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The Construction and Consequences of EC Industrial Policy: Lessons from the Electronics Sector

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1. Introduction

European Community policy for the electronics industry1 emerged in the late 1970's, as the failure of national champion policies was becoming widely evident. The symbolic starting point was a set of meetings initiated by European Commission Vice President, Viscomte Etienne Davignon, with the chief executives of Europe's twelve largest native2 electronics firms. These 'round table' meetings were the first serious attempts by the European Commission to establish a close working relationship with the European electronics industry. They signified a new departure in policy-making: both a new policy bargaining axis, and the genesis of European level efforts at competitive enhancement.

Three main arguments are advanced in this paper. First, the past decade has witnessed a sea-change in the nature of the agenda-setting and policy-making processes for the EC electronics sector. EC policy-making has gone from being an intra-institutional consensus-building process, to a multi-sided bargaining process. The role of non-governmental actors in policy formulation and implementation has increased significantly since the early 1980's. In particular, large European high technology firms have significantly enhanced their policy bargaining position in relation to public sector actors. Firms have gone from being 'policy outsiders' to 'policy partners'. In fact, EC policy for electronics substantially derives from bargaining between the European Commission and large European electronics firms - the firms frequently exerting the most influence over the final policy outcome.
Second, at a 'sub-pentagonal' level, EC policy results in part from intra-Commission bargaining. Ideological cleavages exist as much within the Commission as they do within the Council of Ministers.

Thus, policy is in part an outcome of intra-Directorate-General (DG) rivalries, and bargaining between those bureaucrats and Commissioners of different ideological persuasions.
Third, despite the rhetoric and the stated intention to move towards greater liberalisation, policy for electronics retains considerable interventionist elements. These are particularly prevalent in trade policy issues. The official Commission position on industrial policy advocates a middle-way between government-directed firm strategy, and free market competition. However, the policy reality often resembles a 'protective partnership', i.e. selective, firm requested government intervention. Although verbally shunning sectoral policies, the Commission has identified certain industries as 'strategic', and apportioned them special policy treatment. The European-based electronics industry has long been in a preferential partnership with the EC.

2. International State-Firm Bargaining

Although often diametrically opposed, and never identical, public policy and corporate strategy can converge at certain times, and in specific circumstances. Peterson (1991) supports this conclusion. He cites the Single Market programme as an example of such convergence, arguing that it was launched largely because both European governments and industry reached consensus on its desirability3. A significant actor which Peterson omits however is the European Commission. We contend that in certain cases, such bargaining takes place primarily between firms and EC institutions - national governments participating via the EC Council of Ministers. The concept of 'bargaining' is taken here as meaning the process whereby "an agreement or contract establishes what each party will give, receive, or perform in a transaction between them"4.

Strange & Stopford (1991) and Tucker (1991) argue that contemporary industry-specific policy is shaped through a process of government-firm bargaining. Thus, in effect, the entire nature of international economic relations has changed fundamentally, as the negotiating power of firms within the international arena, has increased significantly. As Strange (1992) puts it:

> governments must now bargain not only with other governments, but also with firms and enterprises, while firms now bargain with governments and with one another5.

Hence, not only has the nature of government-industry relations changed, but as Strange & Stopford (1991) conclude, the entire nature of international diplomacy has been transformed as "industrial policies and economic management" replace conventional military-based foreign policies, as the chief form of inter-state competition6. These authors develop the notion of a 'Triangular Diplomacy' within international policy bargaining. They argue that within the contemporary international political economy, the notion of 'diplomacy' must be expanded to include power bargaining with and between transnational corporations. Thus, states must now bargain both with each other and with global firms; whilst global firms also bargain with each other [Stopford & Strange 1991: 19-23].
Our 'Pentagonal Diplomacy' notion attempts to expand the Stopford & Strange model in specific applications. That is to say, when applied to the unique institutional structure of the European Community - which is an international setting, given that it consists of fifteen nation states - an extra dimension must be added to the bargaining process. In analysing, within an EC context, how firms and governments relate to and negotiate with one another over defined mutual goals, one must include another player or level of "governance"7 within the paradigm, i.e. the European Commission. Thus, two other "angles" must be included, to transform Stopford & Strange's triangle into a pentagon8. Governments must thus negotiate not only with other governments and with firms, but also with the Commission; and firms must bargain with other firms, governments, and with the European Commission. Hence, what emerges is more along the lines of 'pentagonal diplomacy', rather than triangular diplomacy [Diagram 1]. Such a five-sided bargaining structure is complex, because the interplay varies according to the specificities of a particular bargain. In effect, the pentagonal diplomacy concept is a framework for analysing and explaining how industrial policy develops within the European Community. It entails five interlinked sets of negotiating bargains: state-state, firm-firm, state-firm, firm-European Commission, and European Commission-state. All five bargaining sets come into play for each industry. However, the policy impact of the individual sets varies according to the industry. Thus, for some industries, the firm-Commission interplay is negligible for instance; whilst for

others, it may be the state-state bargain which has little input into policy development. The intention is to determine which bargaining set(s) dominate a particular policy-making process; which of the public and private sector players involved in the policy sphere actually define and drive a given policy. Government-Commission bargaining (which is usually an intra-institutional procedure, between the Commission and the Council) can be a rigorous ordeal, or it may merely constitute a Council "rubber stamping" of a particular policy. Similarly, Firm-Commission negotiating can be central to the development of a particular policy, or it may be peripheral, if not irrelevant, to the policy process. Competencies within the EC still vary, and firms can thus end up bargaining either with governments, with the European Commission, or with both.
This state-firm bargaining concept is further supported by Dunning (1993), who argues that the entire nature of government-firm (or more precisely, multinational enterprise) relations has changed during the last three decades from one based largely on conflict, to one based primarily on cooperation. He gives the reason for this change as mainly due to states coming to view multinational corporations as engines for national competitive advantage enhancement9. Thus, a bargaining situation develops on policy issues, within which the multinational enterprise has an equal, and sometimes dominant, position [Dunning 1993; Blomstrom & Lipsey 1993; Stopford & Strange 1991].

3. The Liberal Policy Mask

The European Commission argues that it has moved away from policies of sectoral preference and industrial intervention. The more recent policy statements emphasise a new commitment to creating a 'suitable business environment' for all industries, and the establishment of a 'promotional partnership' between the EC and corporations, in order to enhance European firms' competitive advantage in the global market. Let us take a closer look at EC electronics policy this decade, and decide if the EC is indeed beginning to throw off the shackles of strategic targeting and interventionist electronics policy instruments.

