	7,2	7,5	7,9	8,0
LARGE	3,8	3,0	2,2	1,9	1,8	1,9	1,9	1,9
EXTRA LARGE	0,1	0,1	0,1	0,1	0,4	0,7	0,8	0,8
UNCLASSIFIED	0,4		0,1	0,2	0,2	0,3	0,3	0,3
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

TABLE IV.2 ter

EUROPEAN ECONOMIC COMMUNITY AND UNITED KINGDOM

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS

(Number)

CLASS	1962	1963	1964	1965	1966	1967	1968	AVERAGE
DESK	-	+90,6	+61,4	+113,6	+63,1	+73,4	+53,8	+72,0
SMALL	-	+45,7	+58,2	+27,1	+26,2	+29,6	+23,6	+32,6
MEDIUM	-	+82,5	+71,2	+28,1	+38,6	+44,3	+37,7	+44,8
LARGE	-	+17,3	+17,9	+13,4	+26,0	+40,6	+33,8	+24,9
EXTRA LARGE	-	+100,0	+100,0	+50,0	+166,7	+159,4	+45,8	+97,7
TOTAL	-	+48,5	+58,1	+33,3	+31,6	+37,8	+30,3	+37,7
TOTAL EXCLUDING DESK	-	+46,1	+57,9	+27,1	+27,5	+31,8	+25,2	+33,5

TABLE IV.3

UNITED STATES

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES

(1959-1969)

CLASS	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	630	803	1.041	1.396	1.870	2.695	3.525	7.350	9.444	11.424	13.987
SMALL	2.424	3.019	5.223	8.170	11.897	16.496	21.377	28.020	35.510	35.036	36.078
MEDIUM	164	251	346	537	735	1.075	1.768	3.401	5.434	5.539	6.258
LARGE	385	451	687	884	1.038	1.101	1.148	1.183	1.565	1.918	2.445
EXTRA LARGE	-	1	4	89	150	183	207	355	634	911	1.011
TOTAL	3.603	4.525	7.301	11.076	15.690	21.550	28.025	40.309	52.587	54.828	59.779
TOTAL EXCLUDING DESK	2.973	3.722	6.260	9.680	13.820	18.855	24.500	32.959	43.143	43.404	45.792

SOURCE: SORIS, BY ADP NEWLETTER, USA COMPUTER CENSUS

TABLE IV. 3 bis

UNITED STATES

PERCENTAGE DISTRIBUTION OF THE NUMBER OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES

CLASS	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	17,5	17,74	14,3	12,6	11,9	12,5	12,6	18,3	18,0	20,8	23,4
SMALL	67,3	66,72	71,5	73,8	75,8	76,5	76,3	69,5	67,5	63,9	60,3
MEDIUM	- 4,5	5,54	4,7	4,8	4,7	5,0	6,3	8,4	10,3	10,1	10,5
LARGE	10,7	9,97	9,4	8,0	6,6	5,1	4,1	2,9	3,0	3,5	4,1
EXTRA LARGE		0,03	0,1	0,8	1,0	0,9	0,7	0,9	1,2	1,7	1,7
T O T A L	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

TABLE IV.3 ter

UNITED STATES

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS

(number)

CLASS	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	AVERAGE 1962-1969
DESK	-	+ 27,5	+ 29,6	+ 34,1	+ 34,0	+ 44,1	+ 30,8	+ 108,5	+ 28,5	+ 21,0	+ 44,7
SMALL	-	+ 24,5	+ 73,0	+ 56,4	+ 45,6	+ 38,7	+ 29,6	+ 31,1	+ 26,7	- 1,3	+ 25,9
MEDIUM	-	+ 53,0	+ 37,8	+ 55,2	+ 36,9	+ 46,3	+ 64,5	+ 92,4	+ 59,8	+ 1,9	+ 50,7
LARGE	-	+ 17,1	+ 52,3	+ 28,7	+ 17,4	+ 6,1	+ 4,3	+ 3,0	+ 32,3	+ 22,6	+ 14,8
EXTRA LARGE			+ 300,0	+ 2.125,0	+ 68,5	+ 22,0	+ 13,1	+ 71,5	+ 78,6	+ 43,7	+ 45,7
TOTAL		+ 25,6	+ 61,3	+ 51,7	+ 41,7	+ 37,3	+ 30,0	+ 43,8	+ 30,5	+ 4,3	+ 30,2
TOTAL EXCLUDING DESK		+ 25,2	+ 68,2	+ 54,6	+ 42,8	+ 36,4	+ 29,9	+ 34,5	+ 30,9	+ 0,6	+ 27,5

EUROPEAN ECONOMIC COMMUNITY

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES (1)

(1962-1969) (thousand dollars)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 June
DESK	1.320,0	2.504,4	4.425,6	11.780,4	20.350,9	36.479,4	49.726,3	53.898,6
SMALL	90.489,6	123.483,0	190.488,0	247.173,6	309.868,3	394.654,0	497.707,2	558.355,9
MEDIUM	16.377,6	22.692,0	39.067,8	52.602,6	80.568,3	125.224,8	169.034,3	197.575,7
LARGE	29.102,0	35.428,0	42.266,0	45.460,0	50.436,3	67.364,0	89.825,0	101.506,3
EXTRA LARGE			1.920,0	3.600,0	9.000,0	46.452,0	72.511,3	86.582,7
TOTAL	137.289,2	184.107,4	278.167,4	360.616,6	470.223,8	670.174,2	878.804,1	997.919,2
TOTAL EXCLUDING DESK	135.969,2	181.603,0	273.741,8	348.836,2	449.872,9	633.694,8	829.077,8	944.020,6

SOURCE: SCRIS

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV.4 bis

EUROPEAN ECONOMIC COMMUNITY

PERCENTAGE DISTRIBUTION OF THE VALUE OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES (1)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969
DESK	1,0	1,4	1,6	3,3	4,3	5,4	5,7	5,4
SMALL	65,9	67,1	68,5	68,5	65,9	58,9	56,6	55,9
MEDIUM	11,9	12,3	14,0	14,6	17,2	18,7	19,2	19,8
LARGE	21,2	19,2	15,2	12,6	10,7	10,1	10,2	10,2
EXTRA LARGE			0,7	1,0	1,9	6,9	8,3	8,7
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV.4 ter

EUROPEAN ECONOMIC COMMUNITY

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS (1)

(value)

CLASS	1962	1963	1964	1965	1966	1967	1968	AVERAGE
DESK	-	+ 89,7	+ 76,7	+ 166,2	+ 72,8	+ 79,3	+ 36,3	+ 81,7
SMALL	-	+ 36,5	+ 54,3	+ 29,8	+ 25,4	+ 27,4	+ 26,1	+ 31,7
MEDIUM	-	+ 38,6	+ 72,2	+ 34,6	+ 53,2	+ 55,4	+ 35,0	+ 47,8
LARGE	-	+ 21,7	+ 19,3	+ 7,6	+ 10,9	+ 33,6	+ 33,3	+ 20,2
EXTRA LARGE	-	-	-	+ 87,5	+ 150,0	+ 416,1	+ 56,1	+ 151,2
TOTAL	-	+ 34,1	+ 51,1	+ 29,6	+ 30,4	+ 42,5	+ 31,1	+ 35,8
TOTAL EXCLUDING DESK	-	+ 33,6	+ 50,7	+ 27,4	+ 29,0	+ 40,9	+ 30,8	+ 34,7

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV.5

EUROPEAN ECONOMIC COMMUNITY AND UNITED KINGDOM

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES (1)

(1962-1969) (thousand dollars)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 June
DESK	2.085,2	4.171,8	6.579,0	14.411,1	23.792,5	40.881,7	59.019,1	64.072,0
SMALL	115.579,2	165.730,2	253.403,4	318.197,4	410.126,1	496.862,2	646.225,8	706.296,9
MEDIUM	19.800,0	34.790,4	60.504,6	79.146,6	119.454,3	175.414,8	246.332,3	280.584,5
LARGE	33.656,0	41.446,0	52.740,8	61.343,2	72.445,5	94.467,2	129.005,0	142.138,3
EXTRA LARGE	3.030,0	5.016,0	10.032,0	13.392,0	31.638,0	76.110,0	110.359,3	125.270,7
TOTAL	174.150,4	251.154,4	383.259,8	486.490,3	657.456,4	883.735,9	1.190.941,5	1.318.362,4
TOTAL EXCLUDING DESK	172.065,2	246.982,6	376.680,8	472.079,2	633.663,9	842.854,2	1.131.922,4	1.254.290,4

SOURCE: SORIS.

(1) Installations are evaluated on the basis of the annual rental.

EUROPEAN ECONOMIC COMMUNITY AND UNITED KINGDOM

PERCENTAGE DISTRIBUTION OF THE VALUE OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES (1)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	1,2	1,7	1,7	3,0	3,6	4,6	4,9	4,8
SMALL	66,4	66,0	66,1	65,4	62,4	56,2	54,3	53,6
MEDIUM	11,4	13,8	15,8	16,3	18,2	19,9	20,7	21,3
LARGE	19,3	16,5	13,8	12,6	11,0	10,7	10,8	10,8
EXTRA LARGE	1,7	2,0	2,6	2,7	4,8	8,6	9,3	9,5
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV.5 ter

EUROPEAN ECONOMIC COMMUNITY AND UNITED KINGDOM

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS (1)

(value)

CLASS	1962	1963	1964	1965	1966	1967	1968	AVERAGE
DESK	-	+100,1	+57,7	+119,0	+65,1	+71,8	+44,4	+71,5
SMALL	-	+43,4	+52,9	+25,6	+28,9	+21,1	+30,1	+31,1
MEDIUM	-	+75,7	+73,9	+30,8	+50,9	+46,8	+40,4	+48,9
LARGE	-	+23,1	+27,3	+16,3	+18,1	+30,4	+36,6	+24,5
EXTRA LARGE	-	65,5	+100,0	+33,5	+136,2	+140,6	+45,0	+82,9
TOTAL	-	+44,2	+52,6	+26,9	+35,1	+34,4	+34,8	+36,1
TOTAL EXCLUDING DESK	-	+43,5	+52,5	+25,3	+34,2	+33,0	+34,3	+35,2

(1) INSTALLATIONS ARE EVALUATED ON THE BASIS OF THE ANNUAL RENTAL.

