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COMMUNITY POLICY

FOR THE ELECTRONIC COMPONENT INDUSTRY

(Communication from the Commission to the Council)

VOLUME IV

COMMUNICATION OF THE COMMISSION TO THE COUNCIL

COMMUNITY POLICY FOR THE ELECTRONIC COMPONENT INDUSTRY

1. INTRODUCTION

In document COM (75) 467, the Commission presented a first brief analysis of the interdependence of electronic components, particularly Integrated Circuits (I.C.), and data-processing industries, which indicated a need for the development of a European competitive capability in the IC sector.

The fast growth of Large Scale Integration (LSI) and its influence particularly on distributed intelligence was underlined as well as the heavy reliance of European digital equipment industries on American IC manufacturers : the latter bringing a risk that the European DP industry may lag technologically behind competitors.

Since this document was published, the analysis has been carried further and the Commission has held meetings with Senior Officials and representatives of component industries from Member States, on the current situation and the future of the European IC industry. It has become clear that, though the computer industry is for the moment the largest single user, the situation of the European IC industry is going to affect a much wider spectrum of the European economy.

The analysis and practical conclusions which have been provisionally drawn are spelt out in the following paragraphs. Clearly these proposals must be subject to modification in the light of subsequent discussions with industry and Governments.

2. THE ELECTRONIC COMPONENT INDUSTRY

Electronic components can be defined as the smallest complete units of an electronic equipment; they include a wide range of products from

resistors and capacitors, to CRT tubes and highly integrated micro circuits.

The industry which makes these products has been characterised by two major phases of technological innovation and advance during the last twenty years.

The invention of the transistor and of solid state technology offered a way to overcome the main problems which had so far heavily restricted the employment of vacuum tubes and relays (eg. high voltages, high power consumption, mechanical fragility, weight and size); the electronic industry then found a large number of new applications.

The introduction of the integrated circuit (IC) which made available complete self contained functional units, represented a further major progress in terms of lower costs per function, lower power consumption, faster operating speeds, higher reliability and miniaturization. The ever-growing density of integration on these devices, which can now group thousands of circuits on a tiny chip, has contributed therefore to an ever wider diffusion of electronic applications in almost all sectors of the economy.

The total world market for electronic components grew from 6850 MUA (1) in 1965 to 14560 in 1973 and is expected to reach 29590 MUA in 1980; the share of integrated circuit devices rose from 1.9 per cent of the total market in 1965 to 11.5 per cent in 1973 (and an estimated 19.2 % in 1980), whereas their cost per unit dropped by several orders of magnitude.

The total component industry is thus comparable in economic scale to the data-processing industry; while the falling cost and size of IC devices is bringing explosive expansion of their applications.

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(1) German plan for Electronic Components - 1974-78

3. EUROPE'S INDUSTRIAL POSITION

The relative position of the European semi-conductor industries vis-à-vis their American and Japanese competitors is shown in Table 1.

On the world scene, only Philips is amongst the leaders in terms of size; the second largest European component manufacturer is only in 10th place.

Moreover, the more advanced the technology, the weaker the relative European position. The European component industry is well-placed and satisfies the bulk of European demand in the sector of passive components, where demand exceeds production only by 4 % (Tables 2 and 3). But its position in the sectors of semi-conductor discrete devices (24 % of demand satisfied by imports) and integrated circuits (44 %) is dramatically worse.

TABLE 1

Estimated turnover of leading manufacturers of semiconductor components in millions UA in 1973

United States	
Texas	470
Motorola	354
Fairchild	223
RCA	131
National Semi-conductors	116
ITT	92
G.E.	81
SIGNETICS	77
General Instruments	77
Europe	
Philips (N)	250
Siemens (FR)	89
SGS (I)	65
AEG (FR)	62
SESCOSEM (F)	54
Plessey	30
Ferranti	12
Japan	
Hitachi	162
Toshiba	108
NEC	100

Source : Programm Elektronische Bauelemente 1974-78 Bundesrepublik - fig. 1

TABLE 2

Component production in enlarged EEC (74) (MUA)

	Semiconductors	Integrated circuits	Passive Components
Belgium	32	7.7	97
Denmark	0.77	-	27
France	248	57	439
Italy	66	22	92
The Netherlands	92	17	94
U.K.	197	85	405
Germany	346	92	781
Ireland	-	-	-
Total EEC	981.77	280.7	1935

Source : Mackintosh Yearbook of West European Electronics : Date - 1976.