A significant development in EC policy for high technology was the 1990 decision to clearly define and establish an EC industrial policy. As usual, this decision involved a proposal from the Commission, which was subsequently adopted by the Council. The official Commission communications surrounding the introduction of a de jure industrial policy were of a purposefully ambiguous nature. Constant stress was put on the concept of 'competitiveness' and on the notion that the attainment of competitiveness is primarily the responsibility of enterprises. However, the role of governmental actors is far from weak in this process, and is more of an active 'partner' than a silent spectator:

The main question is no longer whether an industrial policy is opportune, since governments are increasingly aware that, in advanced economies, they have a major influence on industrial development and performance. The main issue, in the eyes of the Commission, is which conditions need to be present in order to strengthen the allocation of resources by market forces and thereby to accelerate structural adjustment, improve industrial competitiveness, and establish an industrial and in particular, technological, long-term framework (CEC 1990a).

The main policy document outlining this new and enhanced Community role in electronics policy, was the 1990 Industrial Policy In An Open and Competitive Environment report. Internal Commission sources10 argue that this document is indicative of the more liberal tendencies within the Commission. It is seen as a victory for liberalism over interventionism. The document's initial argument is that a growing consensus has emerged on 'the type of policy needed to lay down the conditions for a strong and competitive industry' [CEC 1990b: 1]. This consensus derives from the experience of Community policies operational since the mid-1980's. The implicit argument is that it has been recognised within the Commission that the top-down and heavily interventionist policies of the 1980's have not succeeded in enhancing competitiveness; and thus, a new post-interventionist policy set, with emphasis on global competitiveness, is needed. The communique goes on to state that the 'role of public authorities is above all a catalyst and pathbreaker for innovation. The main responsibility for industrial competitiveness must lie with firms themselves, but they should be able to expect from public authorities clear and predictable conditions for their activities'.

There is nothing new in this argument. To say that the ultimate onus for competitiveness is on firms themselves, is to blandly state the obvious. To say that this firm responsibility should be extensively supported by the public sector, is to focus on the real issue. The Commission acknowledges that firms compete for world market share but it argues that they cannot do so alone. Thus, a middle-way is advocated, between government directed firm strategy and free market competition. The result is the 'protective partnership' model. Of course, those formulating such policy at a Commission or firm level would admit to the 'partnership' notion, but would prefer to, incorrectly, describe it as 'partnership for competitiveness', lacking in all protectionist elements11. Ross (1993) lends support to the thesis that EC industrial policy has been shaped by a Commission-large firm partnership. This applies in particular to policy for the electronics sector. During his time spent as an observer within the cabinet of Commission President Delors, Ross observed that EC policies for electronics have emerged during the 1990's as a result of large European electronics firms exerting pressure on the Commission to assist them:

Jacques Delors was frequently visited by the captains and generals of European industry. A select group of them thus alerted him in spring of 1990 to the clouds gathering around European electronics (Ross 1993).

They exerted pressure through employing the economic argument, that, due to the strategic nature of electronics, if the European electronics industry was in difficulty, the wider European economy would also be adversely affected. In addition, said industrial leaders played the political card, intimating that the Community's raison d'etre may be questioned amongst the European business community, if the Commission did not attempt to assist industry in times of stiff international competition:

Delors's corporate visitors proposed expensive bail-outs and protectionism and intimated, sotto voce, that if the companies sank deeper into trouble the Community might be held responsible, with dire consequences for business confidence in the Commission's efforts (Ross 1993).

Not only did the Commission fear losing the confidence of European business (and thus losing power vis-a-vis national governments) but as several observers have argued12, the Commission saw European industry - especially high technology sectors - as potential allies in the struggle to achieve a federal Europe. The Commission endeavoured to create a common area of action for European industrial affairs and electronics was at the forefront of this undertaking. Moreover, the Commission purposefully "courted" big business, seeing them as important allies in the European integration process. As Flamm (1990) argues:

the EC seems embarked on a path toward technological integration of the Community13.

This objective - involving declining use of national R&D programmes and a much larger role for the European Commission in organising and administering national R&D initiatives - fits with that pursued tangentially for European semiconductor trade and investment [Flamm 1990: 284]. Flamm's arguments lend support to our assertion that EC policy for electronics is part of the Community's efforts to create a common area of control and action for industrial affairs. The success or failure of these efforts has important lessons for the practicality of European integration.

Let us illustrate the notion of a 'protective partnership' with some policy reality. Several examples of policy instrument implementation may be advanced to support a partnership interpretation of EC policy. The most notable realms of EC intervention are R&D initiatives and trade.

4. R&D As An Instrument of the 'Protective Partnership' Model

R&D activities emerge as the EC's dominant policy tool for electronics. Official Commission figure show that in 1993, for instance, the Community spent, in total, over 2 billion ECU (roughly $2.4 billion) on research. This sum hovered around $2 billion per annum for some years before. Much of this sum goes to projects within the Commission directed Framework programme. According to a former EC Commission Vice-President, Karl Heinz Narjes, the Community has a responsibility to

'strengthen the scientific and technological basis of European industry', in addition to actively encouraging industry to become more responsive to the global competitive environment [Narjes 1988: 396]. Thus, it is obvious that at the most senior levels of EC policy-making during the 1980's, an active interventionist view was taken towards the competitive enhancement of European high technology industries such as electronics. In addition, this policy stance had a protective, 'big brother' undertone, which implied that the Commission knew best how to tackle the competitive malaise affecting sectors such as electronics. Market reality indicates that this was not actually the case. As the US Office of Technology Assessment has argued, EC intervention and subsidisation through R&D has had little success in enhancing the international competitiveness of firms within policy targeted sectors [OTA 1991]. Numerous European policy-makers and electronics corporate executives14 argue that an interventionist EC regime will eventually lead to increased competitiveness for European electronics firms. For instance, Alain Gomez of Thomson advances the argument that European electronics firms simply need an 'adjustment period', under EC protection, and with government financial assistance, from which they will eventually emerge as strong global competitors [Fortune 20 April 1992: 159]. The influence of Gomez and other leading pro-intervention electronics executives is implicit in EC policy practices. However, as numerous academic commentators [Porter 1990; Stopford 1993] have argued, and as countries such as Japan and the United States have illustrated, successful national industries tend to be ones where intensely competitive domestic rivalries push each other to excel. By agreeing to deals that limit competition in its own electronics industry, the EC deprives these firms of their incentive to innovate.