TABLE IV.6

UNITED STATES

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEAR, BY SIZE CLASSES (1)

(1959-1969) (thousand dollars)

CLASS	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 June
DESK	10.836,0	13.790,4	17.280,0	22.690,8	28.197,6	39.300,0	47.794,8	92.847,6	120.129,0	159.795,6	182.071,2
SMALL	131.709,6	165.933,6	308.740,8	510.682,8	615.762,0	970.310,2	1.218.386,4	1.691.915,9	2.178.811,2	2.184.119,7	2.239.541,7
MEDIUM	29.406,0	44.538,0	64.257,6	94.663,2	132.875,4	194.299,2	313.574,4	661.326,0	1.115.341,2	1.165.479,0	1.326.954,0
LARGE	167.184,0	210.360,0	321.690,0	437.220,0	495.324,0	533.424,0	557.310,0	558.588,0	665.664,0	818.772,0	1.028.320,(
EXTRA LARGE		1.620,0	7.080,0	78.480,0	130.800,0	159.960,0	183.720,0	313.020,0	552.912,0	797.640,0	890.310,0
TOTAL	339.135,6	436.242,0	719.048,4	1.143.736,8	1.402.959,0	1.897.293,4	2.320.785,6	3.317.697,5	4.632.857,4	5.125.797,3	5.667.196,9
TOTAL EXCLUDING DESK	328.299,6	422.451,6	701.768,4	1.121.046,0	1.374.761,4	1.857.993,4	2.272.990,8	3.224.849,9	4.512.728,4	4.966.001,7	5.485.125,7

SOURCE: SORIS

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV.6 bis

UNITED STATES

PERCENTAGE DISTRIBUTION OF THE VALUE OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES (1)

CLASS	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	3,2	3,2	2,4	2,0	2,0	2,1	2,1	2,8	2,6	3,1	3,2
SMALL	38,8	38,0	42,9	44,6	43,9	51,1	52,5	51,0	47,0	42,6	39,5
MEDIUM	8,7	10,2	8,9	8,3	9,5	10,3	13,5	19,9	24,1	22,7	23,4
LARGE	49,3	48,2	44,8	38,2	35,3	28,1	24,0	16,8	14,4	16,0	18,1
EXTRA LARGE		0,4	1,0	6,9	9,3	8,4	7,9	9,5	11,9	15,6	15,7
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV.6 ter

UNITED STATES

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS (1)

(value)

CLASS	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	AVERAGE 1962-1969
DESK	-	+ 27,3	+ 25,3	+ 31,3	+ 24,3	+ 39,4	+ 21,6	+ 94,1	+ 29,5	+ 33,0	+ 40,3
SMALL	-	+ 26,0	+ 86,1	+ 65,4	+ 20,6	+ 57,6	+ 25,6	+ 39,4	+ 28,3	+ 0,2	+ 27,6
MEDIUM	-	+ 51,5	+ 44,3	+ 47,3	+ 40,4	+ 46,2	+ 61,4	+ 133,4	+ 52,4	+ 4,5	+ 55,4
LARGE	-	+ 25,8	+ 52,9	+ 35,9	+ 13,3	+ 7,7	+ 4,5	+ 0,2	+ 19,2	+ 23,0	+ 11,8
EXTRA LARGE	-	-	+ 337,0	+ 1.008,5	+ 66,7	+ 22,3	+ 14,9	+ 70,4	+ 76,6	+ 44,3	+ 45,7
TOTAL	-	+ 28,6	+ 64,8	+ 59,1	+ 22,7	+ 35,2	+ 22,3	+ 43,0	+ 39,6	+ 10,6	+ 29,4
TOTAL EXCLUDING DESK	-	+ 28,7	+ 66,1	+ 59,7	+ 22,6	+ 35,2	+ 22,3	+ 41,9	+ 39,9	+ 10,0	+ 29,1

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV.7

COMPUTERS PER MILLION OF THE WORKING POPULATION EXCLUDING AGRICULTURE (1962-1968)

(number)

	1962	1963	1964	1965	1966	1967	1968
BENELUX	25	38	58	81	115	173	234
BELGIUM				85	119	168	220
NETHERLANDS				78	112	176	245
FRANCE	26	38	63	97	120	186	(250)
GERMANY	34	43	69	95	122	167	214
ITALY	22	30	47	56	(76)	88	(104)
EUROPEAN ECONOMIC COMMUNITY	28	38	61	85	110	155	200
UNITED KINGDOM	20	36	51	59	79	105	138
UNITED STATES	179	249	333	420	585	746	757

() ESTIMATED BY SORIS

TABLE IV.8

ANNUAL RENTAL VALUE OF COMPUTERS INSTALLED PER WORKER NOT AGRICULTURAL (1962-1968)

(dollars)

	1962	1963	1964	1965	1966	1967	1968
BENELUX	1,890	2,742	4,072	5,398	7,890	11,092	15,206
BELGIUM				5,204	8,086	11,566	16,069
NETHERLANDS				5,580	7,761	10,725	14,166
FRANCE	2,572	3,280	5,087	6,932	8,764	13,494	(18,075)
GERMANY	2,605	3,281	4,824	6,312	7,886	11,363	14,687
ITALY	1,861	2,691	3,848	4,328	(5,883)	7,397	(8,846)
EUROPEAN ECONOMIC COMMUNITY	2,334	3,077	4,571	5,906	7,659	10,966	14,261
UNITED KINGDOM	1,475	2,670	4,160	4,937	7,299	8,375	12,301
UNITED STATES	18,520	22,243	29,287	34,780	48,141	65,688	70,810

() ESTIMATED BY SORIS

TABLE IV.9

HARDWARE EXPENDITURE PER ONE THOUSAND DOLLAR GNP

	1962	1963	1964	1965	1966	1967	1968
BENELUX	0,39	0,55	0,78	1,00	1,46	1,93	2,45
BELGIUM				0,95	1,45	2,00	2,31
NETHERLANDS				1,06	1,47	1,88	2,58
FRANCE	0,40	0,50	0,75	0,99	1,21	1,79	(2,31)
GERMANY	0,58	0,71	0,99	1,24	1,51	2,12	2,57
ITALY	0,47	0,66	0,93	0,99	(1,27)	1,54	(1,72)
EUROPEAN ECONOMIC COMMUNITY	0,48	0,61	0,87	1,08	1,36	1,88	2,30
UNITED KINGDOM	0,37	0,65	0,97	1,13	1,65	1,85	3,03
UNITED STATES	1,73	2,04	2,62	3,02	4,06	5,54	5,83

() ESTIMATED BY SORIS

BENELUX

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962 - 1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968	1969
BULL GE	GAMMA ET	12	10	14	14	10	1	2	
	GAMMA 300	10	7	14	13	10	4	3	3
	GAMMA 60	2	1	1	2	2	2	2	2
	GAMMA 30		13	20	22	20	21	21	21
	GAMMA 10			4	57	110	174	186	183
	CAB 500		4	5	5	4	6	6	5
	SERIES 400			2	6	13	17	27	34
	GE 55					1	35	76	146
	GE 115					5	24	54	85
	GE 265						1	2	3
	TOTAL	24	35	60	119	175	285	379	482
BURROUGHS	B 200/300/500			2	7	11	14	17	20
	B 2500/3500							4	7
	B 5500/6500								1
	TOTAL			2	7	11	14	21	28
CDC	160/A			1	1	1	1	1	1
	3600			1	2	2	2	2	2
	3200			1	2	4	5	5	5
	3300						4	4	5
	3100						1	1	1
	8090				1	1	1	1	1
	8092				1	1	1	1	1
	1700					3	5	9	12
	TOTAL			3	7	12	20	24	28
CII	330				1	1			
	510			1	7	13	17	17	21
	PALLAS (SETI)				1	2	2	2	2
	10010						1	1	5
	10020						2	2	3
	9010						4	6	6
	9040							1	1
	9080								1
	TOTAL			1	9	16	26	29	39
DIGITAL EQUIPMENT	PDP 5				1	1	1	1	1
CORPORATION	PDP 7				1	3	3	3	3
	PDP 8/8S/I				3	9	21	28	53

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS.

BENELUX

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968	1969
follows:									
DIGITAL EQUIPMENT	PDP 9							4	10
CORPORATION	PDP 10							1	2
	TOTAL				5	13	25	37	69
HONEYWELL	H 200			1	6	6	9	8	8
	H 620/610				1	1	1	1	1
	H 1200/1250					2	4	4	6
	H 120/125					3	4	7	14
	DDP 116						4	4	4
	DDP 516						1	3	3
	TOTAL			1	7	12	23	27	36
IBM	305	5	4	5	3				
	650	20	6	7	5	3	1	4	3
	704/705	2	2	2	1	1	1	1	1
	1401	70	120	176	185	196	142	140	83
	1410	3	11	17	19	18	18	9	8
	1440			13	45	53	44	47	39
	1460			2	4	4	4		
	1620	3	21	25	28	28	23	21	13
	1800					1	11	17	24
	1130					11	48	99	123
	7040/44			2	3	4	4	4	3
	7070/72/74	1	3	2	1	1	1	1	1
	7090/94				1	2	2	1	
	360/20/25					43	190	324	438
	360/30				8	47	91	121	133
	360/40					20	43	74	72
	360/50					1	9	19	26
	360/60/65/67							1	4
	360/75							1	2
	TOTAL	104	167	251	303	433	632	884	973

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS..

FOLLOW TABLE IV.10

BENELUX

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962 - 1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968	1969
ICL	MARK 1	1							
	MERCURY	1	1	1	1	1			
	1300/1/2		1	1	1	1	1		
	1900 series					1	4	11	14
	ELLIOTT ARCH 502/503	1	1	2	3	3	3	3	3
	ELLIOTT ARCH 802/803	4	6	11	11	11	11	10	10
	ELLIOTT ARCH 1000			1	1	3	3	3	3
	900 SERIES						3	3	3
	ARGUS 100						1	1	1
	ARGUS 500								1
	TOTAL	7	9	16	17	20	26	31	35
ITT	STANTEC ZEBRA	15	11	11	11	5	1		
	ER 56	1	1	1					
	TOTAL	16	12	12	11	5	1		
MONROE	MONROBOT XI		2	2	3	3	2	2	
	TOTAL		2	2	3	3	2	2	
NCR	315/RMC			3	8	11	14	19	19
	SERIES 100							1	9
	SERIES 200								3
	TOTAL			3	8	11	14	20	31
PHILIPS	X-1	14	11	15	18	16	12	14	14
	X-2/4					7	4	3	3
	X-8				2	8	13	16	16
	PR 8000				2	8	12	13	13
	PR 9200						13	41	60
	PASCAL III			1	1				
	P 1000								8
	DS714								8
	TOTAL	14	11	16	23	39	54	88	122
SCIENTIFIC DATA	SDS 930					1	1	1	2
	SDS 92						1	1	1
	SDS SIGMA 7						1	1	1
	TOTAL					1	3	3	4

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS.

FOLLOW TABLE 1..10

BENELUX

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962 - 1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968	1969
SIEMENS-ZUSE	Z 25				3	4	5	2	1
	Z 23				1	1	1		
	302						1	3	5
	303					1	1	3	7
	304						1	3	3
	305						1	3	2
	4004/15					1	4	5	5
	4004/35							2	2
	4004/45					1	4	6	11
	DIGISET								1
	TOTAL				4	8	18	27	37
TELEFUNKEN	TR 4	1	1	2	2	2	2	2	2
	TR 10				1	1	1	1	1
	TOTAL	1	1	2	3	3	3	3	3
UNIVAC	SS 80/90	9	12	12	13	12	12	11	11
	UNIVAC III		1	1	2	2	2	2	2
	418/422			1	3	6	4	4	4
	1004/5		20	36	46	67	92	82	63
	1040/50			2	4	6	11	11	9
	9200/9300						3	50	74
	1108								1
	9400								1
	TOTAL	9	33	52	68	93	124	160	165
OTHER MANUFACTU-	MINSK				1	1	2	2	2
RERS	LINASEC				4	4	5	5	7
	RAYTHEON PB 250			1	1	1			
	VARIAN								9
TOTAL		175	270	422	600	861	1.277	1.741	2.070

SOURCE : ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS.

TABLE IV.11

BELGIUM

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL
(1965-1969)

MANUFACTURER	NAME OF COMPUTER	1965	1966	1967	1968	1969
BULL GE	GAMMA ET	9	7	-	1	
	GAMMA 10	27	51	69	72	62
	GAMMA 30	11	10	11	11	11
	GAMMA 60	2	2	2	2	2
	GE 55		1	22	43	93
	GE 115		4	16	30	47
	GE 265				1	1
	SERIES 300	9	8	2	1	1
	GE 415	4	6	7	9	12
	GE 425	2	3	4	7	9
	CAB 500	4	3	5	5	5
	TOTAL	68	95	138	182	243
BURROUGHS	B 200/300/500	3	5	7	7	8
	B 2500/3500				2	4
	B 5500/6500					1
	TOTAL	3	5	7	9	13
CDC	3200	1	1	2	2	1
	1700					1
	TOTAL	1	1	2	2	2
CII	510	6	12	16	16	20
	90-10			3	5	5
	330	1	1			
	90-40				1	1
	10010			1	1	5
	10020			2	2	3
	TOTAL	7	13	22	25	34
DIGITAL EQUIPMENT	PDP 8/ I/S			1	3	8
CORPORATION	PDP 10				1	2
	PDP 9					1
	TOTAL			1	4	11
HONEYWELL	120/125		2	3	1	2
	200	3	1	4	4	4
	1250					2
	TOTAL	3	3	7	5	8

SOURCE: RAAD GEVENDEN BUREAU BERENSCHOT-DIEBOLD N.V. REVISED BY SOBEMAP.

