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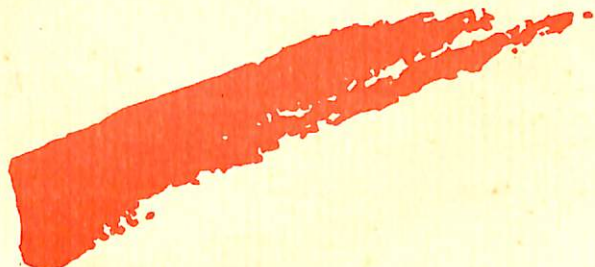
nº 302

***Industrial Policies in a Changing  
World: Brazilian Transition to the  
New Paradigm***

Paulo Bastos Tigre

Instituto de  
Economia  
Industrial  
UFRJ

TEXTOS PARA DISCUSSÃO



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Universidade Federal do Rio de Janeiro  
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Textos para Discussão

*Industrial Policies in a Changing World:  
Brazilian Transition to the New Paradigm*

Paper Prepared for the Institute for New Technologies -INTECH

Paulo Bastos Tigre \*  
IEI/UFRJ

Maastricht, June 1993



ms 95440  
\* I am very grateful to Ralph Bannell, Reinaldo Gonçalves and Maurício Moreira for their helpful comments.

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UFRJ**

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UFRJ/IEI  
TD 302  
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**Ficha Catalográfica**

TIGRE, Paulo Basto

Industrial policies in a changing world: brazilian transition to the new paradigm / Paulo Bastos Tigre. -- Rio de Janeiro: UFRJ/IEI, 1993.

49p. 21cm. -- (Textos para Discussão. IEI/UFRJ; n.º 302)

"Paper prepared for the Institute for New Technologies - INTECH, Maastricht, 1993."

Bibliografia: p. 45-48

1. Política Industrial. 2. Mudança Tecnológica - Aspectos econômicos.  
I. UFRJ. Instituto de Economia Industrial II. Título. III. Série

**SUMMARY**

1. Introduction .....	5
2. Swing in the development paradigm: from structuralism to neoliberalism. ....	7
3. The new paradigm and changes in the international order: globalization, technical change and international trade. ....	14
4. The role of the state in development: Brazil .....	28
5. Strategic Policy Changes .....	37
6. Bibliography .....	45
7. Notes .....	49

**Universidade Federal do Rio de Janeiro**  
**Instituto de Economia Industrial**  
Pálacio Universidade do Brasil  
Av. Pasteur, 250 - Praia Vermelha  
CEP 22290 - Rio de Janeiro - RJ  
295 1447 e 541 8148 (fax)

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## **Industrial Policies in a Changing World: Brazilian Transition to the New Paradigm**

### *1- Introduction*

This paper aims at discussing the role of government policies for industrial and technological development based on the Brazilian experience. Rapid technological change, globalization and the industrial restructuring are shaping new forms of government intervention worldwide. There is a growing recognition among academics and policy makers that protectionism is no longer possible in the new international order, since multilateral agreements concerning tariff and non-tariff barriers, industrial property and transborder dataflows are limiting the freedom of individual states to shelter their industry and technology. Technology innovation itself also helped to reduce barriers since telecommunications networks and cheap international air transport have substantially reduced the effectiveness of government controls. As Reich (1992:7) put it, "even items that governments wish to prevent from getting in (drugs, illegal immigrants) or out (secret weapons) do so anyway".

Following the example of other Latin American countries, like Mexico and Argentina, Brazil is shifting from protectionism to liberal economic policies. Although it is true that Brazil has been much slower than its neighbours in adopting a more orthodox and radical adjustment to curb inflation, it is also true that the country is well advanced in implementing liberal policies concerning industry and technology. This includes pursuing a wide privatization program, removing existing non-tariff barriers and reducing import tariffs, ending restrictions on foreign investment and profit remittance, and introducing a more liberal law concerning patents and industrial property.

Also, Brazil has given up protecting key sectors such as information technology. The government seems to be losing credibility and the capacity to formulate and implement new industrial policies. Consequently, it passively adopts liberal formulas of the kind suggested by international agencies such as the World Bank and the IMF.

My hypothesis is that while policy shifts were badly needed, a "hands-off" policy does not represent a sound alternative policy for industrial development. The new techno-economic paradigm requires building up new competitive advantages in order to boost competitiveness in an increasingly competitive world. In most developing countries market failures cannot be superseded without government intervention to create adequate conditions for development. The successful strategies adopted by Taiwan and Korea to develop key industrial sectors are examples of "hands-on", rather than "hands-off" policies.

The past policies of Brazil produced an impressive change in the structure of the Brazilian economy, giving support to industrial development and diversification, despite high costs, measured in terms of a substantial external debt, high inflation and uneven income distribution. But the transition from one paradigm to another produced a mismatch between government policies and the need to restructure the local industry. Both government and industry were slow to understand the need to adopt new technologies in order to compete in international markets. The local market remained sheltered from foreign competition even after the debt crises obstructed growth potential in the internal market.

Despite negative impacts of the new paradigms on existing industries, due to the Schumpeterian process of "creative destruction", windows of opportunities also opened for developing countries which had already achieved a certain degree of industrial and technological development (Perez, 1983). However, the exploitation of these opportunities requires adequate government policies and firm strategies. The new paradigm is knowledge intensive, a resource built through long term educational and research efforts. Also, it requires the development of a physical and technological infra-structure

such as telecommunications, transport and a basic technology network to support industry's needs. The state itself must also undergo a process of "creative destruction" aiming at reducing bureaucracy and acquire the capabilities and the flexibility needed to cope with a fast changing environment.

This paper analyses the changing role of the state and the basis for new industrial strategies bearing in mind three key aspects: first, it considers recent changes in development theory and policies, including structuralism, liberalism and neo-Schumpeterianism. It is not intended to provide a review but simply discuss major pitfalls in both structuralism and liberalism and suggest that alternative approaches more adaptable to the continuously changing environment and specificities of different countries are needed. Second, we raise some challenges proposed by the new techno-economic paradigm for developing countries. This includes reviewing the process of globalization, technology and organizational change. Third, we briefly analyse the historical development of Brazilian industrial and technology policies from World War II to the present. Dealing with this issue is a difficult task. A major analytical problem is to separate industrial policies, based on sectoral resource allocation, from macroeconomic policies which back up industrial development. The analysis is more directly associated with those aspects of industrial and technological policies which play a role in explaining Brazilian industrial strengths and weaknesses.