In the aftermath of the 1991 Maastricht agreement, the Commission proposed to assess and redirect its R&D policy. The main stated reason for this change in policy was the realisation that although a strong technological base existed in Europe, serious problems existed in, firstly, attempting to convert said knowledge into marketable products, and secondly, transferring these inventions into market shares and profits. These twin weaknesses were acknowledged to be particularly worrisome in leading edge electronics sectors such as semiconductors15. Thus, the change in policy primarily entailed a move closer to market for Community R&D activities, and the encouragement of better ways for industry to quickly and effectively exploit the results of such activities. This new policy had three elements: redirecting research activities, increasing resources, and strengthening the programmes. On the first of these, the Commission introduced the notion of "priority technology projects more directly linked to key generic technologies on which the competitiveness of European industry depends"16. Many of these "priority technologies" were in the electronics sector, eg. semiconductors.

The post-Maastricht R&D policy involved an increased proportion of the Community budget devoted to research. In absolute terms, per annum, this was to be an increase from Ecu 2.4 billion in 1992 to Ecu 4.2 billion in 199717. For Framework III (1990-94), ESPRIT received Ecu 1 billion 352 million, from a total budget of Ecu 5.7 billion [Buigues & Sapir 1993: 28]. This represents almost 25 per cent of the total EC R&D budget being spent on information technologies. In addition, about Ecu 3.1 billion remained unspent after Framework II, and this sum was transferred to Framework III, bringing the total five year budget to Ecu 8.8 billion. This is a Community outlay of roughly Ecu 1.75 billion per annum, through the Framework Programme alone18. Within this, microelectronics is top of the list of five areas of research [CEC 1992: 5]. For Framework IV (1994-98) the agreed amount of finance for information and communication technologies is Ecu 3 billion 384 million, from an overall budget of Ecu 12 billion19 [CEC 1994a: 3-4] This sum shows a significant increase in the proportion of the Framework budget which is apportioned to ESPRIT; the percentage share for information technology has been increased to about 29 per cent. Such an increase was partly in line with natural increases and partly to help fund the priority technology projects.

The fundamental effect of these changes is to increase the Community's influence on European collaborative R&D initiatives.

5. Trade Tools and Protective Partnership

The EC utilises several trade policy tools to protect the electronics sector from full exposure to global competition. These include high tariff levels, local content rules, the Procurement Directive, rules of origin, and anti-dumping legislation. We will briefly examine how these trade instruments affect the ability of one electronics sector - semiconductors - to compete.

In spite of liberal overtones, numerous protectionist element remains in EC trade policy for semiconductors. One of the most controversial of these is the 14 per cent tariff which the EC imposes on semiconductor imports20. At a 1992 semiconductor production conference in Ireland21, almost all of the world's leading chip makers expressed their dissatisfaction with what they described as the EC's "unfair and inconsistant" tariff policy. More specifically, the conference delegates highlighted two aspects of the overall policy for special criticism. Firstly, the high duty on semiconductor manufacturing equipment, and secondly, the varying duties the EC imposes on components22. For instance, US chip giant Intel estimates that the 25 per cent EC duty on production equipment added $125 million to the cost of a wafer fabrication facility which Intel recently built in Ireland. Intel Europe's director and general manager, Hans Geyer, describes the EC tariff system as another manifestation of protectionist policies, and states that such policies

make systems manufacturing in Europe more expensive...and by hurting our customers, the EC is hurting the industry23.

A related policy is that involving "local content" rules, i.e. that manufactured chips which have less than 50 per cent of Community value-added, are subject to tariffs. Most local content requirements in the Community are levied by member states, on their own initiative. However, there are EC wide requirements with regards to antidumping and preferential trade agreements. Here again, several of the leading global chip makers have had conflicts with the Commission (and with indiviidual member states) regarding the very high level of local content required in the chips they sell in the EC.

The above policy is closely linked with another controversial and protectionist element of EC trade policy - the Procurement Directive agreed by the EC Council of Ministers in February 1990. The main thrust of this directive is that contracting bodies may refuse tenders, if 50 per cent or more of the value of manufactured products forming part of the tenders is of non-EC origin. A further dimension of this directive is that when EC and non-EC tenders are considered equivalent, the former must be preferred24. The US has expressed its reservations regarding the 1990 EC Procurement Directive, given its discrimination against non-EC manufacturers.

Another interventionist element of EC trade policy affecting semiconductors is "rules of origin" legislation. This trade tool is directly associated with local content requirements of course, given that local content rules cannot be implemented until the products country of origin has been determined. This procedure may sound overly bureaucratic: one might argue that it is a relatively simple task to determine where a product originates - in fact many have a "Made In...." tag attached! This is true in textiles or in childrens toys for instance; however, it is not such a simple process when applied to semiconductors. Active semiconductor components go through a number of complex stages of production before they are ready for application. Due to production costs such as labour, the less complex but more laborious stages in this process are frequently carried out in countries other than those in which the chips were etched on the silicon for instance. This often means that the design and processing of chips will occur in a firm's home country, such as the US or Japan; the assembly of said microchips will take place in a country where labour costs are low - frequently south-east Asia; and the final testing of the chips will be in the country where the export buyers are located, for example, EC countries.
In 1989, Commission Regulation (EEC) No. 289/89 came into force, determining the origin of integrated circuits. This regulation (binding in all member states of course), adopted a clear and stringent aproach in determining the country of origin for chips. Clear account is taken of the multi-leveled production process for integrated circuits, and of the fact that this entire process chain usually involves two or more countries. Also, most importantly, the Commission takes account of the difference in value between stages of production:

Whereas Article 5 of Regulation (EEC) No.802/68 lays down that a product in the production of which two or more countries were concerned shall be regarded as originating in the country in which the last substantial process or operation that is economically justified was perfomed.....Whereas, for integrated circuits, the variety of operations which come within the scope of manufacture makes it necessary to establish the last substantial process or operation25

Thus, the Commission stipulates that the manufacturing operations following diffusion (eg. assembly and testing) do not - seperately or collectively - constitute sufficent value-added to warrant "country of origin" status being given to the country in which they were conducted. Instead, the regulation determines country of origin as that country in which the knowledge-intensive chip creation stage occurs, i.e. where the microchip is given all its functional capabilities.
In effect, this regulation severely limits microchip imports into the Community. It de facto requires non-EC chip producers to establish chip fabrication facilities within the Community - if they wish to avoid punitive measures on imported products, and enjoy full access to the EC market.