FOLLOW TABLE IV. 11

BELGIUM

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL
(1965-1969)

MANUFACTURER	NAME OF COMPUTER	1965	1966	1967	1968	1969
IBM	360/20/25		23	80	126	183
	360/30	5	24	46	63	68
	360/40		12	25	34	36
	360/50			2	6	10
	650	2		1	1	
	1130		8	28	58	76
	1401	91	98	72	73	40
	1410	6	5	5	2	2
	1440/60	39	47	40	39	31
	1620	21	21	18	14	11
	1800		1	8	14	20
	7040	3	4	4	4	3
	7070	1	1	1	1	1
	305	2				
	TOTAL	170	244	330	435	481
ICL	1900 SERIES				4	5
	FERRANTI MERCURY	1	1			
	802	2	2	2	2	2
	803	3	3	3	3	3
	FERRANTI ARGUS 100			1	1	1
	TOTAL	6	6	6	10	11
NCR	315	2	4	4	5	5
	CENTURY 100				1	3
	CENTURY 200					3
	TOTAL	2	4	4	6	11
PHILIPS ELECTRO-LOGICA	X2/4		1	1	1	1
	X8			1	1	1
	PR8000	2	2	4	4	4
	PR9200				1	1
	P1000					1
	TOTAL	2	3	6	7	8
UNIVAC	USS 80/90	3	3	3	2	2
	418		1	2	2	2
	1004	15	11	20	14	9
	1005		9	8	11	16

SOURCE: RAAD GEVENDEN BUREAU BERENSCHOT-DIEBOLD N.V. REVISED BY SOBEMAP.

BELGIUM

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL
(1965-1969)

MANUFACTURER	NAME OF COMPUTER	1965	1966	1967	1968	1969
follows:						
UNIVAC	1050	2	2	3	3	3
	9200			1	7	10
	9300				8	10
	9400					1
	TOTAL	20	26	37	47	53
SIEMENS-ZUSE	Z23	1	1	1	-	
	Z25	3	3	3		
	302/303/305			3	8	9
	4004/15			3	4	4
	4004/45			1	2	5
	4004/35				1	1
	DIGISET					1
	TOTAL	4	4	11	15	20
OTHER MANUFACTURERS	ZEBRA	1	1			
	LINASEC			1	1	3
	SETI PALLAS		1			
	VARIAN					5
TOTAL		287	406	572	748	903

SOURCE: RAAD GEVENDEN BUREAU BERENSCHOT-DIEBOLD N.V. REVISED BY SOBEMAP.

TABLE IV. 12

NETHERLANDS

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1965-1969)

MANUFACTURER	NAME OF COMPUTER	1965	1966	1967	1968	1969
BULL GE	GAMMA ET	5	3	1	1	
	GAMMA 10	30	59	105	114	121
	GAMMA 30	11	10	10	10	10
	GE 55			13	33	53
	GE 115		1	8	24	38
	GE 265			1	1	2
	SERIES 300	4	2	2	2	2
	GE 415		2	4	6	6
	GE 425		2	2	5	7
	CAB 500	1	1	1	1	
	TOTAL	51	80	147	197	239
BURROUGHS	B 200/300/500	4	6	7	10	12
	B 2500/3500				2	3
	TOTAL	4	6	7	12	15
CDC	160-A	1	1	1	1	1
	1700		3	5	9	11
	3150			1	1	1
	3200	1	3	3	3	4
	3300			4	4	5
	3600	2	2	2	2	2
	8090	1	1	1	1	1
	8092	1	1	1	1	1
	TOTAL	6	11	18	22	26
CII	510	1	1	1	1	1
	90-10			1	1	1
	90-80					1
	TOTAL	1	1	2	2	3
DIGITAL EQUIPMENT	PDP 5	1	1	1	1	1
CORPORATION	PDP 7	1	3	3	3	3
	PDP 8/I/S	3	9	20	25	45
	PDP 9				4	9
	TOTAL	5	13	24	33	58

SOURCE: RAAD GEVENDEN BUREAU BERENSCHOT-DIEBOLD N.V. REVISED BY SOBEMAP.

FOLLOW TABLE IV. 12

NETHERLANDS

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL
(1965-1969)

MANUFACTURER	NAME OF COMPUTER	1965	1966	1967	1968	1969
HONEYWELL	DDP 516			1	3	3
	120/125		1	1	6	12
	200	3	5	5	4	4
	1200/1250		2	4	4	4
	610/620	1	1	1	1	1
	DDP 116			4	4	4
	TOTAL	4	9	16	22	28
IBM	360/20/25		20	110	198	255
	360/30	3	23	45	58	65
	360/40		8	18	40	36
	360/50		1	7	13	16
	360/65				1	4
	360/75				1	2
	650	3	3		3	3
	705	1	1	1	1	1
	1130		3	20	41	47
	1401	94	98	70	67	43
	1410	13	13	13	7	6
	1440/60	10	10	8	8	8
	1620	7	7	5	7	2
	1800			3	3	4
	7090	1	2	2	1	
	305	1				
	TOTAL	133	189	302	449	492
ICL	1900 SERIES		1	4	7	9
	1301	1	1	1		
	ARCH	1	3	3	3	3
	900 SERIES			3	3	3
	503	3	3	3	3	3
	803	6	6	6	5	5
	ARGUS 500					1
	TOTAL	11	14	20	21	24

SOURCE: RAAD GEVENDEN BUREAU BERENSCHOT-DIEBOLD N.V. REVISED BY SOBEMAP.

NETHERLANDS

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL
(1965-1969)

MANUFACTURER	NAME OF COMPUTER	1965	1966	1967	1968	1969
NCR	315	6	7	10	14	14
	CENTURY 100					6
	TOTAL	6	7	10	14	20
PHILIPS ELECTRO-LOGICA	X1	18	16	12	14	14
	X2		6	3	2	2
	X4					
	X8	2	8	12	15	15
	PR8000		6	8	9	9
	PR9200			13	40	59
	PASCAL III/P 1000	1				7
	DS 714					8
	TOTAL	21	36	48	80	114
TELEFUNKEN	TR 4	2	2	2	2	2
	TR 10	1	1	1	1	1
	TOTAL	3	3	3	3	3
UNIVAC	U III	2	2	2	2	2
	USS 80/90	10	9	9	9	9
	418	1	2	2	2	2
	1004	31	33	52	39	20
	1005		14	12	18	18
	1040		2	4	4	3
	1050	2	2	4	4	3
	9200			2	23	31
	9300				12	23
	422	2	3			
	1108					1
	TOTAL	48	67	87	113	112

SOURCE: RAAD GEVENDEN BUREAU BERENSCHOT-DIEBOLD N.V. REVISED BY SOBEMAP.

NETHERLANDS

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL
(1965-1969)

MANUFACTURER	NAME OF COMPUTER	1965	1966	1967	1968	1969
SIEMENS-ZUSE	Z25		1	2	2	1
	302/303/305		1	1	4	8
	4004/15		1	1	1	1
	4004/45		1	3	4	6
	4004/35				1	1
	TOTAL		4	7	12	17
OTHER MANUFACTU-RERS	ZEBRA	10	4	1		
	MINSK	1	1	2	2	2
	LINASEC	4	4	4	4	4
	PB 250	1	1			
	SETI PALLAS	1	1	2	2	2
	VARIAN					4
	MONROE:					
	MONROBOT XI	3	3	2	2	
	SDS:					
	930		1	1	1	2
	92			1	1	1
	SIGMA 7			1	1	1
TOTAL		313	455	705	993	1.167

SOURCE: RAAD GEVENDEN BUREAU BERENSCHOT-DIEBOLD N.V, REVISED BY SOBEMAP.

TABLE IV. 13

BENELUX

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES

(1962-1969)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	15	17	25	85	160	323	444	495
SMALL	151	234	365	461	611	811	1.100	1.250
MEDIUM	4	13	26	40	76	118	159	174
LARGE	5	6	6	7	9	17	26	29
EXTRA LARGE							2	6
UNCLASSIFIED				7	5	8	10	10
TOTAL	175	270	422	600	861	1.277	1.741	1.964
TOTAL EXCLUDING DESK	160	253	397	515	701	954	1.297	1.469

SOURCE: SORIS, SEE TABLE IV. 10

TABLE IV. 13 bis

BENELUX

PERCENTAGE DISTRIBUTION OF THE NUMBER OF COMPUTERS INSTALLED BY SIZE CLASSES

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	8,6	6,3	5,9	14,1	18,6	25,3	25,5	25,2
SMALL	86,3	86,7	86,5	76,8	71,0	63,5	63,2	63,6
MEDIUM	2,3	4,8	6,2	6,7	8,8	9,3	9,1	8,9
LARGE	2,8	2,2	1,4	1,2	1,0	1,3	1,5	1,5
EXTRA LARGE							0,1	0,3
UNCLASSIFIED				1,2	0,6	0,6	0,6	0,5
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

TABLE IV. 13 ter

BENELUX

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS

(number)

CLASS	1962	1963	1964	1965	1966	1967	1968	AVERAGE
DESK	-	+ 13,3	+ 147,1	+ 240,0	+ 88,2	+ 101,9	+ 37,5	+ 85,7
SMALL	-	+ 55,0	+ 56,0	+ 26,3	+ 32,5	+ 32,7	+ 35,6	+ 37,1
MEDIUM	-	+ 225,0	+ 100,0	+ 53,8	+ 90,0	+ 55,3	+ 34,7	+ 73,5
LARGE	-	+ 20,0	-	+ 16,7	+ 28,6	+ 88,9	+ 52,9	+ 32,9
EXTRA LARGE	-	-	-	-	-	-	-	-
TOTAL	-	+ 54,3	+ 56,3	+ 42,2	+ 43,5	+ 48,3	+ 36,3	+ 45,5
TOTAL EXCLUDING DESK	-	+ 58,1	+ 56,9	+ 29,7	+ 36,1	+ 36,0	+ 36,0	+ 39,5

TABLE IV. 14

BELGIUM

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES

(1965-1969)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK				34	67	136	198	262
SMALL				236	307	384	480	555
MEDIUM				14	30	46	60	64
LARGE				3	3	6	9	13
EXTRA LARGE								-
UNCLASSIFIED				1		2	3	9
TOTAL				288	407	574	750	903
TOTAL EXCLUDING DESK				254	340	438	552	641

SOURCE: SORIS, SEE TABLE IV. 11.

BELGIUM

PERCENTAGE DISTRIBUTION OF THE NUMBER OF COMPUTERS INSTALLED BY SIZE CLASSES

CLASS	1965	1966	1967	1968	1969
DESK	11,8	16,5	23,7	26,4	29,0
SMALL	81,9	75,4	66,9	64,0	61,5
MEDIUM	4,9	7,4	8,0	8,0	7,1
LARGE	1,0	0,7	1,0	1,2	1,4
EXTRA LARGE					
UNCLASSIFIED	0,4		0,4	0,4	1,0
TOTAL	100,0	100,0	100,0	100,0	100,0

TABLE IV. 14 ter

BELGIUM

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS

(number)

CLASS	1965	1966	1967	1968	1969
DESK	-	+ 97,1	+ 103,0	+ 45,6	+32,3
SMALL	-	+ 30,1	+ 25,1	+ 25,0	+15,6
MEDIUM	-	+114,3	+ 53,3	+ 30,4	+6,7
LARGE	-	-	+100,0	+ 50,0	+44,4
EXTRALARGE	-	-	-	-	-
TOTAL	-	+ 41,3	+ 41,0	+ 30,7	+20,4
TOTAL EXCLUDING DESK	-	+ 33,9	+ 28,8	+ 26,0	+16,1

TABLE IV. 15

NETHERLANDS

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES

(1965-1969)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK				51	93	187	246	298
SMALL				225	304	427	620	723
MEDIUM				26	46	72	99	101
LARGE				4	6	11	17	18
EXTRA LARGE				-	-	-	2	7
UNCLASSIFIED				6	5	6	7	20
TOTAL				312	454	703	991	1.167
TOTAL EXCLUDING DESK				261	361	516	745	869

SOURCE: SORIS, SEE TABLE IV. 12.