## *2. Swing in the Development Model: From Structuralism to Neo-Liberalism*

Latin American industrialization was deeply rooted in the structuralist though which emerged from the UN's Economic Commission for Latin America's (ECLA) "dependence school". The central idea was that market imperfections and new forms of colonialism led to an unfavourable international division of labour where developing countries specialized in raw material and foodstuff while importing more value-added manufactured goods from developed countries. This situation was considered

to be detrimental to economic development in the periphery since terms of trade tended to favour manufactured goods. Thus, developing countries must pursue industrialization, leaving behind their dependence on primary goods.

ECLA's view was that developing countries' economic structures were different from those prevailing in industrialized countries. In particular, the market in developing economies was considered to be socially less efficient in allocating resources. The possibilities of autonomous industrial development in the periphery was viewed pessimistically because of its subservient role within the international economy. Within this context, accumulation and expansion of capital cannot find its essential dynamic component within the periphery because of the absence of capital goods and financial sectors, the import of technology and penetration by foreign multinationals. Consequently, government intervention was considered to be essential to promote both efficiency and equity.

These ideas justified government intervention in the largest Latin American countries, aiming at boosting industrialization. The resulting import-substitution process, based on selective protectionism against foreign imports, bore fruit in providing the basis for a wide experience of industrialization. By the mid-sixties, the two largest South American countries already showed a manufacturing sector responding to almost a third of their gross domestic product. This compare with the relative distribution of the two most industrialized countries in the world - Japan and Germany - where manufacturing share of GDP was 30% and 32% respectively (see table 1). Thus, the term "semi-industrialized" and "industrializing" are barely adequate to describe the pattern of economic specialization of these Latin American countries.

Table 1

## Distribution of Domestic Product (percent)

Country	Industry		Manufacturing	
	1965	1989	1965	1989
Argentina	42	33	33	35
Brazil	33	43	26	31
Mexico	27	32	20	23
Korea	25	44	18	26
Japan	33	34	34	30
Germany (FRG)	53	37	40	32

Source: World Bank (1991) pp 209

In Latin America the "developmentalism" ideology pushed the process of import substitution ahead from consumer goods in the 50s and 60s to intermediary products in the 70s. In the early eighties, the external debt crises which provoked the Mexican moratorium halted the development process. Foreign capital was no longer available and servicing the existing debt became a major problem for most countries in the region. Mexico and Brazil answered this challenge by deepening the import substitution process aiming at creating trade surplus to service the debt. Since exports could not be substantially increased in the short run, both countries decided to increase import restrictions. Brazil, in particular, did not undertake further steps to adjust the economy to foreign currency shortage. The result was a decline in GDP and a rise in inflation. The crisis opened the field for criticism of about the role of the state in the economy.

From the 80s development theories and policies were strongly influenced by neo-liberalism, which ended up as a hegemonic paradigm in most countries and international forums. According to Schmitz e Cassiolato (1992a:6), although the neo-liberal school was already influential in some industrially advanced

countries for several decades, "in the debate on developing countries neo-liberalism has been a reaction to structuralism, the dominant intellectual paradigm of the years 1950-80". This "counter-revolution in development theory and policy" (1) basically rejected state intervention on the grounds that market imperfections were better than imperfect states. Neo-liberals believe that long-run growth can be maximized through the pursuit of short-run allocative efficiency as determined by market prices.

Neo-liberal policies are rooted in neo-classical economic theory. This has been considered particularly inadequate to deal with the process of change (Possas, 1989) because of its static nature, where elements of analysis are at rest and economic forces in equilibrium. At best it can compare two different positions in a static way. Another major limitation of neo-classical theory is the fact that it does not incorporate non-economic factors which play a key role in the development process. The technology problem is reduced to a mere matter of choice since analysis is based on the criteria of microeconomic optimization in the face of pre-determined technological alternatives. As Schmitz and Cassiolato (1992:7) put it, "variables such as technology and human resources which have an enormous influence upon long-run outcomes are relegated to a category which will look after itself". Recently, however, neo-liberals began to move away from "static" analysis and to attribute more importance to non-economic factors such as globalization in the development process.

A neo-Schumpeterian analysis, by contrast, starts from Schumpeter's central idea that technological change plays a fundamental role in the dynamics of economic activities. It is an alternative theoretical framework that has been developed since the late 1970s to cope with the inadequacies of the existing analysis of economic development based either on neo-classical or structuralist and marxist theories. Two main approaches can be identified in the neo-Schumpeterian analysis. Nelson and Winter's (1982) "evolutionist" approach (inspired by Darwin's dynamic evolution of species), is based on the idea that economic changes in a competitive environment stem from

firms' *unceasing process of search* for innovations. These innovations are then submitted to market *selection mechanisms*. It should be noted, however, that the market is not considered to be the only selection mechanism, since government policies and the strategies of firms also play a key role in selecting innovations.

A second approach is the "technological paradigm", built upon Schumpeter's theory of long cycles in economic development. It shares with the evolutionist approach the belief that technological change is the main driving force behind the transformation of market structures. Freeman et al (1982, 1987), Perez (1983), Perez and Soete (1988) and Dosi (1982, 1984), among others, have developed a theoretical and analytical framework to deal with the economic development process under existing social, technological, and political conditions both in developed and developing countries. The theory incorporates previous non-orthodox analyses such as Sylos-Labini's oligopolistic market structure and makes an in-depth analysis of the economic and technical characteristics of technology.

Essential to neo-Schumpeterian theory, according to Schmitz and Cassiolato (1992:4) is the distinction between different types of technical change: **incremental innovations** occur more or less continuously and are concerned only with the existing array of products and the process of production; **radical innovations** are discontinuous events which cannot be construed as the cumulative addition of small modifications to existing products and process but rather stem from a complete change; **new "technological systems"** consist of combinations of innovations which have ramifications for several branches of the economy; and finally **changes in techno-economic paradigm** are technological (and institutional) transformations that have such a wide range of applications that they affect the conditions of production in all sectors of the economy.