Taken together, import tariffs, rules or origin, the Procurement Directive, and local content requirements, are elements of an EC policy for semiconductors which has obvious and rigorous protectionist tendencies towards imports. As Tyson (1993) argues:

European rules of origin combined with various local content tests to meet the rules, can determine the eligibility of foreign firms for the the following benefits of the unified European market: exemption from residual national quotas, eligibility for government procurement, avoidance of antidumping duties, and eligibility for [EEA] and other preferential trading arrangements26.

A fifth protectionist trade instrument employed by the EC vis-a-vis electronics, is anti-dumping legislation. Anti-dumping is a legal instrument employed by the EC against companies which are alleged to be importing products into the Community at below market prices. Between 1987 and 1991 alone, fourteen anti-dumping investigations were initiated against electronics firms. The companies under investigation were mainly Japanese and South Korean [CEC 1992b]. Such East Asian firms were not necessarily dumping, but could simply have been producing at lower costs. As Ernst (1993) argues, Europeans have cried foul on this practice simply to protect more inefficent European producers27. It is difficult to establish the actual production cost of Japanese and Korean microchips. Thus, we cannot categorically prove whether or not these East Asian firms were actually dumping.
To illustrate the increasing role played by antidumping legislation in EC trade policy, one can see that between 1987 and 1991, the EC Commission initiated 169 antidumping investigations, involving imports from 33 countries. Two leading semiconductor producing countries - Japan and South Korea - were at the top of the list in terms of antidumping investigations. The country most involved was Japan, with 21 investigated complaints; and South Korea was third, having 19 claims against its firms investigated by the Commission28. Of these cases, fourteen concerned the electronics sector. More specifically, three were concerning semiconductors - two against Japanese and one against Korean producers.

We have advanced evidence to suggest that a protective partnership exists in the nature of EC policy for semiconductors. This is evident in both the R&D and trade policy instruments which the Community employs. This reality is in conflict with the main thrust of Ostry's innovation policy model for industry. The essence of that model is to promote structural change and improve international competitiveness [1990: 53]. Our findings indicate that EC policy is actually distorting structural change and probably hindering competitiveness. The innovation policy approach does however fit with the official stated aim of EC industrial policy for electronics29. Thus, significant changes must occur if EC policy reality is to fit the rhetoric.

6. Intra-Commission Rivalries in the Creation of Electronics Policy

Sandholtz (1992) has argued that ESPRIT represented both a major change in European policy-making for high technology, and an interesting case of international cooperation. The dismal past record of cooperation between governments in high technology sectors, added to the generally perceived sensitive, national security associated nature of semiconductors and computers, combined to make ESPRIT quite an unusual initiative. It is further argued that, unlike other forms of government-government-firm-firm collaboration which had occurred in Europe, ESPRIT was unique given that its political leader was itself an international governmental actor - the European Commission [Sandholtz 1992: 2]. Sandholtz in fact argues that, through ESPRIT, the European Commission actually 'seized the

initiative', and exercised policy leadership [1992b: 274]. This is a rounded rejection of the realist argument that 'international organisations' such as the European Commission, are irrelevant in any analysis of international cooperation.

Peterson (1991) argues that the 1990s have witnessed an increased transparency in the administration of EC R&D programmes. Due largely to pressure from the member states, the policy has become more exposed to outside assessment - conducted mainly by independent groups of experts (eg. the ESPRIT Review Board). This development has seen a greater role (at least formally) for university and private research labs within the policy-making process. Thus, they must now be considered in any EC bargaining model. Peterson also supports the notion that Commission Directorate-General XIII (Telecommunications, Information Market, and Exploitation of Research) has been (and continues to be) interventionist. Particularly during the early to mid-1980's, in collusion with the Big 12 information technology firms, Directorate-General XIII dominated EC collaborative R&D programmes. He goes on to argue that this central role of DGXIII has been significantly reduced, as the structure of Framework III (with increased emphasis on the role of SMEs etc.) has witnessed more administrative power swinging to less interventionist DG's such as DGXII (Science and Research)30.

Contrary to popular belief, the Commission is not a monolithic entity. As a multinational institution, it endeavours to contain several divergent political and economic cultures. The most prominent and vigorous intra-Commission schism is the divide between the open market, liberal trade cultures of the Community's northern members, and the more protectionist, Colbertist cultures of France and the Community's southern countries. This largely bipolar divide is particularly evident in industrial policy-making. Thus, tensions arise in both the Council of Ministers and the Commission, between those who favour a 'minimalist' approach - seeing competition policy as the main tenet of industrial policy - and those who prefer a 'maximalist' approach - advocating an active, interventionist industrial policy regime [Sharp,1991:177]. A constant struggle rages between individual Commissioners and Directorate-Generals, to determine policies for so-called 'core' technology industries. This argument is sustained by a number of senior Commission officials31. Ross (1993) argues that Directorate-General IV (Competition Policy), is the most liberal Directorate-General, and has consistantly been the most opposed to interventionist policies for the European electronics sector, and, indeed, has been opposed to the very notion of a 'strategic industry'. It strongly condemned the 1991 'State of Play..' report (which was developed within DGXIII). Directorate-General III (Internal Market and Industry) is not as vigorously free market, but it does have more market-oriented tendencies than Directorate-General XIII, and it did disapprove of the 'State of Play..' communication. It did not like the notion of 'strategic industries' either. Directorate-General XIII is the most interventionist DG, and the most collusive with big business. It has consistantly supported strategic targeting. [Ross 1993; 1995]. Directorate-General XIII is traditionally viewed as a bastion of dirigisme.

The process has become more complex, as the number of actors that significantly influence the policy bargaining procedure has increased. More checks and balances now exist on the Commission, and the general policy-making process is more transparent and inclusive. However, this fact does not appear to have exposed the weaknesses inherent in this policy, nor altered its broadly interventionist nature. Perhaps the late 1993 movement of information technology R&D responsibilities from there to Directorate-General III was a symbolic move, intended to illustrate a desire on the part of the Commission to finally move in reality towards a more liberal regime for information technology. Official Community policy statements indicate that such a power shift has indeed occurred. The policy reality does not fit with this alleged development though. Interventionist elements remain powerful within the Commission policy-bargaining process, and de facto, continue to determine policy. This decade has witnessed the strengthening of Commission liberals, and the attempt to incorporate their approach within the Commission agenda for electronics. Thus, more recent policy statements contain a much greater liberal flavour than previously. However, the interventionist policy tools implemented during the 1980's have not been repealed or superceded. If anything, they are often enforced more rigorously than during their ideological prime.