TABLE IV. 15 bis

NETHERLANDS

PERCENTAGE DISTRIBUTION OF THE NUMBER OF COMPUTERS INSTALLED BY SIZE CLASSES

CLASS	1965	1966	1967	1968	1969
DESK	16,4	20,5	26,6	24,8	25,5
SMALL	72,1	67,0	60,7	62,6	62,0
MEDIUM	8,3	10,1	10,2	10,0	8,7
LARGE	1,3	1,3	1,6	1,7	1,5
EXTRA LARGE				0,2	0,6
UNCLASSIFIED	1,9	1,1	0,9	0,7	1,7
T O T A L	100,0	100,0	100,0	100,0	100,0

TABLE IV. 15 ter

NETHERLANDS

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS

(number)

CLASS	1965	1966	1967	1968	1969
DESK	-	+ 82,4	+ 101,1	+ 31,6	+21,1
SMALL	-	+ 35,1	+ 40,5	+ 45,2	+16,6
MEDIUM	-	+ 76,9	+ 56,5	+ 37,5	+2,0
LARGE	-	+ 50,0	+ 83,3	+ 54,5	+5,9
EXTRALARGE	-	-	-	-	+250,0
TOTAL	-	+ 45,5	+ 54,8	+ 41,0	+17,8
TOTAL EXCLUDING DESK	-	+ 38,3	+ 42,9	+ 44,4	+16,6

BENELUX

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES (1)

(1962-1969) (thousand dollars)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 June
DESK	324,0	336,0	502,8	1.723,2	3.178,8	6.010,2	8.074,8	8.816,8
SMALL	10.102,8	14.839,2	22.482,0	28.064,4	37.155,0	45.445,8	60382,8	67.014,3
MEDIUM	651,6	2.065,2	4.174,8	6.546,6	13.892,4	22.696,8	31.914,0	35.133,8
LARGE	2.160,0	2.310,0	2.466,0	3.538,0	4.772,0	7.940,4	11.062,0	12.103,5
EXTRA LARGE							1.818,0	4.532,7
TOTAL	13.238,4	19.550,4	29.625,6	39.872,2	58.998,2	82.093,2	113.251,6	127.601,1
TOTAL EXCLUDING DESK	12.914,4	19.214,4	29.122,8	38.149,0	55.819,4	76.083,0	105.176,8	118.784,3

SOURCE: SORIS.

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV. 16 bis

BENELUX

PERCENTAGE DISTRIBUTION OF THE VALUE OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES (1)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	2,5	1,7	1,7	4,3	5,4	7,3	7,1	6,9
SMALL	76,3	75,9	75,9	70,4	63,0	55,4	53,3	52,5
MEDIUM	4,9	10,6	14,1	16,4	23,5	27,6	28,2	27,5
LARGE	16,3	11,8	8,3	8,9	8,1	9,7	9,8	9,5
EXTRA LARGE							1,6	3,6
UNCLASSIFIED								
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV. 16 ter

BENELUX

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS (1)

(value)

CLASS	1962	1963	1964	1965	1966	1967	1968	AVERAGE
DESK	-	+ 3,7	+ 49,6	+ 242,7	+ 84,5	+ 89,1	+ 34,4	+ 81,0
SMALL	-	+ 46,9	+ 51,5	+ 24,8	+ 32,4	+ 22,3	+ 32,9	+ 32,7
MEDIUM	-	+ 216,9	+ 102,1	+ 56,8	+ 112,2	+ 63,4	+ 40,6	+ 80,9
LARGE	-	+ 6,9	+ 6,8	+ 43,5	+ 34,9	+ 66,4	+ 39,3	+ 34,0
EXTRA LARGE	-	-	-	-	-	-	-	-
TOTAL	-	+ 47,7	+ 51,5	+ 34,6	+ 48,0	+ 39,1	+ 38,0	+ 41,9
TOTAL EXCLUDING DESK	-	+ 48,8	+ 51,6	+ 31,0	+ 46,3	+ 36,3	+ 38,2	+ 40,4

(1) Installations are evaluated on the basis of the annual rental.

BELGIUM

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEAR, BY SIZE CLASSES (1)

(1965-1969) (thousand dollars)

CLASS	1965	1966	1967	1968	1969
DESK	660,0	1.365,6	2.605,8	3.744,0	4.503,6
SMALL	13.296,0	17.420,4	21.173,4	28.290,6	30.791,6
MEDIUM	2.395,8	5.924,4	9.398,4	12.588,0	13.525,8
LARGE	1.285,0	1.286,0	2.534,4	3.661,0	5.280,0
EXTRALARGE					
TOTAL	17.636,8	25.996,4	35.712,0	48.283,6	54.101,0
TOTAL EXCLUDING DESK	16.976;8	24.630,8	33.106,2	44.539,6	49.597,4

SOURCE: SORIS.

(1) Installations are evaluated on the basis of the annual rental.

BELGIUM

PERCENTAGE DISTRIBUTION OF THE VALUE OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES (1)

CLASS	1965	1966	1967	1968	1969
DESK	3,7	5,3	7,3	7,7	8,3
SMALL	75,4	67,0	59,3	58,6	56,9
MEDIUM	13,6	22,8	26,3	26,1	25,0
LARGE	7,3	4,9	7,1	7,6	9,8
EXTRA LARGE					
TOTAL	100,0	100,0	100,0	100,0	100,0

(1) Installations are evaluated on the basis of the annual rental.

BELGIUM

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS (1)

(value)

CLASS	1965	1966	1967	1968	1969
DESK	-	+ 106,9	+ 90,8	+ 43,7	+ 20,3
SMALL	-	+ 31,0	+ 21,5	+ 33,6	+ 8,8
MEDIUM	-	+ 147,3	+ 58,6	+ 33,9	+ 7,5
LARGE	-	+ 0,1	+ 97,1	+ 44,5	+ 44,2
EXTRALARGE	-	-	-	-	-
TOTAL	-	+ 47,4	+ 37,4	+ 35,2	+ 12,0
TOTAL EXCLUDING DESK	-	+ 45,1	+ 34,4	+ 34,5	+ 11,4

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV. 18

NETHERLANDS

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEAR, BY SIZE CLASSES (1)

(1965-1969) (thousand dollars)

CLASS	1965	1966	1967	1968	1969
DESK	1.063,2	1.813,2	3.404,4	4.330,8	4.909,2
SMALL	14.768,4	19.734,6	24.272,4	32.092,2	37.391,6
MEDIUM	4.150,8	7.968,0	13.298,4	19.326,0	19.775,4
LARGE	2.253,0	3.486,0	5.406,0	7.401,0	7.296,0
EXTRALARGE	-	-	-	1.818,0	6.156,0
TOTAL	22.235,4	33.001,8	46.381,2	64.968,0	75.528,2
TOTAL EXCLUDING DESK	21.172,2	31.188,6	42.976,8	60.637,2	70.619,0

SOURCE: SORIS.

(1) Installations are evaluated on the basis of the annual rental.

NETHERLANDS

PERCENTAGE DISTRIBUTION OF THE VALUE OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES (1)

CLASS	1965	1966	1967	1968	1969
DESK	4,8	5,5	7,3	6,7	6,5
SMALL	66,4	59,8	52,3	49,4	49,5
MEDIUM	18,7	24,1	28,7	29,7	26,2
LARGE	10,4	10,6	11,7	11,4	9,7
EXTRA LARGE	-	-	-	2,8	8,1
TOTAL	100,0	100,0	100,0	100,0	100,0

(1) Installations are evaluated on the basis of the annual rental.

NETHERLANDS

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS (1)

(value)

CLASS	1965	1966	1967	1968	1969
DESK	-	+ 70,5	+ 87,8	+ 27,2	+ 13,4
SMALL	-	+ 33,6	+ 23,0	+ 32,2	+ 16,5
MEDIUM	-	+ 92,0	+ 66,9	+ 45,3	+ 2,3
LARGE	-	+ 54,7	+ 55,1	+ 36,9	- 1,4
EXTRALARGE	-	-	-	-	+238,6
TOTAL	-	+ 48,4	+ 40,5	+ 40,1	+ 16,3
TOTAL EXCLUDING DESK	-	+ 47,3	+ 37,8	+ 41,1	+ 16,4

(1) Installations are evaluated on the basis of the annual rental.

FRANCE

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968 (June)	1969 (June)
BULL GE	GAMMA 300	27	21	26	22	14			
	GAMMA 60	16	10	8	8	6	7	7	6
	GAMMA 30	37	60	99	112	129	110	109	90
	GAMMA ET		79	79	74	56	40	32	30
	CAB 500		46	42	42	45	49	49	40
	GE 225		3	5	5	5	6	6	9
	GAMMA 10			34	212	297	620	648	780
	GAMMA M 40				2	7	12	11	15
	GE 115						21	48	120
	GE 55						75	160	250
	GE 600 (SERIES)								3
	GE 400 (SERIES)			4	12	27	56	56	63
	TOTAL	80	219	297	489	586	996	1.126	1.406
BURROUGHS	B 200/300/500		1	4	8	17	24	24	25
	B 3500							1	14
	B 5500							1	2
	B 6500								1
	TOTAL		1	4	8	17	24	26	42
COMPAGNIE DE COMPTEURS	RAYTHEON PB 250			22	27	29	33	33	35

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

FRANCE

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968 (June)	1969 (June)
follows:									
COMPAGNIE DE COMP-									
TEURS	SETI PALLAS			4	10	12	13	13	15
	TOTAL			26	37	41	46	46	50
CII	SERIES 3000		7	22	30	51	24	24	22
	510/530			5	46	59	48	49	45
	910/920				4	7	6	6	6
	300/330				13	14	15	15	15
	CINA				2	1			
	90/10				1	12	35	51	113
	90/40				10	10	15	26	52
	90/80					4	6	7	18
	4000						9	10	28
	10020						4	4	5
	10070						1	1	1
	TOTAL		7	27	106	158	163	193	305

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

TABLE IV. 19

FRANCE

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968 (June)	1969 (June)
CONTROL DATA CORPORATION	160/A			1	5	5	4	4	3
	3600			3	4	5	6	6	5
	3200				3	4	3	2	2
	8090					2	5	7	9
	6600					2	4	4	4
	3300						2	2	2
	1700						3	4	4
	6400						2	2	4
	3400							1	1
	TOTAL			4	12	18	29	32	34
FRIDEN	5610						5	25	50
	TOTAL						5	25	50
HONEYWELL	H-200				20	40	50	60	90
	H-1200					3	10	11	
	H-120/125						6	9	11
	TOTAL				20	43	66	80	101

FRANCE

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968 (June)	1969 (June)
IBM	650	60	38	28	21	3	3	1	
	704/705	8	10	6	5	5	3	4	4
	305	12	22	18	14	5	3	3	3
	1620	11	13	62	74	61	42	60	35
	7070/72/74	6	10	12	13	15	14	12	12
	1401	170	215	375	525	525	510	480	470
	1410	28	32	36	38	20	15	14	10
	7090/94		2	5	6	4	3	4	3
	1710			6	10	8	8	14	20
	7010			5	6	6	5	4	4
	7030			1	1	1	1	1	1
	7040/44			8	10	16	16	11	5
	1440			16	20	20	14	12	20
	1460			6	12	10	10	10	
	1130					18	41	50	100
	1800					5	7	10	30
	360/20				5	98	505	545	1.650
	360/30				4	68	234	285	
	360/40				3	27	61	75	
	360/44						6	8	
	360/50					6	18	22	

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

TABLE IV. 19 FRAN...

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968 (June)	1969 (June)
follows:									
IBM	360/65, 67					1	16	20	29
	360/75, 85						2	3	3
	360/92						1	1	1
	TOTAL	295	342	584	767	922	1.538	1.649	2.400
ICL	FERRANTI ARGUS 400								1
	ELLIOTT 802/803	1	1	2	2	2	2	2	2
	1200/1/2		5	16	16	12	12	8	8
	1300/1/2		8	11	18	18	17	15	15
	1500/1			4	3	3	3	3	3
	1902/3					7	17	31	35
	1904	2	2	2	2	2	2	2	4
	1900/1901					1	9	24	40
	TOTAL	3	16	35	41	45	62	85	108
ITT	D 1370	2							
	TOTAL	2							
MONROE	MONROBOT XI			4	11	11	13	13	
	TOTAL			4	11	11	13	13	
NATIONAL CASH RE REGISTER	315, 315/RMC	2	2	2	2	6	9	25	45
	SERIES 100								1
	TOTAL	2	2	2	2	6	9	25	46

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORTS.