Table 2 summarizes the major differences between neo-liberal and neo-Schumpeterian approaches towards technology-intensive industries in developing countries.

**Table 2**  
**Neo-liberal versus neo-Schumpeterian approach towards high-technology in LDCs**

	Neo-liberal	Neo-Schumpeterian
Focus of analysis	Short-run costs	Interactive learning
Concept of technology	Technology as a tradeable recipe or input	Technology as tacit knowledge not easily transferred
Innovation process and	Separateness of production and diffusion of technology	Synergy of producer user
Technical progress (opportunity)	Continuous and cumulative (single-track race)	Continuous and discontinuous (opening windows of opportunity)
Concept of labour	Labour as a cost	Labour as a resource
Concept of competitiveness	Product (or price) competitiveness	Structural competitiveness
Role of the state	Reliance on market forces	Strategic state intervention
Point of entry	Late stage	Early stage

Source: Schmitz and Cassiolato (1992:9).

The present wave of transformation based on microelectronics is considered to be a change in the techno-economic paradigm, since it is radically altering the pre-existing "Fordist/Taylorist" paradigm by introducing a new best practice frontier and setting new efficiency standards. Developing countries are the most affected by a change in paradigm as we will see in the next section. But at the early stage of a new techno-economic

paradigm there may also exist "windows of opportunity" for developing countries. At this phase, knowledge is relatively freely available, since the new scientific and technical principles of product and process innovation can be learned in universities. However this is only an entry point, favoured by technological discontinuity, that must be followed by complementary investment in R&D infrastructure, skill development and the establishment of a close interaction between suppliers and the users of technology. In order to articulate industry-research links it is also necessary to build a "national system of innovation" with country-specific priorities.

The concept of a new techno-economic paradigm has important implications for development policies. Assuming that development is highly influenced by key innovations which are monopolized by a few countries, simplistic neo-classical assumptions such as that new technology is equally and freely available to all comers are rejected. The theoretical framework (such as the general equilibrium theory) used by neo-liberals is completely inadequate to deal with the economic and competitive dynamic of the late 1900s, as empirical findings stemming from economics, management studies, history and sociology have proven. Neo-liberals have greatly contributed to the analysis of government failures, in particular the costs of intervention, but pay much less serious attention to the analysis of market failures. This bias can be identified, in practice, by the trend of neo-liberal analysis to ignore successful government intervention to promote industrialization in high-tech sectors in East Asian countries like Japan, South Korea and Taiwan.

Neo-Schumpeterian theory is seen as a resurgence of work on what may be termed a structural view or perspective on economic growth and development (Justman and Teubal, 1990:44). It combines the need to understand structural and long-run processes with an analysis of market forces.



### 3- *The New Techno-Economic Paradigm, Globalization and Technological Changes*

#### *The New Techno-Economic Paradigm and its Implication for Developing Countries*

As we saw in section 2, the perception of the role of technological change for economic performance has changed substantially in recent years. A change in the "techno-economic paradigm" may take a relatively long time to crystallise and diffuse but it establishes a new trajectory of innovation, organizational structure of firms and skill requirements which the productive sector must conform to if firms wish to remain competitive. Perez (1983) argues that the development of a new paradigm involves a new "best practice" set of rules and custom for designers, engineers, entrepreneurs and managers, which differ in many important respects from the previously prevailing paradigm. She recognizes that it is not always easy for companies and countries to adapt to a change of paradigm and that depressions represent periods of mismatch between an emerging new paradigm and the old institutional framework.

The new techno-economic paradigm is associated with the development of information technology. In most leading industrial countries the production and trade of computers, electronic components and telecommunication equipment are among the fastest growing sectors. But, as Freeman and Soete (1990) have shown, the application of this new technology is now affecting, although very unevenly, all other sectors, because of its actual or potential economic and technical advantages. Since electronic equipment prices are going down and the technology is becoming more appropriate to user's needs, information technology is diffusing at a fast rate throughout industry, services and agriculture. This involves a process of change in production functions, products, and a new set of rules for engineers, managers and entrepreneurs which differs widely from the previously existing paradigm.

Such a change will affect developing countries in many ways. One of the major impacts for Latin American countries exporters

of raw materials, energy, and basic intermediary goods is that the new techno-economic paradigm is information intensive rather than energy and material intensive. Consequently it tends to reduce the use of traditional materials such as steel and other metals as the result of new designs and of the substitution of new materials for traditional ones. Steel, oil, copper and other materials account for a major share of Latin America's exports. This typical early paradigm industry is competitive in world terms, since it has favorable access to rich ore and cheap energy sources and incorporates a relatively modern technology.

As noted earlier (Tigre, 1988) one possible consequence is a trend of declining terms of trade between traditional manufactured goods and high technology products. In the late 50's, Raul Prebisch, at that time head of The Economic Commission for Latin America, showed that the prices of raw material and foodstuff exported by Latin American countries were declining in relation to imported manufactured goods. This was due to smaller price-elasticity of primary goods in relation to manufactures, since demand for these commodities were growing more slowly than differentiated, technology intense products. These findings influenced a range of import substitution industrialization policies on the continent during the following 20 years. The new techno-economic paradigm renews the danger of declining terms of trade between traditional and more advanced manufactured goods.

A second important potential long-term impact of the new paradigm on developing countries is the trend towards opening up a new "technology gap" between countries. Few countries were able to successfully develop a "national system of innovation" which was suitable for the new information-technology paradigm, integrating R&D, design, production, engineering and marketing. The development of such a system require multi-skill training, efficient computer networking and collaborative research and state support for generic technologies, and university-industry collaboration (Freeman, 1987:73). Few developing countries have been able to develop a national system of innovation to support local industry technology upgrading.

Due to its systemical and structural changes needed, catching up with established technological leaders could be harder for lagging countries in the new paradigm than it was before. Freeman (1987:97) argues that "it is no use simply importing today's technology from the leading countries, for by the time it has been introduced and efficiently assimilated, the leaders have moved on and the relative position of the various countries may be unchanged or even worsened from the standpoint of the followers". This is of course detrimental to the competitive position of developing countries since the leaders introduce new products with better performance and higher quality and change production methods by the introduction of automated equipment thus reducing the competitive advantages of countries with cheap unskilled labor. Countries lacking the adequate educational, research and development and technological infrastructure are thus disadvantaged in international competition.