TABLE 3

Component market in enlarged EEC (1974) (MUA)

	Semiconductors	Integrated circuits	Passive Components
Belgium	58	15	99
Denmark	21	5	48
France	262	97	455
Italy	126	49	132
The Netherlands	78	32	120
U.K.	293	125	481
Germany	461	175	681
Ireland	-	-	-
Total EEC	1299	498	2016

Source : Mackintosh Yearbook of West European Electronics : Date - 1976.

4. THE NEED FOR A EUROPEAN CAPABILITY IN INTEGRATED CIRCUITS

Yet the possession of an up-to-date capability in the design, development and manufacture of integrated circuits, together with the skills and tools to apply them, is critical to the European economy :

- Integrated circuit devices are already key tools of the major advanced technology industries, data-processing and telecommunications, and are rapidly becoming essential to a widening range of other user industries, avionics, instrumentation, television, radio, clock and watch, toys and all types of control devices, in the industrial, automotive and other fields.

- This trend and in particular the use of LSI is changing the concept of equipment and system design with the designer of advanced components playing a more and more important and conditioning role.

- This situation requires an ever closer collaboration between the IC manufacturer and the user, which demands the presence in Europe of a strong and competitive local industry with highly developed design and manufacturing capability.

5. CHALLENGES FACING THE EUROPEAN INDUSTRY

What are the reasons for the weaknesses of the European industry, particularly in the most advanced sector of integrated circuits ?

- The European market is still too fragmented, compared with that of the United States

A recent US Department of Commerce (+) report on the industry concluded :

) Department of Commerce global market survey - Electronic components - oct. 1974

"The discrepancy between foreign and American technology in the highly complex devices, notably IC's, arises partly from the paucity of R & D funds for basic research currently available to foreign component firms. Another major factor is the small size of markets for high technology components in other countries, compared to the United States. This makes it less feasible economically for foreign manufacturers to tool up for new technology market lines. Furthermore, foreign producers usually make major investments in advanced componentry production only after a U.S. originator has marketed a new product and proved its commercial success."

In short, the size and advanced character of the U.S. market, together with the diversified, even divided character of the European market, means that products tend to be developed first in the United States, and then to be marketed in Europe once economies of scale are already being achieved and prices falling. European manufacturers of standard advanced components thus tend to come late into the market at an economically disadvantageous time.

- The United States industry has a well established technical leadership (aprox. 2 year gap in advanced product lines in 1974) and though the market share of certain European manufacturers is substantial when all types of components are considered, in the field of digital integrated circuits, American manufacturers dominate the European and world scene in terms of market share (80 % of components to the European DP market in 1974 (1)).

According to the U.S. Department of Commerce, the demand for more advanced components will continue to outspace local production in Europe as well as in other countries. This fact is brought home by the following predictions of European production and market for IC (1).

Total production in western world 1974 : 1800 MUC
forecasted for 1980 : 3600 MUC

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(1) European Periinformatic industry - SEMA 1976.

TABLE 4

PRODUCTION

	USA	JAPAN	EUROPE	OTHERS
1974	62 %	24 %	14 %	-
1980	64 %	25 %	10 %	1 %

TABLE 5

CONSUMPTION

	USA	JAPAN	EUROPE	OTHERS
1974	48 %	25 %	23 %	4 %
1980	42 %	26 %	26 %	6 %

- Europe's commercial deficit for IC alone is expected to grow from 200 M US $ in 1974 to 740 M US $ in 1980.

In this sector, as in other sectors of advanced technology, a major impetus has come from Government programmes in the U.S. and Japan :

- American Federal Government funding continues to provide around 50 % of the R & D expenditure of major US component manufacturers as it has done for the last 15 years. US official support for R & D in the component industry is said to be some 500 M US $ a year (1).

- In Japan the three major national computer manufacturers have joined with the telecommunications industry (National Telephone and Telegraph Public Corp., together with Nippon Electric and Hitachi) to develop very large scale integration to compete against IBM's fourth generation computers.

(1) French delegation report 9.1.1976

A four year plan to support VLSI (Very Large Scale Integration) has recently been approved : Industry and public authorities will between 1975 and 1979 spend about $ 330 M including some $ 200 M of public money These crude financial facts, however, are not enough to explain the dynamic posture and success of the American, and in the future possibly the Japanese integrated circuit industries.

The essence of both these challenges was the establishment of ambitious national goals for the total electronic equipment industry, and the creation, in consequence, of a large advanced and demanding market for integrated circuits. In the case of the United States, the goals were set by the space program, with its pressing demands for miniaturisation, and by defence :

market which together were larger, in the 1960s, than the entire European market for electronic equipment. In the case of Japan, the new market goals set for the VLSI programme are to match and beat the systems requirements of what is known or thought about IBM's new "Future Series" of computers, and to provide new advanced components to meet the requirements of future generations of electronic telecommunications switching.