7. The Main Policy Actor for Electronics

Mason (1992) argues that for cars, EC policy-making is a member state-dominated process. Thus, in theoretical terms, he comes down on the side of the neo-realists, perceiving the EC as a loose network

of inter-state bargains, controlled by national governments. Governments dominate the European Commission, and not the other way around, as neo-functionalists might have you believe.
This work subscribes to a different principle from both the neo-functionalist and neo-realist schools. This approach attributes influence to both sources of political authority (EC and national), within the policy bargaining process. However, for the electronics industry, the process is dominated by large firms. As Green (1993) argues, neither intergovernmentalism nor neo-functionalist theory takes account of the firm as an actor within EC policy-making32. Neither is sufficent to analyse recent EC policy-making for industry, as neither can adequately explain the increased influence of the firm within this process.
Other academic studies support our emphasis on the central role that firms play within (EC) policy-making. From their study of European government-industry relationships in both the telecommunications and consumer electronics sector, Cawson et.al. found that

even where governments were acting strategically in the promotion of industries and products, outcomes were ultimately decided by the strategies of firms [1990: 361].

Firm bargaining power was particularly strong in situations where governmental actors set 'performance' objectives, such as the competitive enhancement of the domestic electronics industry. In these situations, government is trying to set both the policy means and ends - a situation which gives more bargaining power to the corporate actors, without whose specific actions the policy ends could not be achieved [Cawson et.al. 1990: 362]. This supports our argument concerning the role of firms in EC policy for electronics industries such as semiconductor components. Such policy has specified 'performance' objectives (competitive enhancement), thus giving semiconductor producers greater policy bargaining strength relative to EC governmental agents.
Similarly, Junne (1992) argues that large firms occupy centre stage in the creation and control of EC policy for areas such as trade and the environment. He argues that they influence policy-making both through their economic activity, and through their political interventions [1992: 23]. These transnational corporations get directly involved in policy development when their interests are at stake, or when their cooperation is needed in order to implement specific measures:

Their relationship with the Commission (and national political bodies) implies more than that od the normal lobbyists who try to impose their vision on government. Representatives of MNCs are often called in by government (or the Commission, for that matter) because of their in-depth knowledge of specific affairs which civil servants would lack [Junne 1992: 24].

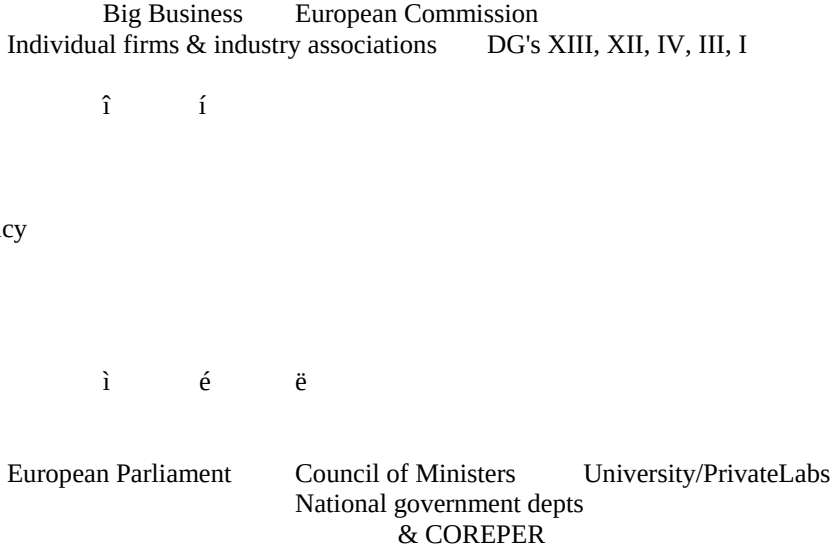
As we have already seen, George Ross (1992: 1995) substantiates this argument. As an observer within the Delors Cabinet during 1991, he witnessed first-hand the direct and high level relationship which existed between the Commission and the European electronics industry. Frequent meetings occurred between President Delors and the Chief Executive Officers (CEOs) of some of Europe's industrial giants33. The overall objective for both parties was to halt the competive decline of the indigenous European electronics industry. Delors participated in such meetings because he believed in the need for a corporate input into industrial policy formulation. He listened even more attentively to the electronics firms because of their implicit threats to withdraw their political support for the Community (and thus for the integration process) if their views were not adequately accounted for in the policy-making process [Ross 1995: 115-6].

It is evident that a complex set of bargains exist between firms, firms and the Commission, the Commission and the member states (usually through the Council of Ministers), member states themselves, and states and firms, in order for EC electronics policy to emerge. However, the empirical evidence shows that two other, more peripheral actors must now also be accounted for in the bargaining process. They are, firstly, the European Parliament; and secondly, non-governmental, non-corporate members of the scientific community (i.e. from university or private research labs). The European Parliament's function in approving EC R&D spending, and its increased willingness to use this role to question and delay related policies, means that it must be considered within certain parts of the policy-making process. The existance of independent R&D policy assessment panels, and the new

'European Assembly of Science and Technologies'34, indicates that university and private research labs also influence policy choices at certain times in the policy-making process.
Thus, one is faced with the option of expanding the pentagonal diplomacy model to incorporate two further actors. However, given the fact that neither of the two players mentioned above have a significant impact upon the policy bargaining process, and generally only influence certain parts of the policy set (mainly collaborative R&D initiatives), it is not deemed necessary to include them within the pentagon. Instead they may be viewed as linked external variables, which influence certain sides of the pentagon at particular times.

Thus, in summation, the EC bargaining process which has been outlined comprises five categories of actors: firstly, on the Commission side, Directorate-Generals XIII (Telecommunications, Information Market and Exploitation of Research), III (Internal Market & Industry), XII (Science & Research), and to a slightly lesser extent, I (External Relations)35, and IV (Competition Policy); secondly, on the Council of Ministers side, assorted national government departments and COREPER (national permanent representatives to the Community); thirdly, the European Parliament, on budgetary issues; fourthly, university and private research laboratories; and finally, most of the leading European-based electronics firms.
Of these, the most important actors are Directorate-Generals I, III, IV, and XIII of the EC Commission, and the large European electronics firms.