However, there are also opportunities for developing countries with a minimum endowment of skills and technological resources to enter the new paradigm. Perez and Soete (1988) argue that in a changing "techno-economic paradigm from an electro-mechanical to microelectronic technical base, there are also favorable conditions for lagging countries for catching up since there is time for learning while everybody else is doing so. Given a reasonable level of productive capacity and locational advantages and a sufficient endowment of qualified human resources in the new technologies, a temporary window of opportunity is open, with low thresholds of entry where it matters most. New products have relatively low entry requirements in managerial ability and capital as compared to mature products that have exhausted their technological dynamism.

The main implication of these arguments for government policy is that the catching-up efforts require at least a partial resolution of the basic structural barriers for technology acquisition, development and diffusion. The role of the state will be to help firms entering in new and more dynamic sectors and to contribute to building up a "national system of innovation". This include developing "the intellectual or intangible capital"

as well as the appropriate regulations, incentives and structural framework to induce innovation and new forms of organization and cooperation. This will be further analysed in the last section of this paper.

### *The Process of Economic Globalization*

The process of economic globalization has come to absorb an increasing share of the attention of industrial and development economists in recent years. It reflects not only a raise in international trade, strategic alliances among firms from different countries, and regional integration, but also a belief that we are living through a transformation that will rearrange the the world's politics and economics in the coming century. A recent work on the globalization trend goes as far as to claim that "there will be no products or technologies, no national corporations, no national industries. There will no longer be national economies, at least as we have come to understand that concept" (Reich, 1992:3).

There is plenty of evidence that money, technology, information and goods are flowing across national borders more easily and rapidly than ever before. Capital controls and trade barriers are being reduced all over the world and, in particular, in regions which used to pursue cautious policies concerning foreign investment and imports like Latin America, Eastern Europe and East Asia. The flow of money and information (and consequently trade) has been much facilitated by new technology such as satellite communication, fax, and modems.

For developing countries, integration with the global economy may provide opportunities for technology transfer and economic growth. A more open trade and investment regime may facilitate technology acquisition through imported inputs such as capital goods and components. Another source of technology transfer from trade occurs through exporting. "Exposure to international markets keeps exporters informed of new products, and foreign buyers are an important source of information that can be used to upgrade technology" (WB, 1991:89). However, there is not yet enough evidence to prove that the world as a whole is becoming

more interlinked. Rather, globalization seems to be restricted to certain regions and products. Also, as the evidence provided below suggests, the benefits of global integration have been harvested by few developed and developing countries, which succeeded in developing the capabilities to absorb, diffuse and further develop the technology. There are three main arguments supporting this approach:

*1) Trade growth tend to concentrate in a certain number of sectors.*

International trade is growing in food and manufactured products but not in other primary goods like fuels, metals and minerals. Even in manufactured goods, growth rates are smaller in the 80s than they were in the 60s and 70s (see table 3).

Table 3  
Growth of Export (average annual percentage change)

Country and commodity group	1965/73	1973/80	1980/87	1987/89
World	9.2	4.9	3.6	5.1
Primary goods	6.9	2.8	1.9	1.4
Food	4.9	7.0	4.1	6.3 (1)
Fuels	9.8	0.3	-1.2	0.8 (1)
Non-food primary	3.7	4.1	2.5	-2.6 (1)
Metals & minerals	7.3	9.1	1.6	-4.4 (1)
Manufacturers	10.7	6.2	4.2	5.9

(1) 1987 and 1988 only (average)

Source: World Bank

The stagnation in world trade of primary goods is associated with the decline of terms of trade. Commodity prices have been falling since the 1970s and volatility in these markets pose serious problems for primary producers (WB, 1991:106). But another trend, stemming from the diffusion of the new techno-economic paradigm, is likely to reduce the export volumes of

many commodities. New technologies are usually energy and material-saving. They reduce the use of traditional materials such as steel and other metals because of new designs and the substitution of materials as mentioned before. New materials like optical-fibers, carbon-steel and fine ceramics are successful examples of substitutes for metals. These materials allow more control over physical conformation (weight, resistance, properties), production processes (availability, costs, localization) and environmental impacts. Also, the trend of new products incorporating microelectronics inputs or designed and produced with the aid of computers is to save materials and energy.

A new techno-economic paradigm usually involves clusters of key technologies which share the characteristics of rapidly falling costs, widespread availability and potential for application throughout the economy. The development of new key technologies such as microelectronics gave rise to new industries and reinvigorated existing industries which incorporated it. Consequently, trade is growing mainly in technology intensive products where competitiveness is associated with performance and quality variables related to design, technical services and marketing rather than low prices. Since the 1960s, evidence has been collected (Hufbauer, 1966; Freeman, 1987) pointing to the conclusion that there is a clear-cut relationship between trade performance and innovative leadership.

This, of course, has negative implications for developing countries which cannot compete for technology leadership or even follow suit within a reasonable lag in clusters of new technologies. As Freeman (1987) puts it, "a change of techno-economic paradigm accentuates these types of comparative advantages since the leading country is capable of exporting a wide range of new and improved goods and services with performance characteristics and costs which are generally superior to those competitors. The laggard countries, on the other hand, who are slow to realise and to adopt the new paradigm, are geared to a pattern of production and exports which are increasingly obsolete and non-competitive in terms of technology."

It should be noted, however, that some niches of "natural products" still present significant growth opportunities as a result of rise in personal income in developed countries. This includes quality foodstuff and other fine non-durable goods, typically consumed by populations enjoying higher standards of living. The recent economic recovery of Chile was based on the exports of wine and fresh fruits, while in Brazil products like orange juice and leather shoes are among the fast growing export items. However, competitiveness in these industries also requires the introduction of new technologies in order to ensure high quality and low costs. Actually, exporting fresh fruits aggregates more value than processed fruits, since quality management requirements on production, storing, and transportation are much higher.

*ii) International trade is growing mainly inside regional trading blocks*

Trade within regional blocks is playing an increasingly important role in international trade. As table 4 shows, almost 60% of the European Community countries exports occur inside the region, against only a third in 1960. Thus, the image of Europe as a set of countries that have opened themselves to the global economy may not be appropriate as a description of their pattern of trade.