FRANCE

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968 (June)	1969 (June)
SEREL	1001				1	1	8	8	8
	TOTAL				1	1	8	8	8
SIEMENS-ZUSE	4004/15					1	1	3	3
	4004/25						1	1	1
	4004/35							5	12
	4004/45						1	4	7
	TOTAL					1	3	13	23
TELEFUNKEN	TR 4				1	1	1	1	1
	TOTAL				1	1	1	1	1
TELEMECANIQUE MORS	MAT 01						10	11	20
	TOTAL						10	11	20
UNIVAC	1107		1	1	1	1	1	1	1
	490/91/92			1	1	1	1	1	2
	1004/5			12	45	67	40	42	33
	1108				2	5	7	9	15

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

TABLE IV. 19

FRANCE

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968 (June)	1969 (June)
follows:									
UNIVAC	1040/50				2	2	4	4	4
	418					1	1	1	2
	9200/9300						1	8	12
	1206			1	2	8	8		
	TOTAL		1	15	53	85	63	66	69
TOTAL		382	588	998	1.548	1.935	3.036	3.399	4.663

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

TABLE IV. 20

FRANCE

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES

(1962-1969)

CLASS	1962	1963	1964	1965	1966	1967	1968 (1)	1969 (June)
DESK		46	102	293	412	871	(1.286)	1.369
SMALL	320	475	806	1.139	1.364	1.903	(2.417)	2.845
MEDIUM	30	34	52	71	98	158	(244)	296
LARGE	30	33	36	38	43	55	(71)	80
EXTRA LARGE			1	3	9	31	(46)	53
UNCLASSIFIED	2		1	4	9	18	(15)	20
TOTAL	382	588	998	1.548	1.935	3.036	(4.079)	4.663
TOTAL EXCLUDING DESK	382	542	896	1.255	1.523	2.165	(2.793)	3.294

(1) Estimated by SORIS

SOURCE: SORIS, SEE TABLE IV. 19.

TABLE IV. 20 bis

FRANCE

PERCENTAGE DISTRIBUTION OF THE NUMBER OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK		7,8	10,2	18,9	21,3	28,7	31,5	29,4
SMALL	83,7	80,8	80,8	73,6	70,5	62,7	59,3	59,1
MEDIUM	7,9	5,8	5,2	4,6	5,0	5,2	6,0	8,3
LARGE	7,9	5,6	3,6	2,5	2,2	1,8	1,7	1,7
EXTRA LARGE			0,1	0,2	0,5	1,0	1,1	1,1
UNCLASSIFIED	0,5		0,1	0,2	0,5	0,6	0,4	0,4
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

TABLE IV. 20 ter

FRANCE

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS

(number)

CLASS	1962	1963	1964	1965	1966	1967	1968	AVERAGE
DESK	-	-	+ 121,7	+ 187,3	+ 40,6	+ 110,2	+ 47,6	+ 86,8
SMALL	-	+ 48,4	+ 69,7	+ 41,3	+ 19,8	+ 39,5	+ 27,0	+ 37,9
MEDIUM	-	+ 13,3	+ 52,9	+ 36,5	+ 38,0	+ 61,2	+ 54,4	+ 46,7
LARGE	-	+ 10,0	+ 9,1	+ 5,6	+ 13,2	+ 27,9	+ 29,1	+ 15,8
EXTRA LARGE	-	-	-	+ 200,0	+ 200,0	+ 244,4	+ 48,4	+ 152,1
UNCLASSIFIED	-	-	-	+ 300,0	+ 125,0	+ 100,0	- 16,7	-
TOTAL	-	+ 53,9	+ 69,7	+ 55,1	+ 25,0	+ 56,6	+ 34,4	+ 46,5
TOTAL EXCLUDING DESK	-	+ 41,9	+ 65,3	+ 40,1	+ 21,4	+ 42,2	+ 29,0	+ 38,1

TABLE IV.21

FRANCE

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES (1)

(1962-1969) (thousand dollars)

CLASS	1962	1963	1964	1965	1966	1967	1968 (2)	1969 June
DESK	-	938,4	1.941,6	5.938,8	8.469,6	17.558,4	(25.142,6)	26.731,2
SMALL	20.506,8	29.616,0	50.486,4	70.051,8	85.870,8	117.128,4	(151.978,5)	176.547,4
MEDIUM	4.356,0	4.936,8	8.632,8	12.306,0	19.113,6	31.981,2	(42.083,6)	55.917,5
LARGE	13.272,0	14.696,0	16.982,0	18.204,0	19.036,0	24.156,0	(32.888,4)	38.386,0
EXTRA LARGE			1.920,0	3.600,0	9.000,0	28.956,0	(42.907,3)	50.094,0
TOTAL	38.134,8	50.187,2	79.962,8	110.100,6	141.490,0	219.780,0	(295.000,4)	347.676,1
TOTAL EXCLUDING DESK	38.134,8	49.248,8	78.021,2	104.161,8	133.020,4	202.221,6	(269.857,8)	320.944,9

SOURCE: SORIS.

(1) Installations are evaluated on the basis of the annual rental.

(2) Estimated by SORIS.

TABLE IV. 21 bis

FRANCE

PERCENTAGE DISTRIBUTION OF THE VALUE OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES (1)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	-	1,9	2,4	5,4	5,9	7,9	8,5	7,7
SMALL	53,8	59,0	63,1	63,6	60,7	53,3	51,5	50,8
MEDIUM	11,4	9,8	10,8	11,2	13,5	14,6	14,3	16,1
LARGE	34,8	29,3	21,2	16,5	13,4	11,0	11,2	11,0
EXTRA LARGE			2,5	3,3	6,5	13,2	14,5	14,4
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV. 21 ter

FRANCE

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS (1)

(value)

CLASS	1962	1963	1964	1965	1966	1967	1968	AVERAGE
DESK	-	-	+ 106,9	+ 205,9	+ 42,6	+ 107,3	+ 43,2	+ 86,1
SMALL	-	+ 44,4	+ 70,5	+ 38,8	+ 22,6	+ 36,4	+ 29,8	+ 37,8
MEDIUM	-	+ 13,3	+ 74,9	+ 42,5	+ 55,3	+ 67,3	+ 31,6	+ 50,8
LARGE	-	+ 10,7	+ 15,6	+ 7,2	+ 4,6	+ 26,9	+ 36,2	+ 16,3
EXTRA LARGE	-	-	-	+ 87,5	+ 150,0	+ 221,7	+ 48,2	+ 119,1
TOTAL	-	+ 31,6	+ 59,3	+ 37,7	+ 28,5	+ 55,3	+ 34,2	+ 40,9
TOTAL EXCLUDING DESK	-	+ 29,1	+ 58,4	+ 33,5	+ 27,7	+ 52,0	+ 33,4	+ 38,9

(1) Installations are evaluated on the basis of the annual rental.

TABLE . IV. 22

GERMANY

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968	1969 (June)
AEG-TELEFUNKEN	TR 4	7	3	10	15	18	23	28	30
	TR 5	1	1						
	TR 10			4	6	7	7	8	8
	TR 86						1	8	13
	TR 440							2	3
	TOTAL	8	4	14	21	25	31	46	54
BULL/GE	GAMMA 30	12	15	23	33	37	40	38	38
	GAMMA ET	6							
	CAB 500		1						
	SERIES 300		10	11	11	9	2	2	1
	GAMMA 10			9	72	208	286	292	287
	SERIES 400				7	12	21	34	37
	GAMMA M40					1	1	1	1
	GE 55					2	29	65	78
	GE 115					3	15	45	56
	GE 265							1	1
	TOTAL	18	26	43	123	272	394	478	499
BURROUGHS	B 200/300/500		1	5	13	17	18	18	18
	B 2500						1	1	1

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

Follow: TABLE IV. 22 GERMANY

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968	1969 (June)
follows:									
BURROUGHS	B 3500						1	2	2
	TOTAL		1	5	13	17	20	21	21
CDC	LPG 30	15	19	28	31	33	33	33	33
	RPC 4000		4	6	9	10	10	10	10
	LPG 21			18	28	33	38	43	45
	160 A		2	3	4	3	3	2	2
	160 4A		1	1	1	1	1	2	2
	1700					5	8	10	12
	8090			2	3	4	5	4	5
	8092				4	3	2	2	2
	3100				1	2	2	4	5
	3200			1	2	2	2	3	4
	3300					2	4	8	8
	3400				3	3	3	3	3
	3800				1	1	2	2	2
	6400					1	1	1	1
	6600							1	1
	TOTAL	15	26	59	87	103	114	128	135

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968	1969 (June)
CII	RW 300/330			1	1	1	1	1	1
	CAE 510/530			2	2	3	6	6	6
	C 90-10					1	3	4	4
	C 90-40				2	2	3	3	5
	C 90-80						1	1	1
	C 10010							2	3
	C 10020							2	4
	C 10070								1
	TOTAL			3	5	7	14	19	25
DIGITAL EQUIP-MENT CORPORATION	PDP 4/7/9				1	6	10	30	32
	PDP 5			2	1	1	1		
	PDP 8/8S/81				3	14	24	101	118
	PDP 6/10				2	2	2	7	8
	LINC 8/PDP 12					2	2	7	9
	TOTAL			2	7	25	39	145	167
HONEYWELL	H 200			2	14	41	54	56	54
	H 110/120/125					3	19	44	55
	H 1200/1250					2	6	9	9

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

Follow: TABLE IV. 22 GERMANY

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968	1969 (June)
follows:									
HONEYWELL	H 2200						3	4	4
	DDP 116							6	6
	DDP 416							4	6
	DDP 516							15	16
	DDP 24							1	1
	DDP 124							2	2
	TOTAL			2	14	46	82	141	153
IBM	305	55	40	12	8	2	2		
	650	70	20	13	7	4	3		
	704/705	1	1	1	1	1	1	1	1
	1401	330	500	730	905	790	565	335	305
	1410	25	30	55	55	35	17	14	12
	1440			105	210	205	180	160	155
	1460			18	23	15	13	15	13
	1620	40	60	75	80	65	50	50	48
	7010			3	6	4	3	2	2
	7040/44			5	6	5	4	3	3
	7070/72/74	21	21	21	19	10	8	5	5
	7090/94	1	4	6	6	5	5	4	4
	1130					30	93	165	225
	1710			6	6	5	5	5	5

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968	1969 (June)
follows:									
IBM	1800					2	6	10	18
	360/20				5	250	725	1.180	1.477
	360/30				24	160	380	615	695
	360/40				8	45	115	160	180
	360/44						3	5	5
	360/50					8	25	43	48
	360/65/67						3	10	10
	360/75						2	2	2
	TOTAL	543	676	1.050	1.369	1.641	2.208	2.784	3.213
ICL	PEGASUS	2	1	1	1	1			
	558		1	4	5	3			
	1201/2		3	1	1	1			
	1300/1/2	4	3	7	4	3	2	1	1
	1500/1	2	2	5	5	3	3	3	3
	1901						2	2	2
	1902/3					5	7	9	11
	1904					1	1	1	1
	1907						1	1	1
	1909					3	3	3	3
	ELLIOTT 502/503			1	2	2	2	2	2

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

Follow: TABLE IV. 22

GERMANY

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968	1969 (June)
follows:									
ICL	ELLIOTT 802/803	8	8	11	11	11	10	7	7
	ARCH			2	3	4		3	3
	900 SERIES					1	6	2	2
	FERRANTI ARGUS 100				1	2	2	2	2
	FERRANTI ARGUS 400						1	3	4
	FERRANTI ARGUS 500							3	6
	TOTAL	16	18	32	33	40	40	42	48
NCR	315	7	9	10	13	21	30	32	33
	CENTURY								5
	TOTAL	7	9	10	13	21	30	32	38
RAYTHEON	PACKARD BELL 250				10	12	13	13	13
	ERA 510						9	10	14
	RAY 703						2	6	9
	TOTAL				10	12	24	29	36