EC Policy-Bargaining for Electronics:
The Actors



One can see that the process has become more complex, as the number of actors that influence the policy bargaining procedure has increased. It may be argued that more checks and balances now exist on and within the Commission, and the general policy-making process is more transparent and

inclusive. However, this fact does not appear to have exposed the weaknesses inherent in this policy, nor altered its broadly interventionist nature.

8. Some Policy Consequences

How can one rate the "partnership" between EC governmental actors and industry in creating competitive advantage for specific European information technology sectors? More particularly, how is EC policy affecting the competitiveness of European electronics producers?
The 'Porter Diamond'36 was created as a means of conceptualising the interrelated components which together comprise a nation's competitive advantage. For Porter (1990), government's role in establishing competitive advantage for an industry is to stimulate improvement and innovation domestically. He stresses that it is up to the industry alone to actually compete though. Thus, the Diamond advances four attributes which shape the domestic competitive environment for corporate enterprises, and by extension, enhance or hinder the domestic firms' competitiveness in the global market. In brief, they are factor conditions (eg. skilled workforce), demand conditions (eg. sufficent domestic economies of scale), related and supporting industries (eg. having a software industry in addition to a computer hardware industry), and firm strategy, structure, and rivalry (eg. regulatory systems such as EC competition policy)37. These four Porter Diamond attributes comply perfectly with the present EC policy approach for semiconductors, and electronics in general. This is actually not a surprise. In searching for a more acceptable policy structure, the EC Commission set upon Porter's model, correctly seeing it as en vogue amongst large segments of the international business and governmental community. One can see Porter's concepts throughout the 1990 Industrial Policy in an Open and Competitive Environment Commission report. Indeed, his competitve advantage model is mentioned by name in the document. Policies have been implemented for human capital development ('factor conditions'), sufficent economies of scale, through the Single Market programme ('demand conditions'), developing links between enterprises at different stages in the production cycle, and encouraging the development of indigenous semiconductor design and equipment manufacturers ('related and supporting industrues'), and, through competition policy, to regulate corporate structure and behaviour ('firm strategy, structure, annd rivalry').
Thus, if one sees any utility in the Porter model and if it has been applied to the EC policy structure, why has competitiveness not improved?
The answer lies in the important extra-Diamond variable, government. As argued previously, government (or governmental actors such as the European Commission) should not attempt to control competitive advantage. If it does, the competitive diamond will be distorted. Although unable to control competitive advantage, there is no denying the influence which public policy can have on said phenomenon [Porter 1990]. Therefore, the argument here is that the overall thrust of EC policy has failed to enhance the global competitiveness of the European electronics industry because it has been overly interventionist and frequently directed at the wrong areas. Thus, using Porter's model, one can argue that the nature and extent of EC policy has upset the balance of the Diamond and adversely affected the competitiveness of European electronics producers. We suggest a number of ways in which the Community could change its overall policy structure. These include the abolition of trade tools such as antidumping, rules of origin, and import tariffs, which merely protect uncompetitive European-based firms; the phasing out of large collaborative R&D programmes which are administered by the Commission; greater emphasis on funding of basic research within the framework of the industry-led Eureka initiative; and more promotional assistance - through training schemes, technological diffusion, etc. - for start-ups and young SMEs' within the electronics industry.
Such changes may reinforce the Diamond and finally permit the creation of a viable domestic competitive environment for European producers. After that, it is up to the firms themselves to build competitive advantage and capture greater global market share.

9. The Firm-Commission Bargain: A Theoretical Frame

Moravcsik (1994) perceives nation-states and their diplomatic representatives as the most important actors within the EC decision-making process. He argues that 'non-governmental organizations rarely participate in decisive decisions; where they do, they rarely enjoy decision-making power' [1994:9].

Firms do however (in specific circumstances) play a significant role in the EC decision-making process [Sandholtz & Zysman 1989; Cawson et.al. 1990; Green 1993]. One cannot ignore the changed role of the firm in the policy process. Large European high technology firms have significantly enhanced their policy bargaining position in relation to political actors. The thrust of EC policy for electronics industries has derived from bargaining between the European Commission and large European electronics firms. National governments (and the European Parliament) have generally only entered the process in a consultative way, or to give policy compromises final approval. This firm-Commission bargaining partnership has come to the fore since Jacques Delors became Commission President in 1985 [Green 1993: 35]. In the spirit of French social Catholicism, Delors has always advocated dialogue and cooperation between industry and government. The notion of 'policy partnership' may be distinguished from mainstream theories of government-business relations such as corporatism, pluralism, and private interest government. It is substantively different from pluralist conceptions of 'lobbying' or 'interest group politics'.

The essence of 'neo-corporatism', as applied to the EC, is that the future European political economy would be kept together through a "web of dense and durable, bi-, tri-, and multilateral bargaining relationships, involving public and private bodies alike" [Streek & Schmitter 1992:199]. Streek & Schmitter go on to argue that neo-corporatism assumes an underlying social structure which is effectively polarized between 'capital' and 'labour' [1992:212]. Sargent (1985) supports the argument that this polarization occurs at an EC level. She asserts that the Community institutions have endeavoured to develop a 'social partnership' with representatives of labour and capital, and that this is indicative of EC level corporatism [1985:229]. This fundamental feature of neocorporatism distinguishes it from the policy partnership which we identify within EC-industry relations for electronics. The Commission bargains only with capital, only with the management of Europe's large electronics firms. Labour does not enter the equation - certainly not at the policy-making level. As such, what we are describing for electronics cannot be conceptualised through neocorporatist theory. Furthermore, the nature of neocorporatist EC-level policy bargaining differs from that which this work describes. Although the European Commission consults with the social partners during the creation and implementation of reports and legislation, it does so neither at a high level (Commissioners are never directly involved), nor on an equal basis [Sargent 1985:239]. In effect, the neocorporatist interpretation of EC-business negotiation places private interest organisations in a subordinate role to EC institutional actors. This further distinguishes neocorporatism from the policy partnership notion, in that, first, consultation does not take place at the level of Commissioner-CEO; second, these interest groups constitute only a part of the Commission's wide consultations on a particular issue(s); and third, neocorporatism refers specifically to "organisations" and not to individual firms or a small, autonomously grouped, alliance of firms.