Regional trading is also likely to play an important role for the other two world economic superpowers: USA with the proposed inclusion of Mexico in the North American Free Trade Agreement and Japan due to the strengthening of bilateral and multilateral trade agreements with Asian countries, including the Association of South East Pacific States. Financial and industrial investments are now booming and reinforcing regional trade ties. Since Japan became the major economic player in Asia, trade within Asia has grown faster than trade between Asia and other regions. As Japan moves away from the low end of consumer goods market it opens a niche for other Asian countries exports.

**Table 4**  
Intraunion trade as a percentage of total exports, 1960-87

Economic Union	1960	1970	1980	1987
European Community	34.6	48.9	52.8	58.8
Association of South-East Pacific States	21.7	14.7	17.8	17.7
Caribbean Community	4.5	7.3	6.4	6.3
Central American Common Market	7.5	26.8	22.0	11.9
Latin American Free Trade Area	7.7	10.2	13.5	11.3
Andean Group	0.7	2.3	3.5	3.2
West African Economic Community	2.0	2.3	3.5	3.2

Source: World Bank (1991:107)

Regional trading blocs may hinder the goal of a more open global trading system, since the favorable conditions offered to their participants may result in the exclusion of non-member countries. Trading blocs linking developing countries only such as the Andean Group, the Caribbean Community and the West African Economic Community produced only limited results (see table 4), since participating countries have a similar pattern of economic specialization. Thus, they can neither find customers for their major exports within the bloc or acquire much needed import products from it.

The Mercosul, a recently created regional trading bloc joining together Argentina, Brazil, Uruguay and Paraguay is now booming in regional trade, but sooner or later it will face the problem of not being linked with a major world partner which could play a more complementary role in trade.

*iii) Foreign trade and investment are still a limited part of the GDP*

Foreign trade is becoming increasingly important part of the economic activities of most countries. However, it still represents a relatively small part of advanced industrial countries' GNP (see table 5) where the internal market are the still the main

target for local firms. With the exception of Canada, where geographical, political and economical links with the USA favoured exports, large "continental" countries present a relatively low exports/GNP ratio. This is the case of Brazil, China, India and USA where exports represent less than 15% of GNP.

Table 5

Exports as part of the Gross Domestic Product in selected countries, 1989, millions of dollars.

Country/Region	Exports	GDP	Exp/GDP (%)
<i>Latin America</i>			
Argentina	9,567	53,070	18.0
Mexico	22,975	200,730	11.4
Brazil	34,392	319,150	10.7
<i>Asia</i>			
Korea Rep.	62,283	211,880	29.4
Indonesia	21,773	93,970	23.2
Malaysia	25,053	37,480	66.8
China	52,538	417,830	12.5
<i>Advanced</i>			
Japan	275,040	2,818,520	9.8
United States	346,948	5,156,440	6.7

Source: World Bank (1991:208 and 230).

Porter (1990) found, based on a study of successful industries in ten leading countries, that domestic competition was a key to global success. Firms usually become internationally competitive after developing competitive advantages and economies of scale domestically. The implication for developing countries is that developing a competitive internal market may be an essential condition for successful manufactured goods exports, at least in sectors which depend on economies of scale

or require a relatively long learning period. Some Asian countries such as Malaysia, Honk-Kong and Singapore constitute a special case since their industrialization process was not based on import-substitution. Rather, they took advantage of their long-standing trading tradition to attract export-oriented foreign capital.

Unilateral trade liberalization *per se* is no guarantee of a beneficial integration within the world economy since linking to the new techno-economic paradigm is not a "natural" process for developing countries. Those which do not adapt to the changing role of products and technology will be increasingly marginalized from world trade and investment. Liberal policies may help gain access to certain equipment and consumer goods but are not enough to improve competition. Successful integration with the global economy may require selective and flexible government intervention in order to induce local firms to modernize and become more export oriented. Korea and Japan are prominent examples of successful intervention combined with export orientation. Adopting protectionist policies without demanding international competitiveness may help infant industries to take off but may also hinder long term prospects if the industry remains sheltered for too long.

### *The Technology Challenge*

In the production realm, the new paradigm involves radical changes in both technology and organization. Global competition intensified the search for alternatives to the traditional Fordist and Taylorist manufacturing methods which have exhausted their productivity growth potential. A new innovation trajectory based on the application of microelectronics, new organizational techniques and cooperation with suppliers and clients is now being pursued by most manufacturing firms worldwide, after the success of leading Japanese firms such as Toyota. Much has been written about the new industrial practices and their implementation, and it is not the intention of this paper to review them (2). However, for the purpose of analysing the implications of the new manufacturing challenge for government policies,

reference will be made to the major technological and organizational changes which are now underway.

The new production paradigm is often associated with the use of information technologies and automated equipment. Unlike many technologies which are specific to a particular process or area in manufacturing, information technology is a pervasive technology (Bessant, 1991). It can be applied in almost all sectors of economic activity and in different phases of the production chain. In manufacturing it facilitates and increases the efficiency of a wide range of information-based operations like P&D, monitoring and control including production planning, sales order processing, purchasing, production scheduling, transport, quality management, and customer services. In the service sector it has been increasingly applied in banking, retail sales, general management, government and communication services. Actually it is almost impossible to find a single sector which is not potentially affected by information technology.

But simply buying the technology does not produce sound productivity impacts. Successful introduction of automation usually require parallel organizational changes to cope with the characteristics of the equipment, layout, and the need to carry out the job in a more creative form in order to simultaneously improve quality, reduce costs and delivery time, and increase product innovation. Some techniques like "just-in-time and total quality control have become "a paradigm" as a result of their tremendous success in improving productivity and quality, and in lowering costs. Modernizing techniques, however, require certain conditions to be successfully introduced. Among the requirements of the emerging production paradigm raised by two issues will be highlighted for their importance for government policies: skill requirements and work organization.

### *Skill Requirements*

New technologies are usually complex and demand higher levels of skill. Firms introducing new technologies require more qualified personnel able not only to execute the work but also

to think and resolve problems. In most industrial sectors there is an increased need for engineers, technicians and other qualified staff and a decline in the number of unskilled and semi-skilled workers in manufacturing.