Knowledge acquired from Federal Government funded R & D is made widely available to the US industry as a whole within an environment which constitutes, in a sense, a common market in people and ideas; people move freely and frequently from company to company. Finally there has emerged that special US industrial blend between large and powerful companies (which have the resources to maintain a worldwide market presence, massive R & D and advanced large scale production)and a range of initially small, fast growing entrepreneurial concerns that have pioneered new markets and products and rapidly grown to become large themselves. Abundant risk capital has been available to support them.

Agressive business skills, innovative marketing techniques and extensive customer applications assistance and product tailoring are still considered of vital importance to sustain leadership.

As for Japan, in a totally different climate, the setting of bold ambitious longterm goals, which are then supported by collaboration between industry and Government jointly is also a potent force.

In integrated circuits, both the United States and Japan in short have adopted vigorous offensive strategies.

6. EUROPE'S RESPONSE

Europe's response to these challenges has been essentially defensive, partly because of unfavourable features of the European environment.

A number of European Governments have recognised the key nature of the electronic component and in particular integrated circuit industries and substantial sums of public money have been invested. In 1974, the Federal Republic of Germany initiated a five-year plan for the support of the component industry costing some 80 MUA over the five years. The French Government has been spending sums of similar magnitude through a variety of programs, including those in the defence field. The British Government has been investing some 6 M UA per year in R & D in the industry. Other substantial expenditures are made in the defence and telecommunications sectors of other Member States.

These public funds, however, are fragmented between a variety of national programmes, and the requirements and markets they are designed to satisfy vary from country to country. European industry is thus encouraged to

(1) see report : "Development in the data processing sector in the Community in relation to the world situation" Chapter V - § 5.

spread resources in efforts to meet a variety of suboptimal markets. Public procurement power, when used to support national industries, is also a discouragement to other Community firms.

Europe, moreover, sees little of the mobility between companies which is such a striking feature of the US scene. Language, other barriers, and a more secretive business climate limit the movement of people and knowhow. In an unfavourable environment, and lacking the support of abundant risk capital, there are few signs of new innovative entrepreneurs. The major component manufacturers in Europe tend to be the large electric and electronic manufacturers who have seen the necessity of being in this business but find it hard to make profits in such an environment.

As integrated circuits impact on an ever-widening range of user industries, the need to have access to the most advanced technologies grows more urgent. In consequence many European manufacturers have sought licensing or other arrangements with companies in the USA. Such arrangements, however, can only bring the best results if the European companies concerned already have an advanced capability and bargaining power.

While the largest European companies (see Table 1) have the scale to match in some measure, the R & D and markets efforts of major US concerns, other Community enterprises do not.

And yet, the European industry does possess the technical ability to compete at world level, while put together the European market and the resources of European industry and Government are large enough to generate an industrial effort which could turn that potential into profitable growth.

7. COMMUNITY ACTION

Is it possible for the European Community to overcome these grave weaknesses, and to match and beat the formidable challenge from the US and Japan in the different climate of Europe ? Only if the fundamental handicaps in the environment and market of the European industry are removed, if the industry itself can respond by a collaborative effort in those areas where joint activities are possible, and if Governments can support these activities by coordinating or pooling their support.

In the belief that the political and industrial will exists to do this, the Commission proposes :

A. Markets

i) Longterm

To establish, together with a few limited but critical sectors of the equipment industry (data processing, telecommunications, defence), advanced technology goals (for the mid 1980s), based on their requirements and on the best possible scientific and industrial estimate of the technological potential of the IC industry.

ii) Medium Term

To seek to bring these user groups together with a view to joint specification of advanced components and, possibly, joint procurement. This activity can both help to create a larger and more homogeneous market for the European component industry and benefit users by creating conditions for a European second or first source of competitive supply.

A start has already been made on exploring possibilities for pooled requirements in the periinformatic sector. In the data-processing sector as a whole public procurement can constitute a useful nucleus for defining future requirements and imposing standards, such as those already agreed by the CECC.

Contacts are being developed with the telecommunications administrations with a view to exploring their joint needs.

In the view of the Commission, the defence market and its requirements are critical to the success of a European component policy and many Member States already recognise the vital importance of ICs to defence equipment industries. It is hoped that this industrial matter can be handled in a pragmatic and practical way.