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968	1969 (June)
PHILIPS	ELECTROLOGICA X-1	13	14	15	15	15	12	14	14
	ELECTROLOGICA X-8				1	4	6	5	5
	PR 8000						2	2	3
	PR 9200						1	2	2
	TOTAL	13	14	15	16	19	21	23	24
SIEMENS-ZUSE	301/2						1	8	11
	303				4	33	46	51	52
	304						12	12	23
	305						4	23	28
	2002	32	38	33	36	37	38	37	36
	3003			8	23	26	28	29	31
	4004/15					18	43	60	62
	4004/25					9	21	29	29
	4004/35					1	25	56	72
	4004/45					4	21	49	64
	4004/55						1	4	8
	Z 22	45	45	45	48	48	48	48	48
	Z 23	27	50	62	86	92	92	92	92
	Z 25		2	25	65	79	89	94	97

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

Follow: TABLE IV. 22

GERMANY

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968	1969 (June)
follows:									
SIEMENS-ZUSE	Z 31		2	3	5	7	7	8	8
	DP 100						11	12	14
	TOTAL	104	137	176	267	354	487	612	675
UNIVAC	SS 80/90	46	48	46	46	46	44	42	37
	UNIVAC III	7	8	8	8	10	10	10	11
	418				2	2	2	2	2
	490 SERIES			1	1	1	3	4	4
	1004/5		13	130	175	196	216	192	182
	1040/1050			1	16	43	55	47	46
	1107		2	2	3	3	3	3	3
	1108						1	1	3
	9200/9300						6	150	209
	TOTAL	53	71	188	251	301	340	451	497
OTHER MANUFACTURERS	FACIT:								
	EDB 3		1	1	1	1	1	1	1
	REGNECENTRALEN:								
	GIER		1	2	3	3	3	3	3

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1962-1969)

MANUFACTURER	NAME OF COMPUTER	1962	1963	1964	1965	1966	1967	1968	1969 (June)
follows: OTHER MANUFACTURERS	STANDARD ELEKTRIK:								
	STANTEC ZEBRA	1	3	7	6				
	ER 56	7	7	9	9	9	9	6	6
	TOTAL	8	10	16	15	9	9	6	6
	MONROE:								
	MONROBOT XI				3	4	5	5	5
	UNCLASSIFIED	4							
TOTAL		789	994	1.618	2.251	2.900	3.862	4.966	5.600

SOURCE: ADP NEWSLETTER (EUROPEAN COMPUTER CENSUS) AND EDP EUROPE REPORT-REVISED BY SORIS

TABLE IV. 23

GERMANY

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES

(1962-1969)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	61	73	121	225	446	664	929	1.035
SMALL	662	851	1.383	1.885	2.283	2.914	3.637	4.115
MEDIUM	39	41	82	109	140	227	314	352
LARGE	23	29	32	32	31	51	72	82
EXTRA LARGE						6	14	16
UNCLASSIFIED	4							
TOTAL	789	994	1.618	2.251	2.900	3.862	4.966	5.600
TOTAL EXCLUDING DESK	728	921	1.497	2.026	2.454	3.198	4.037	4.565

SOURCE: SORIS, SEE TABLE IV. 22.

TABLE IV. 23 bis

GERMANY

PERCENTAGE DISTRIBUTION OF THE NUMBER OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	7,7	7,4	7,5	10,0	15,4	17,2	18,7	18,5
SMALL	83,9	85,6	85,5	83,7	78,7	75,4	73,2	73,5
MEDIUM	5,0	4,1	5,0	4,9	4,8	5,9	6,3	6,3
LARGE	2,9	2,9	2,0	1,4	1,1	1,3	1,5	1,4
EXTRA LARGE						0,2	0,3	0,3
UNCLASSIFIED	0,5							
T O T A L	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

TABLE IV. 23 ter

GERMANY

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS

(number)

CLASS	1962	1963	1964	1965	1966	1967	1968	AVERAGE
DESK	-	+ 19,7	+ 65,8	+ 86,0	+ 98,2	+ 48,9	+ 39,9	+ 61,7
SMALL	-	+ 28,5	+ 62,5	+ 36,3	+ 21,1	+ 27,6	+ 24,8	+ 32,2
MEDIUM	-	+ 5,1	+ 100,0	+ 32,9	+ 28,4	+ 62,1	+ 38,3	+ 43,6
LARGE	-	+ 26,1	+ 10,3	-	- 3,1	+ 64,5	+ 41,2	+ 20,1
EXTRA LARGE	-	-	-	-	-	-	+ 133,3	+ 96,8
TOTAL	-	+ 26,0	+ 62,8	+ 38,9	+ 28,8	+ 33,2	+ 28,6	+ 35,9
TOTAL EXCLUDING DESK	-	+ 26,5	+ 62,5	+ 35,3	+ 21,1	+ 30,3	+ 26,2	+ 32,6

GERMANY

TABLE IV. 24 ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES (1)

(1962-1969) (thousand dollars)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 June
DESK	957,6	1.191,6	1.899,6	3.823,2	8.305,2	12.392,4	15.886,6	17.645,0
SMALL	43.980,0	55.681,8	82.710,0	111.036,6	135.354,2	172.312,6	213.786,6	237.477,6
MEDIUM	6.906,0	7.020,0	14.115,0	19.928,4	28.303,8	48.723,6	67.876,2	76.130,2
LARGE	8.062,0	12.316,0	14.352,0	15.024,0	15.134,0	23.291,6	31.490,4	35.368,8
EXTRA LARGE						5.316,0	12.216,0	13.896,0
TOTAL	59.905,6	76.209,4	113.076,6	149.812,2	187.097,2	262.036,2	341.255,8	380.517,6
TOTAL EXCLUDING DESK	58.948,0	75.017,8	111.177,0	145.989,0	178.792,0	249.643,8	325.369,2	362.872,6

SOURCE: SORIS

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV. 24 bis

GERMANY

PERCENTAGE DISTRIBUTION OF THE VALUE OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES (1)

CLASS	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	1,6	1,6	1,7	2,6	4,4	4,7	4,7	4,6
SMALL	73,4	73,1	73,1	74,1	72,4	65,8	62,6	62,4
MEDIUM	11,5	9,2	12,5	13,3	15,1	18,6	19,9	20,0
LARGE	13,5	16,1	12,7	10,0	8,1	8,9	9,2	9,3
EXTRA LARGE						2,0	3,6	3,7
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV. 24 ter

GERMANY

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS (1)

(value)

CLASS	1962	1963	1964	1965	1966	1967	1968	AVERAGE
DESK	-	+ 24,4	+ 59,4	+ 101,3	+ 117,2	+ 49,2	+ 28,2	+ 64,7
SMALL	-	+ 26,6	+ 48,5	+ 34,2	+ 21,9	+ 27,3	+ 24,1	+ 29,7
MEDIUM	-	+ 1,7	+ 101,1	+ 41,2	+ 42,0	+ 72,1	+ 39,3	+ 49,8
LARGE	-	+ 52,8	+ 16,5	+ 4,7	+ 0,7	+ 53,9	+ 35,2	+ 22,7
EXTRA LARGE	-	-	-	-	-	-	+ 129,2	+ 94,5
TOTAL	-	+ 27,2	+ 48,4	+ 32,5	+ 24,9	+ 40,1	+ 30,2	+ 33,5
TOTAL EXCLUDING DESK	-	+ 27,3	+ 48,2	+ 31,3	+ 22,5	+ 39,6	+ 30,3	+ 32,7

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV. 25

ITALY

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1959-1969)

MANUFACTURER	NAME OF COMPUTER	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
BULL GE	GAMMA ET	8	13	15	15	18	16	15		8		-
	OLIVETTI 9003		2	6	16	24	26	28		20		10
	OLIVETTI 6001			4	16	46	66	70		50		40
	GAMMA 300			11	11	12	12	12		7		-
	GAMMA 60				1	2	2	2		2		2
	GAMMA 10						2	11		11		10
	ELEA 4001							13		300		450
	OLIVETTI GE 115							8				
	GE 415							3		23		
	GE 425							1		6		60
	GE 435									4		
	GE 625									2		
	GE 635									1		4
	GE 645									1		
	TOTAL	8	15	36	59	102	124	163		435		576
BURROUGHS	B 283									2		2
	B 300									3		3
	B 500									1		1
	TOTAL									6		6

SOURCE: SORIS ESTIMATES ON THE BASIS OF: ADP NEWSLETTER (EUROPE COMPUTER CENSUS), RIVISTA DI ORGANIZZAZIONE AZIENDALE, MONDO ECONOMICO, EDP EUROPE REPORT.

Follow: TABLE IV. 25

ITALY

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1959-1969)

MANUFACTURER	NAME OF COMPUTER	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
CII	510									4		2
	TOTAL									4		2
CONTROL DATA CORPORATION	G 15	1	1	1	2	2	2	2		2		-
	G 20				1	1	1	1		1		1
	3300									1		3
	6600									1		1
	1700											1
	TOTAL	1	1	1	3	3	3	3		5		6
HONEYWELL	120/125								2	8	47	52
	200								2	4	4	4
	1200									2	3	4
	TOTAL								4	14	54	60

SOURCE: SORIS ESTIMATES ON THE BASIS OF: ADP NEWSLETTER (EUROPE COMPUTER CENSUS), RIVISTA DI ORGANIZZAZIONE AZIENDALE, MONDO ECONOMICO, EDP EUROPE REPORT.

Follow: TABLE IV. 25

ITALY

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1959-1969)

MANUFACTURER	NAME OF COMPUTER	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
IBM	305	4	21	23	31	11	11	11				
	650	16	26	26	25	2	2	1				
	704/705	2	2	2	3	3	3	2				
	7070/74		1	7	8	8	9	11		11		
	7090/94				1	1	3	3				12
	7040/44						4	4		4		
	1620				14	20	21	34		16		15
	1401			1	130	220	330	332		286		
	1410				5	20	28	35		21		350
	1440						30	61		81		
	1460						6	7		7		
	360/20									59		
	360/30									117		
	360/40/44									47		
	360/50									12		453
	360/65									8		
	1130									10		20
	TOTAL	22	50	59	217	285	447	501		679		850
INTERNATIONAL COMPUTERS LTD	MARK 1	1	1	1	1	1	1	1		1		
	1201/2			1	1	1	1	1		1		1

SOURCE: SORIS ESTIMATES ON THE BASIS OF: ADP NEWSLETTER (EUROPE COMPUTER CENSUS), RIVISTA DI ORGANIZZAZIONE AZIENDALE, MONDO ECONOMICO, EDP EUROPE REPORT.

Follow: TABLE IV. 25

ITALY

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1959-1969)

MANUFACTURER	NAME OF COMPUTER	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
follows:												
INTERNATIONAL COMPUTERS LTD	ELLIOTT 503						1	1		1		1
	ARCH 1000							1		2		3
	M 21-40											1
	TOTAL	1	1	2	2	2	3	4		5		6
NATIONAL CASH REGISTERS CO.	315					1	1	1		1		2
	CENTURY											1
	UNCLASSIFIED											3
	TOTAL					1	1	1		1		6
SIEMENS - ZUSE	3003									1		1
	4004/15									3		6
	4004/25									1		2
	4004/35									1		2
	4004/45									1		2
	303											1
	304											1
	TOTAL									7		15

SOURCE: SORIS ESTIMATES ON THE BASIS OF: ADP NEWSLETTER (EUROPE COMPUTER CENSUS), RIVISTA DI ORGANIZZAZIONE AZIENDALE, MONDO ECONOMICO, EDP EUROPE REPORT.