Another key feature has been a trend towards more flexibility in the patterns of work and skill distribution. In order to adjust to market changes and support increasingly integrated technologies there is a shift from single skills towards multiple skills. A multiskilled worker can be more flexible in changing duties thus responding to the frequent shifts in work demand which characterize any work environment. Another important advantage of multiple skilled workers is their capacity to better understand the whole manufacturing process and thus be able to contribute to the improvement of quality and productivity. This can be achieved by participating in quality control circles, trouble-shooting groups and other participative techniques. From the worker's point of view acquiring different skills is less monotonous than always performing the same jobs. Typically, multiskilled workers have a career plan and salaries are not related directly to what function they actually do but rather to their employment time and general work performance.

The major consequence for government policies of this greater reliance on higher qualified and multiskilled workers is the need to expand and improve education and training. There is a growing recognition that education improves productivity and growth. A better educated person usually absorbs new information faster and applies unfamiliar inputs and new processes more effectively. In the present wave of rapid technical change, much needs to be learned about how to operate and maintain new equipment, understand new forms of quality

control and organization techniques. A survey conducted by Ferraz et al (1992) with 130 leading manufacturing firms in Brazil concluded that the most relevant attributes for flexible automation for over 80% of the sample were rational logic, the ability to learn new skills and general technical knowledge. Motor co-ordination and manual dexterity, on the contrary, were considered important by less than 25% of the interviewed firms. As far as skills characteristics required for the introduction of

new organization techniques such as total quality control and just-in-time are concerned, the attributes thought to be of fundamental importance by at least 75% of the sample were the initiative to resolve problems, identification with the objectives of the firm, the ability to obtain new qualifications, taking responsibility for production processes, and rational logic. Again, those attributes thought to be least relevant were motor co-ordination and manual dexterity.

Unlike *taylorist* production methods, where the major source of workers'skill acquisition is on-the-job training, in the new paradigm skills are acquired mainly through formal education. New organizational techniques such as total quality control require basic knowledge of statistics and other skills which are more dependent upon the general educational level of the workforce. Vocational training also play an important complementary role. But since technology is changing fast, a worker must acquire capabilities that will help him to continuously learn throughout his life. Usually, short-term vocational training simply teaches how to operate existing tools and equipment which are bound to become obsolete sooner or later.

### Work Organization

The "mass production" paradigm based on semi-skilled labour and multi-levels of hierarchy is associated with a management style which is biased towards centralised command and top-down control (Ferraz et al, 1992). In that system workers are asked to perform their duties under established set of rules and tight control. The new paradigm, in contrast, requires models of work organization which permit, according to Bessant (1991:315) a degree of local autonomy and self-organization, a high level of functional flexibility and group or team rather than individual work.

The emerging patterns of work organization require major changes in institutional culture. Often, managers and supervisors resist handing over part of their power to workers and struggle to keep their hierarchical position within the organization. Typically, firms start their modernization programs by acquiring equipment and by introducing techniques which

do not require major organizational changes, thus avoiding conflicts among hierarchical levels. But institutions must face this challenge if higher standards of quality and smaller inventories and waste are to be achieved. Problems of quality must be solved at source and, in order to do so, employees must have freedom and flexibility to search for solutions rather than passing the problems on. In many Japanese factories, assembly workers have the power to stop the production line if they find quality problems. This of course requires a certain degree of stability and goodwill between the firm and their employees which is not usually present in western organizations. The table below summarizes major shifts concerning the traditional and the new paradigm in work organization and control.

Table 6  
The traditional vs. the new paradigm in Work Organization and Control

	Traditional	New Paradigm
Control and Structure	Bureaucratic, centralized control via formal rules and procedures	Informal control mechanism, with central goalsetting, co-ordination and participatory decision-making
	Single top-down line of command with vertical communication	Network communication
	Cascade of supervisory levels	local autonomy and self control
Work Organization	Stable pyramid growing in height and complexity as it expands	Flat flexible network of agile units/remains flat as it expands
	Clear vertical links and separate specialised functional departments	Interactive, co-operative links between functions
	Standard routines and procedures Single bottom-up information flow	Flexible, adaptable procedures Multiple horizontal and vertical information flows

Adapted from Ferraz et al (1992).

#### 4. *The Role of the State in Development: The Case of Brazil*

This section examines the role of the state in the industrial development of Brazil. The analysis shows that policies were successful in transforming Brazilian economy from an agrarian to an integrated and diversified industrial base. From 1946 to 1987, the share of manufactured products in total exports rose from 7.4% to 50%. However, two major aspects deserve a critical assessment: first, due to a critical shortage of foreign currency, government policies have been strongly biased towards import-substitution. Lately, pressed by the international economy globalization trend, the government has started to dismantle the existing protectionist and regulatory framework but have not yet implemented new policies capable of increasing the competitiveness of Brazilian industry. Second, Brazil has faced macroeconomic disorder, characterized by very high inflation rates. Other major topics will emerge from the historical analysis, bearing in mind the relationship between government policies and industrial and technological development.

This section is divided into three parts according to the period studied. The first refers to the early industrialization process, which goes from World War II to the late 60s. The second period starts in 1968, when the Strategic Development Plan was put in force, to 1979 and will be referred to as the "70's". The last part refers to the period from 1980 to now. Although important changes in government policies have been introduced since 1990, there are not yet a clear industrial development strategy to deserve a separate discussion.

##### *Early Import-Substitution: The Pre-1968 period*

From the Second World War onwards, the role and structure of the Brazilian State was deeply transformed. The successive crises which shook the Brazilian economy since the great depression, pointed at the extreme fragility of a development model based on primary exports (Tigre, 1978:120). At this time, the dominant international paradigm was based on the manufacturing of steel, internal combustion engines, rapid

diffusion of the use of electricity, and mass production of consumer goods. Aiming at developing these industries the Brazilian state under Getulio Vargas government established state-owned firms like Fabrica Nacional de Motores (combustion engine manufacturing) in 1940 and Cia Siderúrgica Nacional (steel) in 1941. In these initiatives the state provided not only the required capital, organization, and institutional framework but also played an active role in international politics in order to assure the technology transfer needed. This included negotiations with the pre-war German government in a strategy designed to create an alternative to American technology, since the American government was reluctant to support Brazilian industrialization.