Although relevant to many areas of EC-business relations, 'pluralism' does not entirely encapsulate what has been occuring within the electronics sector. Lehmbruch describes pluralism as being characterised by

> the predominance of 'pressure-group' politics and the lobbying of government agencies and parliament by fragmented and competing interest groups, and by a low degree of effective participation by unions in policy-making.

Thus, unlike corporatism, there are no interest "blocks" which are sanctioned by government and which negotiate on behalf of a business sector. The interests are not "licensed, supported, or controlled by the state", nor do they exercise a monopoly within their particular business sector [Schmitter 1977:9]. It is more like a state of anarchy, with no real rules or central authority. Although one may be initially tempted to describe EC relations with the large European electronics producers as pluralist, the evidence suggests that the relationship is in fact more complex. Large European-based electroncs firms are more than mere lobby interests: they are in fact invited by the European Commission to discuss the creation and implementation of EC industrial policy. They negotiate - generally at the level of European Commissioner-corporate Chairman - and together forge the policy which is then sent for approval to the national governments.

Thus far, neither neocorporatism nor pluralism seem to account for what has occured vis-a-vis policy formulation for EC electronics. In particular, they focus on groups or industry associations, rather than on a handful of large firms acting together but autonomously.

A third theory is that of 'private interest government'. In brief, the notion arises as an alternative to direct state intervention and regulation. It involves an attempt by government to use the collective self-interest of social groups as a means for achieving public policy objectives [Streeck & Schmitter 1985:16]. In effect, Streeck & Schmitter (1985) describe it as an attempt to maximise the overlap between the specific interests ('categoric good') of particular groups, such as business lobbies, and the broader interests ('collective good') of society. The policy bargaining which occurs between public and 'private' interest government helps to define this overlap. Inherently, the theory involves a close relationship between interest associations and state or Community authorities, and a significant level of policy input from the 'private interest government' actors [Streeck & Schmitter 1985:20]. Thus, this idea comes closest to conceptualising the Commission-firm interplay for electronics policy. However, it denotes a more liberal regime than that which we describe for the European electronics industry. Being an alternative to state intervention and regulation, the theory implies that government policy is constructed entirely in accordance with free-market principles. Also, the private interest government literature does not adequately account for EC policy bargaining relationships, concentrating instead on the national level.
Thus, what we are describing cannot be adequately conceptualised through any of the existing theories or literature. The theory of private interest government does help to describe the creation and control of EC electronics policy but it does not account sufficently for the interventionist tendencies of the European Commission or for the collusive nature of the policy. Therefore, we advance the 'policy partnership' notion as the basis for further theoretical debate on the nature of EC-firm relations.

10. Conclusions

The Community has continually argued that its role is largely that of a 'competitive facilitator', i.e. the instigator of structural adjustments and the catalyst of innovation. Competitive enhancement per se, is the job of firms themselves. This is a very thin dividing line between realms of responsibility. For instance, as the changing structure of the Community Framework R&D programme has shown, it is increasingly difficult to delineate between Commission and corporate sponsored Community-wide research projects. Furthermore, consider the overall expanse of EC policy for the electronics sector: elaborate and expensive R&D support structures; competition rules which police corporate structure and practice; a wide array of policies aimed at assisting firms to comply with international environmental standards, to adapt to new production and management techniques, to have a well trained and flexible manpower pool at their disposal; trade tools which serve to restrict the impact of global competition on Community-based firms.The Commission is in all areas of activity which affect the competitiveness of European electronics producers. Furthermore, it is there with the support of a majority of all other actors in the paradigm - national governments, the European Parliament, universities, private research laboratories, and firms.
It may be argued that there is nothing unusual or unprecedented about this fact, particularly when viewed in a global context. Relations between the public and private sectors have long been close and consensual in Japan and Korea for instance. In the United States, there are many cases of government-firm negotiated intervention, eg. the 1986 Semiconductor Trade Agreement. Interestingly though, in relation to semiconductors, such partnerships do not appear to have adversely affected corporate competitiveness in these third countries.
The widely espoused 'liberal approach' which the Community is supposed to have adopted since the early 1990's, has not come to fruition. Intervention - manifest through everything from product development activities to managed trade - persists, and shows no sign of abating. The main transformation has simply been a large-scale shift in policy initiation annd control from the national to the Community level. In applying the principle of subsidiarity to electronics, one finds that most governments and firms have decided that activities are best consumated and conducted at a Community level.

The other important change in policy has been the nature of the agenda setting and policy-making processes. EC policy-making has gone from being an intra-institutional consensus-building procedure, to a multi-sided bargaining process. The role of non-governmental actors, particularly firms, has increased significantly since the beginning of the 1980's, and now frequently has an equal say in the formulation and implementation of policy. As Peterson (1991) argues:

Taken together, [the Framework Programme and Eureka] have provided industry with a significant and unprecedented role in decision-making about the goals, organization, and funding priorities of European collaborative R&D38.

In effect, a Community-firm policy partnership has developed for the electronics industry, coinciding with and overshadowing (although not completely replacing) the incestuous nationally based government-firm relationships of the 1960's and 1970's. This new partnership is even evident in the Framework programme, the former bastion of public sector driven policy for industry. Sandholtz (1992) lends support to the notion that ESPRIT developed from a firm-Commmission bargaining process:

With the help of company representatives, the Commission drafted a proposal for ESPRIT, including the strategic rationale and specific objectives in the work programme. In this sense the Commission/industry alliance was moving ahead of governments39.

Moreover, Sandholtz's findings reveal that the individual large electronics firms involved in the ESPRIT negotiations, played a vital role in convincing their respective national governments to accept the European collaborative programme [1992: 310]. Thus, their influence on the policy bargain was evident at both the national and the European level of government, displaying these firms' preeminent power position as both policy shaper and governmental mediator.