Follow: TABLE IV. 25

ITALY

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1959-1969)

MANUFACTURER	NAME OF COMPUTER	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
UNIVAC	USS/80/90	3	7	15	19	31	33	33		33		24
	SERIES 1100		1	1	1	1	1	1		1		1
	UNIVAC III					1	5	5		5		5
	1004					2	57	65		65		65
	490 RT					1	1	1		2		3
	1050						4	4		4		4
	1108									4		4
	SERIES 9000											11
	TOTAL	3	8	16	20	36	101	109		114		117
TOTAL		35	75	114	301	429	679	781		1.270		1.644

SOURCE: SORIS ESTIMATES ON THE BASIS OF: ADP NEWSLETTER (EUROPE COMPUTER CENSUS), RIVISTA DI ORGANIZZAZIONE AZIENDALE, MONDO ECONOMICO, EDP EUROPE REPORT.

TABLE IV. 26

ITALY

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES

(1959-1969)

CLASS	1959	1960	1961	1962	1963	1964	1965	1966 (1)	1967	1968 (1)	1969 (June)
DESK (2)	1	1	1	2	2	4	14	(19)	25	(30)	34
SMALL	32	68	97	263	365	592	673	(925)	1.090	(1.299)	1.397
MEDIUM	-	2	6	22	46	64	74	(100)	110	(135)	149
LARGE	2	4	10	14	16	19	20	(28)	31	(37)	40
EXTRA LARGE									14	(18)	21
UNCLASSIFIED											3
TOTAL	35	75	114	301	429	679	781	(1.072)	1.270	(1.519)	1.644
TOTAL EXCLUDING DESK	34	74	113	299	427	675	767	(1.053)	1.245	(1.489)	1.610

SOURCE: SORIS, SEE TABLE IV. 25.

(1) Estimated by SORIS

(2) Data underestimated because of inaccurate survey of this class computers.

TABLE IV. 26 bis

ITALY

PERCENTAGE DISTRIBUTION OF THE NUMBER OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES

CLASS	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	2,9	1,3	0,9	0,7	0,5	0,6	1,8	1,8	2,0	2,0	2,1
SMALL	91,4	90,7	85,1	86,8	85,1	87,2	86,2	86,3	85,8	85,5	84,9
MEDIUM		2,7	5,2	7,2	10,7	2,4	9,5	9,3	8,7	8,9	9,1
LARGE	5,7	5,3	8,8	4,6	3,7	2,8	2,5	2,6	2,4	2,4	2,4
EXTRA LARGE									1,1	1,2	1,3
UNCLASSIFIED.				0,7							0,2
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

TABLE IV. 26 ter

ITALY

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS

(number)

CLASS	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	AVERAGE 1962-1969
DESK	-	-	-	+ 100,0	-	+ 112,5	+ 249,5	+ 35,7	+ 31,6	+ 20,0	+ 63,3
SMALL	-	+ 106,7	+ 48,2	+ 188,2	+ 46,8	+ 49,1	+ 9,2	+ 37,4	+ 17,8	+ 19,2	+ 28,7
MEDIUM	-	-	+ 200,0	+ 235,1	+ 94,2	+ 40,0	+ 13,8	+ 35,1	+ 10,0	+ 22,7	+ 29,5
LARGE	-	+ 88,6	+ 122,7	+ 59,0	+ 8,9	+ 38,7	+ 2,7	+ 40,0	+ 10,7	+ 19,4	+ 18,0
EXTRA LARGE	-	-	-	-	-	-	-	-	-	+ 28,6	-
TOTAL	-	+ 117,1	+ 80,2	+ 150,2	+ 46,7	+ 45,4	+ 9,5	+ 37,3	+ 18,5	+ 19,6	+ 29,0
TOTAL EXCLUDING DESK	-	+ 117,8	+ 80,4	+ 150,3	+ 46,8	+ 45,4	+ 9,2	+ 37,3	+ 18,2	+ 19,6	+ 28,7

TABLE IV. 27

ITALY

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEAR, BY SIZE CLASSES (1)

(1959-1969) (thousand dollars)

CLASS	1959	1960	1961	1962	1963	1964	1965	1966 (2)	1967	1968 (2)	1969 June
DESK	19,2	19,2	19,2	38,4	38,4	81,6	295,2	(397,3)	518,4	(622,3)	705,6
SMALL	1.801,2	3.723,6	5.517,6	15.900,0	23.346,0	34.809,6	38.020,8	(51.488,3)	59.767,2	(71.559,3)	77.316,6
MEDIUM		444,0	1.332,0	4.464,0	8.670,0	12.145,2	13.821,6	(19.258,5)	21.823,2	(27.160,5)	30.394,2
LARGE	840,0	1.584,0	3.528,0	5.608,0	6.106,0	8.466,0	8.694,0	(11.494,3)	11.976,0	(14.384,2)	15.648,0
EXTRA LARGE									12.180,0	(15.570,0)	18.060,0
TOTAL	2.660,4	5.770,8	10.396,8	26.010,4	38.160,4	55.502,4	60.831,6	(82.638,4)	106.264,8	(129.296,3)	142.124,4
TOTAL EXCLUDING DESK	2.641,2	5.751,6	10.377,6	25.972,0	38.122,0	55.420,8	60.536,4	(82.241,1)	105.746,4	(128.674,0)	141.418,8

- SOURCE: SORIS

(1) Installations are evaluated on the basis of the annual rental.

(2) Estimated by SORIS.

TABLE IV. 27 bis

ITALY

PERCENTAGE DISTRIBUTION OF THE VALUE OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES (1)

CLASS	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	0,7	0,3	0,2	0,1	0,1	0,1	0,5	0,5	0,5	0,5	0,5
SMALL	67,7	64,5	53,1	61,1	61,2	62,7	62,5	62,3	56,2	55,3	54,4
MEDIUM		7,7	12,8	17,2	22,7	21,9	22,7	23,3	20,5	21,0	21,4
LARGE	31,6	27,5	33,9	21,6	16,0	15,3	14,3	13,9	11,3	11,1	11,0
EXTRA LARGE									11,5	12,1	12,7
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV. 27 ter

ITALY

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS (1)

(value)

CLASS	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	AVERAGE 1962-1969
DESK	-	-	-	+ 100,0	-	+ 100,0	+ 250,0	+ 39,3	+ 30,5	+ 20,0	+ 65,3
SMALL	-	+ 112,5	+ 42,6	+ 171,1	+ 38,8	+ 62,2	+ 13,7	+ 35,4	+ 16,1	+ 19,7	+ 26,1
MEDIUM	-	-	+ 200,0	+ 266,7	+ 109,1	+ 39,1	+ 15,6	+ 39,3	+ 13,3	+ 24,5	+ 30,3
LARGE	-	+ 100,0	+ 150,0	+ 40,0	+ 14,3	+ 18,8	+ 5,3	+ 32,2	+ 4,2	+ 20,1	+ 17,2
EXTRA LARGE	-	-	-	-	-	-	-	-	-	+ 27,8	-
TOTAL	-	+ 114,3	+ 52,0	+ 164,0	+ 42,5	+ 58,3	+ 15,0	+ 35,9	+ 28,6	+ 21,7	+ 28,7
TOTAL EXCLUDING DESK	-	+ 117,6	+ 52,7	+ 164,6	+ 42,8	+ 58,1	+ 13,6	+ 35,9	+ 28,6	+ 21,7	+ 28,6

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV. 28

UNITED KINGDOM

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1958–1969)

MANUFACTURER	NAME OF COMPUTER	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
BULL GE	GAMMA 300				1	4	5	5	1				
	GAMMA 150				3	2	3						
	GAMMA 30					1	2	5	7	8	7	7	5
	GAMMA 10							7	40	45	50	50	50
	GE 415								3	5	6	6	6
	GE 425								1	1	3	3	4
	GE 115/130								1		10	23	24
	GE 265										1	4	6
	TOTAL				4	7	10	17	53	59	77	93	95
BURROUGHS	B 200/300					2	5	9	28	35	51	48	46
	B 500										3	6	5
	B 2500										1	6	6
	B 3500										2	6	7
	B 5500											5	5
	TOTAL					2	5	9	28	35	57	71	69
CDC	3200/3300							1	1	3	3	3	3
	160/A – 1700									2	3	4	3
	6600											2	2
	TOTAL							1	1	5	6	9	8

SOURCE: COMPUTER SURVEY

Follow: TABLE IV. 28

UNITED KINGDOM

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1958-1969)

MANUFACTURER	NAME OF COMPUTER	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
COMPUTER TECHNOLOGY	MODULAR ONE											3	8
	TOTAL											3	8
DIGITAL EQUIPMENT	PDP 4/5/7/8/9							4	21	54	76	104	127
	PDP 6									2	2	2	2
	TOTAL							4	21	56	78	106	129
GEC-AEI	AEI 1010			1	2	5	6	8	8	7	7	4	4
	TRW 130/330						4	6	10	10	10	10	9
	959 PC							1	1	2	3	3	3
	CON-PAC 4000							1	2	9	12	15	15
	SERIES 90								2	7	13	14	14
	SIGMA TWO										1	1	1
	TOTAL			1	2	5	10	16	23	35	46	47	46
HONEYWELL	H 800					1	1	1	2	3	3	4	4
	H 400					2	2	15	14	13	13	13	12
	H 200 SERIES							11	38	64	108	148	155
	H 1400							1	1	1	1	1	1
	H 1800							1	1	1	1	2	2
	H 2200								1	3	6	8	8

SOURCE: COMPUTER SURVEY

UNITED KINGDOM

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1958-1969)

MANUFACTURER	NAME OF COMPUTER	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
follows:													
HONEYWELL	DDP SERIES									3	4	12	15
	TOTAL					3	3	29	57	88	136	188	197
IBM	650	4	6	10	13	9	4	2	3				
	704/705	1	1	2	2	3	2	2	2	3	3	3	3
	305			4	7	6	5	2	2				
	1401			2	21	83	142	184	260	249	196	143	108
	1410				1	2	8	13	22	25	15	8	6
	1440/1460							33	114	139	128	118	109
	1620				2	10	14	18	22	25	21	14	11
	7010							2	2	2	2	2	2
	7030				1	1	1	1	1	1	1	1	1
	7070/2/4				1	3	4	5	6	5	4	2	2
	7090			1	2	3	5	7	10	7	6	4	4
	7094 I,II						1	2	2	2	2	2	2
	360/20/25/30								32	151	299	418	445
	360/40/44								13	45	82	117	130
	360/50								4	20	37	48	52
	360/65/67								1	9	17	20	21
	360/75									2	2	2	2
	1710							1	1				
	1800/1130									10	28	67	76
	TOTAL	5	7	19	50	120	186	272	497	695	843	969	974

SOURCE: COMPUTER SURVEY

Follow: TABLE IV. 23

UNITED KINGDOM

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1958-1969)

MANUFACTURER	NAME OF COMPUTER	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
ICL	DEUCE, MARK I, II	32	35	38	40	35	31	30	21	17	14	4	
	PEGASUS	19	24	30	39	34	38	37	29	5		-	
	MERCURY	9	15	19	19	13	19	19	9	34	25	25	24
	EMIDEC 1100		1	6	13	16	16	19	21	24	23	20	17
	EMIDEC 2400				2	2	3	3	3	3	3	3	3
	PERSEUS		2	2	2		2						
	SIRIUS				3	10	17	19	14	13	11	11	10
	ARGUS SERIES				1	2	3	11	15	24	36	100	102
	ATLAS				1	1	2	4	4	7	5	6	6
	LEO I	1	1	1	1	1	1						
	LEO II	4	6	10	11	11	11	10	9	3	2	1	1
	LEO III					3	14	24	32	30	35	30	33
	LEO 326							3	4	6	10	12	12
	LEO 360							1	1	1	4	4	4
	ICL 1201/2	25	35	51	59	55	82	94	42	48	30	30	24
	ICL 1301/2					9	64	139	117	132	124	120	106
	ICL 1500/1					3	49	95	61	60	60	57	56
	POSEIDON, APOLLO					2					4	6	6
	ORION I					2	7	8	6	7	3	5	4
	ORION II							2	3	3	5	5	5
	KDN 2					1	6	7	8	8	8	7	8
	KDF 6						2	11	12	11	12	12	12
	KDF 7								2	4	4	6	6
	KDF 8							5	7	7	7	8	8
	KDF 9					1	8	18	25	26	28	32	32