During the War, the shortage of imported goods like petrol, capital goods, and other inputs led the government to create the "Coordination for Economic Mobilization" which, in fact, acted as a superministry. According to Ianni (1971), this was the first government planning experience in Brazil. Multiannual planning became an important instrument to support the industrialization process in the next three decades. This included building up the required infra-structure (electricity generation and roads) and providing protection and incentives to attract private capital, both local and foreign, to produce automobiles and durable consumer goods. The results were impressive: from 1945 to 1975 industrial growth averaged 8.8 percent a year; percapita income increased by 4 percent annually; and agricultural output showed an yearly increase of 5.6% - all in real terms (Gereffi, 1990).

In the mid-fifties, influenced by the structuralist arguments favouring industrialization, the Kubitschek government launched the "Targets Plan" (1956-61), a collection of five-year targets for output and investment in infra-structure, heavy industry, food and education. The plan relied heavily on external financing (through suppliers credits) and foreign direct investment. In order to attract FDI the government not only dropped all existing restrictions on remittances of profits, interest and dividends but also granted a preferential overvalued exchange rate to foreign loans and investment (Moreira, 1993).



## Textos para Discussão

Other important policy measures, introduced in the late 50s to boost manufacturing investment in selected sectors, were *ad valorem* import tariffs (ranging from 0 to 150%), and differentiated exchange rates that penalized imports.

The plan succeeded in implementing its targets both in infrastructure and manufacturing. The achievements went beyond the targets planned in electric power capacity (5,2 GW), roads construction (13,000 km) but fell very short in oil, steel ingots, cement, and passenger car production. From 1955 to 1961, GDP grew at an annual average rate of 9,4% while the manufacturing output went up 12% yearly. Assessing the results, Moreira (1993) argued that the plan put too much emphasis on heavy industry, failing to provide light industry with the right incentives and financial means to grow and sell in the international market. The rush into heavy industry produced an industrial capacity well beyond that which the internal market could absorb, thus creating a slow-down in growth during the next decade. He also noted that greater export orientation would have allowed growth to go on irrespective of the limits of the internal market.

Multinational affiliates were given overprotection, and no demand was made on them to search for international competitiveness, exports and technology transfer. Also, the government overlooked the need to improve education, science and technology notwithstanding the industry's high technological and skill requirements. The technology question was not completely ignored in the Target Plan (1956/60) and Government Program for Economic Action (1964/66), since they recognized the importance of technology for industrial development (Guimarães, 1993), but these were mere references to the problem rather than a real intention to incorporate technology in the sphere of government action.

The 1960s were turbulent years, marked by a military coup in 1964 and an attempt to restore a more liberal policy based on "the supremacy of price mechanisms". In practice however, as Moreira (1993:19) noted, "theoretical principles quickly gave way to a puzzling pragmatism, which has not fundamentally altered either the government's role or the previous pattern of

industrialization". A short period of reforms designed to cope with the inadequacy of the financial system and to promote exports were followed in the 1970s by a new import-substitution phase.

*Secondary Import-Substitution Phase: the 1970's*

In the 70's, Brazil entered a secondary industrialization phase aiming at reducing its dependence on intermediary goods imports such as petrochemicals, fertilizers, capital goods, pulp and paper and non-ferrous metals. Import substitution would eventually include technology development as part of a strategy developed to increase "national autonomy". Three successive development plans - Targets and Basis for Government Action (1970/71) and the 1st and 2nd National Development Plans (1972/74 and 1975/79) detailed these policies. The plans followed reforms in public and private sector financing (3) and the trade and foreign capital regime by introducing exports incentives and a selective import liberalization policy (4). After the oil shock in 1973, however, the import liberalization policy was abandoned.

It should be noted that the development strategy was not based on import-substitutions only. Rather, it put much emphasis on export promotion aiming at both diversifying and increasing the volumes of exports. At this time the country began to expand both its commodity exports (soybeans, orange juice, minerals) and its manufactured exports (steel, apparel, footwear, transport equipment) thus deepening the industrialization process. Stimulated by subsidised credits and tax exemptions, manufactured exports increased their percentage of total exports from 5.3% in 1964 to 24.1% in 1974. In that period, known as the economic "miracle", GDP grew at an average annual rate of 10%. Examining trade regimes adopted by Brazil, Mexico, Korea and Taiwan, Bradford Jr. (1990) argues that they all fit the export push model more than either the import substitution regime attributed to the Latin Americans NICs or the open economy regime attributed to the East Asian Nics.

Another similarity with the East Asian model is that Brazilian resource allocation policy gave priority to capital goods and heavy industries, a choice shared by the Park Chung Hee regime in Korea under the "Heavy and Chemical Industry Plan" in 1973.

From 1973 Brazil was badly affected by the troublesome phase which hit the international economy. Brazil relied heavily on oil imports. Also, the oil shock reduced trade growth and manufacturing exports from the developing countries, since they began to encounter stiffer protectionist measures in the developed countries' markets. As a large oil importer, Brazil was affected in a double way. Imports jumped from US\$ 6.2 billion in 1973 to US\$ 12.6 billion in 1974 and the small trade surplus obtained in the former year turned into a mega-deficit of US\$ 4.7 billion, equivalent to 6.5% of GDP. The answer of the recently empowered Geisel government was a long term "structural" program based on investment promotion for import substitution. Geisel refused to introduce a more orthodox stabilization plan based on monetary and demand control and launched the ambitious II NDP. Despite recognizing the limits imposed by the international crisis, the plan proposed a structural change in the pattern of specialization of the Brazilian economy aiming at reducing external vulnerability by substituting critical inputs imports and developing new competitive advantages. The plan attributed to the state a central role in industrial development both in planning and direct investment. Policy makers believed that the market would not react to the crisis and government intervention was needed to supersede underdevelopment: "If left to market forces only", argued planning minister Reis Velloso, "there will be no private sector in sectors like steel, fertilizers, petrochemicals and non-ferrous metals" (Castro and Souza, 1985:32).