B. Industrial collaboration and competition

i) Longterm

To meet the ambitious longterm goals set by equipment manufacturers, major European component manufacturers will need to create a common advanced technology capability in various areas.

Industry, in short, will need to work out together a joint technological development programme analogous to that established in Japan, and able to draw on resources comparable to those of US key industries (1).
Public laboratories might also be involved.
The European industry has already expressed willingness and interest in exploring such a collaborative programme, which would inevitably involve some division of effort between the major companies in the industry and a firm agreement between the companies concerned to exchange knowhow.
The longterm character of the work should make this possible, despite the competition between the companies on shorter term product development.
Public support for a longterm programme of this kind should be conditional on such a rationalisation and sharing of effort.

ii) Medium Term

In the short to medium term, it is neither desirable nor possible that all companies should combine, to rationalise products, and their marketing. Europe needs more than one major IC manufacturer to compete in world markets, and industrial collaboration needs to be built on exploiting and developing the market strengths of the different component manufacturers in Europe. Nonetheless, examination of the structure of the European IC.

(1) See report "Development in the data processing sector in the Community, in relation to the world situation" Table 5.10

industry has shown that few companies have the size to mount a research and development effort covering the entire range of products, and that many are operating at a loss because of the combined impact, not only of low cost foreign competition, but of an excessively wide product range combined with inadequate economies of scale. It is not possible for industry to await the fruits of a longterm joint programme of cooperation before taking steps to overcome these weaknesses on the industrial side.

It is natural and proper that individual companies should seek part of the solution in relations with American companies, which can provide them with advanced technology and marketing skills. But there is clearly scope also for bilateral commercial and industrial agreements between European component companies, for example to rationalise marketing and development of particular products or materials, to develop or specify the development of particular production and testing machinery, to acquire jointly certain American developments and to develop them further. Such agreements could form the basis for more ambitious later industrial combinations and could facilitate the movement of people and ideas that is indispensable to the longterm programme described above.

In relation to agreements for long and medium term cooperation which has just been raised, it must be specified that such agreements must take into account the requirements of the rules on competition of the Treaty (Art. 85,86). The Commission emphasises nevertheless that a strengthening of Europe structures could improve the actual competition in the world market.

C. Public Support

i) Longterm

A basic technology programme to meet the kind of goals set out under B. i) above can only be achieved if it is given continuous and massive political and financial support.

Japan's VLSI programme suggests the kind of orders of magnitude of financial resources that are involved and which, in a European programme, would have to be provided from the combined resources of industry and public authorities.

A major financial contribution from industrial companies is necessary to commit them fully to the success of the programme.

Public contribution are also necessary because industry alone is not at present generating sufficient profits to finance longterm high risk R & D on a scale to ensure success. The ratio of public to industrial investment in any such longterm programme may, however, vary from country to country, given that in one country (say Holland) the potential industrial resources available (Philips) may be much greater than those available from the public sector whereas in others (say the UK and France) the opposite may be the case.

For such a common programme to be successful all partners must make a contribution surpassing a certain minimum threshold in terms of either skills and acquired know-how or finance. In the absence of such a major effort by all partners, the risk and cost of the commitment to share know-how and effort fully, will not be acceptable, particularly for the more powerful and advanced partners. During the coming months, in which the details of a common programme will be explored with industry and governments, all partners will therefore have to take fundamental political economic and technical decisions, to commit the necessary resources of share know-how and results. At this stage the Commission considers that it would be premature to make detailed proposals on the form of public support for such a programme, but certain factors are already apparent.

Some national funding is essential to commit and involve politically the full interest of key Member States, and to meet the concerns of Member States without a strong component industry who would find 100 % Community funding unacceptable.

In the view of the Commission, an element of Community funding is, however, also necessary, to guarantee to all participants that commitments to rationalise and pool efforts are fulfilled.

The form of such a support will have to be decided when discussions between industry, Member States and the Commission are more advanced.

ii) Medium-Term

To support and encourage bilateral commercial and industrial associations between Community companies, it is proposed to use the Community premium scheme described in the data-processing program. The products considered

which, for the time being, are limited to the data processing applications sector, and the eligibility criteria we set out in the Annex to the draft Council Decision on a multi annual programme for the data processing sector. Budgetary indications are set out in Annex C-2.

If discussions with the electronic components industry and users suggest a wider application of the Community premium scheme to components, intended for sectors other than data processing (such as telecommunications) or to manufacturing and test equipment, the Commission will make a proposal in 1977 at the same time as the proposals on the long term programme mentioned above.