SOURCE: COMPUTER SURVEY

UNITED KINGDOM

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1958-1969)

MANUFACTURER	NAME OF COMPUTER	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
follows:													
	KDP 10					5	6	5	4	3	2		
ICL	MIRIAD I								8	11	9	9	8
	MIRIAD II									2	5	11	9
	XL 9									1	3	4	6
	1900 SERIES								62	214	451	668	714
	HERMES, F 1600										3	8	8
	SPECTRA 70/45										2	4	4
	SYSTEM 4/30										13	23	24
	SYSTEM 4/40											4	4
	SYSTEM 4/50										7	26	28
	SYSTEM 4/70										2	14	14
	M 21-40											2	4
	FP 6000									2	2		
	ELLIOTT 401/2/3/5	26	37	39	41	37	41	33	22	20	15	10	6
	ELLIOTT 502/3				1	1	3	21	15	15	16	16	16
	ELLIOTT 802/3	1	7	33	73	74	164	206	133	127	124	124	122
	ELLIOTT 900 SERIES								1	14	28	203	209
	ELLIOTT 4100 SERIES								23	49	78	91	94
	TOTAL	117	163	229	306	318	589	824	713	931	1.213	1.721	1.749

SOURCE: COMPUTER SURVEY

Follow: TABLE IV. 28

UNITED KINGDOM

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1958-1969)

MANUFACTURER	NAME OF COMPUTER	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
NCR	315					3	25	47	31	35	44	55	52
	ARCH						5	8	14	17	33	37	38
	MCS 920							3	14	16	70		
	CENTURY											1	4
	TOTAL					3	30	58	59	68	147	93	94
UNIVAC	SS 80			1	1	5	5	5	4	6	4	3	1
	1050							5	10	13	15	17	17
	418								2	2	2	2	2
	490								2	4	4	4	4
	1107							2	2	2	2	2	2
	1108								1	2	5	8	8
	9200/9300										8	39	43
	TOTAL			1	1	5	5	12	21	29	40	75	77
OTHER MANUFACTURERS	ITT: STANTEC ZEBRA & COMPUTING SYSTEM	13	24	37	39	22	46	46	21	19	16	21	17
	MONROE MONROBOT XI					3	7	12	16	16	18	18	19

SOURCE: COMPUTER SURVEY

UNITED KINGDOM

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY MANUFACTURER AND MODEL

(1958-1969)

MANUFACTURER	NAME OF COMPUTER	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
follows:													
OTHER MANUFACTURERS	RAYTHEON:												
	PACKARD BELL 250					1	1	1	1	1	2	7	8
	UNCLASSIFIED (SIEMAG, DATA 6000 PHILIPS)										5	8	6
	PHILIPS: ELECTROLOGICA 4000-5000- 8000											63	67
	FRIDEN: 5610											12	12
TOTAL		135	194	287	402	489	892	1.301	1.511	2.037	2.684	3.504	3.575

SOURCE: COMPUTER SURVEY

TABLE IV. 29

UNITED KINGDOM

NUMBER OF COMPUTERS INSTALLED AT THE END OF EACH YEAR BY SIZE CLASSES

(1958–1969)

CLASS	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	13	24	37	43	39	85	108	152	217	291	654	691
SMALL	121	167	245	346	418	718	1.035	1.158	1.528	1.980	2.296	2.300
MEDIUM		2	2	6	19	74	132	162	218	299	404	430
LARGE	1	1	3	5	9	11	19	30	49	71	95	100
EXTRA LARGE				2	2	4	7	9	23	32	41	42
UNCLASSIFIED					2				2	11	14	12
TOTAL	135	194	287	402	489	892	1.301	1.511	2.037	2.684	3.504	3.575
TOTAL EXCLUDING DESK	122	170	250	359	450	807	1.193	1.359	1.820	2.393	2.850	2.884

SOURCE: SORIS, SEE TABLE IV. 28.

TABLE IV. 29 bis

UNITED KINGDOM

PERCENTAGE DISTRIBUTION OF THE NUMBER OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES

CLASS	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	9,6	12,4	12,9	10,7	8,0	9,5	8,3	10,1	10,7	10,8	18,7	19,3
SMALL	89,6	86,1	85,4	86,1	85,5	80,5	79,6	76,6	75,0	73,8	65,5	64,3
MEDIUM		1,0	0,7	1,5	3,9	8,3	10,1	10,7	10,7	11,1	11,5	12,0
LARGE	0,8	0,5	1,0	1,2	1,8	1,2	1,5	2,0	2,4	2,7	2,7	2,8
EXTRA LARGE				0,5	0,4	0,5	0,5	0,6	1,1	1,2	1,2	1,2
UNCLASSIFIED					0,4				0,1	0,4	0,4	0,4
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

TABLE IV. 29 ter

UNITED KINGDOM

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS

(number)

CLASS	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	AVERAGE 1962-1969
DESK		+ 84,6	+ 54,2	+ 16,2	- 9,3	+ 117,9	+ 27,1	+ 40,7	+ 42,8	+ 34,1	+ 124,7	+ 51,9
SMALL		+ 38,0	+ 46,7	+ 41,2	+ 20,8	+ 71,8	+ 44,2	+ 11,9	+ 32,0	+ 29,6	+ 16,0	+ 28,4
MEDIUM		-	-	+ 200,0	+ 216,7	+ 289,5	+ 78,4	+ 22,7	+ 34,6	+ 37,2	+ 35,1	+ 51,3
LARGE		-	+ 200,0	+ 66,7	+ 80,0	+ 22,2	+ 72,7	+ 57,9	+ 63,3	+ 44,9	+ 33,8	+ 49,2
EXTRA LARGE		-	-	-	-	+ 100,0	+ 75,0	+ 28,6	+ 155,6	+ 39,1	+ 28,1	+ 61,8
TOTAL		+ 43,7	+ 47,9	+ 40,1	+ 21,6	+ 82,4	+ 45,9	+ 16,1	+ 34,8	+ 31,8	+ 30,6	+ 33,7
TOTAL EXCLUDING DESK		+ 39,3	+ 47,1	+ 43,6	+ 25,3	+ 79,3	+ 47,8	+ 13,9	+ 33,9	+ 31,5	+ 19,1	+ 31,2

TABLE IV. 30

UNITED KINGDOM

ESTIMATED ANNUAL VALUE OF COMPUTERS INSTALLED AT THE END OF EACH YEAR, BY SIZE CLASSES (1)

(1958-1969) (thousand dollars)

CLASS	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 June
DESK	280,8	518,4	799,2	919,0	765,2	1.667,4	2.153,4	2.630,7	3.441,6	4.402,3	9.292,8	10.173
SMALL	7.072,8	9.912,0	14.375	19.947,0	25.089,6	42.247,2	62.915,4	71.023,8	100.257,8	102.208,2	148.518,6	147.941
MEDIUM	-	350,4	350,4	1.047,6	3.422,4	12.098,4	21.436,8	26.544,0	38.886,0	50.190,0	77.298,0	83.0
LARGE	384,0	384,0	1.602,0	2.688,0	4.554,0	6.018,0	10.474,8	15.883,2	22.009,2	27.103,2	39.180,0	40.632
EXTRA LARGE				3.030,0	3.030,0	5.016,0	8.112,0	9.792,0	22.638,0	29.658,0	37.848,0	38.688
TOTAL	7.737,6	11.164,8	17.127,4	27.631,6	36.861,2	67.047,0	105.092,4	125.873,7	187.232,6	213.561,7	312.137,4	320.443,
TOTAL EXCLUDING DESK	7.456,8	10.646,4	16.328,2	26.712,6	36.096,0	65.379,6	102.939,0	123.243,0	183.791,0	209.159,4	302.844,6	310.269,

SOURCE: SORIS

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV. 30 bis

UNITED KINGDOM

PERCENTAGE DISTRIBUTION OF THE VALUE OF COMPUTERS INSTALLED (AT THE END OF EACH YEAR) BY SIZE CLASSES (1)

CLASS	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
DESK	3,6	4,7	4,7	3,3	2,1	2,5	2,0	2,1	1,8	2,1	3,0	3,1
SMALL	91,4	88,8	83,9	72,2	68,1	63,0	59,9	56,4	53,5	47,8	47,6	46,2
MEDIUM		3,1	2,0	3,8	9,3	18,0	20,4	21,1	20,8	23,5	24,8	25,9
LARGE	5,0	3,4	9,4	9,7	12,3	9,0	10,0	12,6	11,8	12,7	12,5	12,7
EXTRA LARGE				11,0	8,2	7,5	7,7	7,8	12,1	13,9	12,1	12,1
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

(1) Installations are evaluated on the basis of the annual rental.

TABLE IV. 30 ter

UNITED KINGDOM

ANNUAL RATE OF GROWTH OF COMPUTERS INSTALLATIONS (1)

(value)

CLASS	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	AVERAGE 1962-1969
DESK	-	+ 84,6	+ 54,2	+ 15,0	- 16,7	+ 117,9	+ 29,1	+ 22,2	+ 30,8	+ 27,9	+ 111,1	+ 43,5
SMALL	-	+ 40,1	+ 45,0	+ 38,8	+ 25,8	+ 68,4	+ 48,9	+ 12,9	+ 41,2	+ 1,9	+ 45,3	+ 29,2
MEDIUM	-	-	-	+ 199,0	+ 226,7	+ 253,5	+ 77,2	+ 23,8	+ 46,5	+ 29,1	+ 54,0	+ 53,9
LARGE	-	-	+ 317,2	+ 67,8	+ 69,4	+ 32,1	+ 74,1	+ 51,6	+ 38,6	+ 23,1	+ 44,6	+ 41,6
EXTRA LARGE	-	-	-	-	-	+ 65,5	+ 61,7	+ 20,7	+ 131,2	+ 31,0	+ 27,6	+ 50,4
TOTAL	-	+ 44,3	+ 53,4	+ 61,3	+ 33,4	+ 81,9	+ 56,7	+ 19,8	+ 48,7	+ 14,1	+ 46,2	+ 37,2
TOTAL EXCLUDING DESK	-	+ 42,8	+ 53,4	+ 63,6	+ 35,1	+ 81,1	+ 57,4	+ 19,7	+ 49,1	+ 13,8	+ 44,8	+ 37,1

(1) Installations are evaluated on the basis of the annual rental.

TABLE V. 1 PERCENTAGE OF EXTRA-LARGE COMPUTER EXPENDITURE ON TOTAL EXPENDITURE (DESK COMPUTERS EXCLUDED)

COUNTRIES	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
GERMANY	-	-	-	-	-	-	-	2,12	3,75	3,83
FRANCE	-	-	-	-	2,46	3,46	6,77	14,32	15,90	15,61
ITALY	-	-	-	-	-	-	-	11,52	12,10	12,77
BENELUX	-	-	-	-	-	-	-	-	1,73	3,82
EEC	-	-	-	-	0,70	1,03	2,00	7,33	8,75	9,17
UK	-	11,34	8,39	7,67	7,88	7,95	12,32	14,18	12,50	12,47
EEC+UK	-	-	1,76	2,03	2,66	2,84	4,99	9,03	9,75	9,99
US	0,38	1,01	7,00	9,51	8,61	8,08	9,71	12,25	16,06	16,23

TABLE V. 2 PERCENTAGE OF EXTRA-LARGE COMPUTER NUMBER ON THE TOTAL (DESK TYPE EXCLUDED)

COUNTRIES	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969 (June)
GERMANY	-	-	-	-	-	-	-	0,19	0,35	0,35
FRANCE	-	-	-	-	0,11	0,24	0,59	1,43	1,65	1,61
ITALY	-	-	-	-	-	-	-	1,12	1,21	1,30
BENELUX	-	-	-	-	-	-	-	-	0,15	0,21
EEC	-	-	-	-	0,03	0,07	0,16	0,67	0,83	0,85
UK	-	0,56	0,44	0,50	0,59	0,66	1,26	1,34	1,44	1,46
EEC+UK	-	-	0,10	0,14	0,17	0,34	0,57	0,92	1,04	1,04
US	0,03	0,06	0,92	1,09	0,97	0,84	1,08	1,47	2,10	2,21