Another policy creation dimension has emerged in this work. At a 'sub-pentagonal' level, EC policy results in part from intra-Commission bargaining. Ideological cleavages exist as much within the Commission as they do within the Council of Ministers. Thus, policy is in part an outcome of intra-Directorate-General (DG) rivalries, and bargaining between those bureaucrats and Commissioners of different ideological persuasions. These differences have had a significant impact upon the creation of electronics policy. More generally, intra-Commission rivalries effect the nature of EC industrial policy. This notion that ideological conflicts between different departments of a single governmental actor partially shape policy, is not especially new. As Wilks & Wright argue, the notion of intra governmental and intra-bureaucracy policy disputes is a recurrent theme in research findings [1987: 288]. Non-Community examples of governmental fragmentation include that of the acrimonious dispute between the Japanese Ministry of International Trade and Investment and Ministry of Posts and Telecommunications, over the sponsorship and regulation of Nippon Telephone & Telegraph; and the fierce rivalry in the United States between the federal departments of defence and justice (to name only the main protagonists), for control of telecommunications policy [Wilks & Wright 1987: 288]. Thus, to argue that differences of opinion within the European Commission bureaucracy must be considered when analysing the EC policy-making process, does not set a theoretical precedent. Evidence from studies of the policy-making process of other governmental structures suggests that such intra-institutional clashes are quite common.

It is difficult - if not impossible - to establish the impact which a policy has on a firm. This is particularly true for R&D policies. The counterfactual proves insurmountable in any assessment of "competitive enhancement" resulting from R&D policy. Similarly, it is difficult to gauge the precise effect of trade tools on corporate market performance. Whilst not being able to assign definitive "success" or "failure" labels to EC policy tools, electronics policy has not had the desired effect on industry. This may mean that policy has had no obvious impact, either positively or negatively; or it may mean that a policy has distorted market forces in a way which can hinder competition.
As regards the EC 'protective partnership' for the electronics industry, it is suggested that in the medium to long term, too much collaboration can become collusive, sustain or create oligopolies, and consequently adversely affect competitiveness [Mytelka 1991]. Thus, EC electronics policy has market distorting elements. A remedy might be to restrict or abolish trade tools such as antidumping practices, rules of origin, local content requirements, and import tariffs, which merely protect uncompetitive (former national champion) European-based firms. Further restructuring of collaborative R&D initiatives may also contribute to a more competitive European-based electronics industry.
If one believes the official Commission line, as put forth in the 1990 and 1994 industrial policy documents for instance, there is an aspiration towards a purely supportive, 'environment enhancing'

role for the Community. In developing the four attributes of the Porter Diamond for building competitive advantage, this aspiration is beginning to take shape. However, EC policy does not stop at this business environment enhancement role. In directing collaborative R&D initiatives such as ESPRIT, and in employing several protectionist trade tools, it goes beyond this liberal, promotional mandate.

This paper sheds some light on the neofunctionalist assertion that any shift in policy emphasis from the national to the European level deepens economic integration and strengthens European political union. Cawson et.al. (1990) argue for instance that

It is possible that the current period is one of transition where national policies are giving away to European-level initiatives, and that it is not state intervention itself that is waning but the salience of the nation-state level within Europe [1990: 377-8].

The evidence herein tends to support large parts of this neofunctionalist position. The Commission's success in creating a common area of action for information technology affairs, has helped to solidify Europe's industrial integration. Moreover, it appears to have translated into greater political unity. This is evident in the secondary role of national governments in creating and controling EC policy for electronics industries. However, the Commission has achieved this success through a policy partnership with large firms. Neofunctionalism fails to account for the role of large firms in EC policy bargaining. As a theory, it does not therefore go far enough in explaining the creation and control of EC electronics policy.

A point worth emphasising is that this power shift constitutes more than special interest lobbying for certain industries. Instead, it comes much closer to Streeck & Schmitter's (1985) theory of private interest government. As the Pentagonal Diplomacy model suggests, for certain industries, EC industrial policy is determined jointly by corporate and governmental agents. Large electronics firms have gone from being policy outsiders until the late 1970's, to being "policy partners" since the early 1980's. Their senior executives are consulted by and negotiate with governmental actors on policy decisions. Several previous studies support this notion of large firms partly creating EC policy [Junne 1992; Green 1993]. Ross lends further support to the argument that EC electronics policy has been shaped by a Commission-large firm partnership. He reveals that a number of large electronics companies have been directly involved in the creation of EC policy for this sector [1995:115-6]. 'Policy partnerships' differ from lobby interests in that they are formed on the initiative of the Commission (Davignon's 1979 roundtable meetings); occur at the highest levels, often between Comissioners and CEOs (Delors himself met with the electronics leaders); and, on the non-governmental side, involve only a handful of international corporations, as opposed to a variety of sectoral interest groups or industry associations.

EC policy for the industry did evolve as part of the Community's efforts to create a common area of action for industrial affairs. This is evident from the 1979 Davignon 'round table' meetings with electronics leaders, through the creation of Framework and ESPRIT and EC involvement in Eureka, and culminating in the 1990, 1991 and 1994 EC industrial policy documents, wherein electronics are explicitly targeted for "special treatment". Moreover, the shift in policy emphasis away from the national and towards the EC level for this industry, established electronics as the Community's vanguard high technology industry in the post-SEA drive towards economic integration.

The increased role of Community institutions in policy for high technology industries such as semiconductors had political undertones [OTA 1991; Forum Europe 1992]. In effect, the European Commission saw European industry - especially large firms within critical, enabling industries such as electronics - as potential allies in the struggle to achieve a federal Europe:

A lot of small, national champions would become a few, big European ones, whose interests would lie with the Community, not with seperate states40.

This approach signifies a complete reversal of earlier EC attitudes. As Haas (1958) and Green (1993) have argued, during the first thirty years of its existance, the Community viewed big business as "too nationalistic", and kept them largely outside of EC policy decisions41. The post-1970's idea may have

been that that European industrial interests could be integrated through first, coordinating policy for a few large firms within key technology industries. These sectoral common areas of interest would in turn "spill over" to other industries. Neofunctionalist theory states that the logical next step would be a consolidation of wider economic integration, due to industrial unity; and this would subsequently enhance political union. Therefore, the creation of a policy partnership with large, critical technology firms, would serve to foster European industrial integration, and at the same time, gradually undermine the position of the nation state as a policy actor. Ross's arguments supported this neofunctionalist interpretation of EC strategy from the Davignon-industry meetings onwards. He states that President Delors devoted considerable attention to the leaders of Europe's main electronics firms because of their implicit threats to withdraw their political suport for the Community (and thus for the integration process) if their views were not adequately accounted for in the policy-making process [Ross 1995:115-6]. Neofunctionalism may therefore serve to partially explain the reasons why the European Commission desired to set in motion the kind of dynamic resulting in policy partnerships with the major European-based electronics firms.

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