In order to avoid a short term balance of payments crisis the government reintroduced non-tariff barriers, raised import tariffs and increased subsidies to exports, mainly expanding the credit available at negative interest rates. Investment plans under the II NDP relied heavily on external indebtedness, at a time when cheap Eurocurrency funds were available. As a

consequence, from 1974 to 1979 the external debt trebled to US\$ 50 billion, while short term internal debt was also substantially increased (Moreira, 1993:30).

for technology policies, the 1970's was characterized by a greater emphasis on technology. The country was seen by policy makers as too dependent on foreign technology. They believed that industrial development would only succeed if sustained by internal forces. Technology production was seen as a late phase of the import-substitution process. According to Guimarães (1993) this approach dominated technology policy during the 70's and 80's. He claims that the project had limited support from the industrial private sector and was basically oriented towards the academic community and state research centres. A positive result was a large expansion of technological capabilities through investment in higher education and post-graduate programs.

There are conflicting interpretations among economists on the results of this second import-substitution industrialization phase. Those more favourable to the strategies adopted claim that economic growth and exports were kept at a relatively high level. More important, however, was the successful implementation of new heavy industry such as rolled steel, aluminium, petrochemical, paper pulp and capital goods industries. Castro and Souza (1985:36) claim that these efforts were crucial to structurally changing the unbalanced Brazilian industry, which was too vulnerable to external crisis, and this could not be achieved by simply restricting public spending and economic growth. Batista (1992:149) argues that indebtedness was essential to maintain growth and industrialization. "Given the rigidities in the structure of production and consumption of the Brazilian economy and the external restrictions for the development of additional export earnings, an adjustment strategy in response to the first oil shock solely based on expenditure reducing and switching policies would have been extremely costly in terms of real absorption and output losses".

In fact, Brazil became a net exporter of capital goods and intermediate products in the following decade, due to subsidized private and public investments in import-substitution

undertaken during the II NDP. These high costs have been the basis for critical responses to the plan. They draw attention to the costly macroeconomic "side-effects" like the huge-external debt and high inflation which deteriorated public sector finance. Moreira (1993:36) adds that "the incentive regime continued to be largely non-selective, biased towards the internal market, and exports a heavily subsidised and lesser business."

The controversy may be reduced if we introduce the "post-factum" argument that the import substitution industrialization strategy bore fruit to develop a large resource-based industry, but became obsolete with the diffusion of the new technological paradigm. In fact, the II NDP was too optimistic about the economic prospects of the world economy after the oil shock. It relied on the thesis that Brazil's large endowment of natural resources presented such a potential for industrial development that even high macroeconomic costs would pay-off, as the country became a world industrial power. Resources were misallocated in sectors which latter became stagnant due to the characteristics of the new paradigm, like nuclear power plants, large steel complexes and railways. But this, of course, could not be perceived at that time. The emphasis on autarchy were also superseeded by the globalization trend of the 1980's. Overprotection induced the substitution of components, raw materials and capital goods imports without a clear selective criteria, often giving way to inefficient production. In many cases, reducing the "vulnerability" of import dependence became a burden for local industry rather than a benefit. In fact, the Brazilian economy become more vulnerable to the external world due to high indebness.

### *The 1980' Lost Decade and the Mismatch of the 1990's*

Caught by the second oil shock and the subsequent spiral rise in interest rates, Brazil entered the early 1980s with severe troubles from which it has not recovered yet. The oil prices tripled while international interest rates doubled, thus pushing current account deficit to 5.8% of GDP in 1982 while inflation broke the three-digit barrier (Moreira, 1993:36).

This period saw no long lasting solution for economic problems. The balance of payment remained positive, due to new import restrictions which banned practically all non-essential imports and increases in manufacturing exports after the maturation of previous investment in intermediate goods processing plants. The trade surplus was entirely absorbed by the external debt service and Brazil shifted from importer to exporter of capital. In the 1980's trade surplus averaged 2.6% of GNP a year while external debt was kept leveled at US\$ 115 billion. As to inflation, it soon reached the four digit stage as orthodox adjustment policies adopted in the early 80's gave way to heterodox policies after the democratization process. Actually, this period is not short of policies at all. A survey conducted by the business newspaper *Gazeta Mercantil* (1991) found that from 1980 to 1990 there were eight different inflation stabilisation plans, fifteen different policies towards wages, eighteen changes in the rules regulating foreign exchange, fifty-four changes in the rule controlling prices, twenty-one different proposals on the negotiation of foreign debt, four different currencies, nineteen decrees related to cuts in public expenditure, eleven separate indexes for calculating the devaluation of local currency and five wages and price freezes (5) Ferraz et al (1992) add to this list 11 changes of Finance Minister .

The impact of such an unstable economic environment on industrial development was debilitating. From 1981 to 1990 manufacturing industry decreased 1.2% while GDP per capita fell 6%. As the internal market collapsed, the overprotected local industry was not prepared to take on the international market. The role of the federal government in the economy was substantially reduced as a result of public finance troubles. From 1980 to 1990, the share of federal government-owned enterprises in total investment had fallen from 4.6% to 1.7% of the GNP. The operational income of the government productive sector represented about 16% of GNP in 1986 but decreased to 10.5% in 1990 (Serra e Afonso, 1993:37).

The fall in public productive investment in Brazil, estimated as 50% between 1981 and 1991, may be a symptom of the general economic crisis, rather than an explicit policy towards

reducing the size of the state. From 1981 onwards, it became almost impossible to obtain foreign credits for new investment, due to the debt crisis. Internal sources also became very scarce since the government substantially reduced direct investment in public firms and limited their access to private funds, as part of the (unsuccessful) effort to curb inflation. State-owned firms were also affected by a decline on real tariffs. For example, in the 80s, real tariffs for telecommunications services went down about 80% thus reducing the self-financing capacity of the Telebrás system.

A more explicit policy towards privatization began in 1990 with the Collor government (followed by Itamar Franco after his impeachment) and up to now several major state-owned manufacturing companies have been taken over by private groups. These include Usiminas and Companhia Siderurgica Nacional (CSN), the two largest integrated steel plants in South America, and most of the state shares in petrochemical and fertilizer companies. Privatization is seen as a goal in itself disregarding the adverse conditions in which the transfer is taking place (6). Despite the present uneasy economic situation which dampens private sector willingness to participate more actively in the privatization program, the government is planning to sell electricity, telecommunications and other public utility companies.

Significant changes emerged in the early 90s' concerning import and investment barriers. The long-standing practice of using import licenses as a nontariff barrier to protect domestic industry has been abandoned. Multinational firms now have freedom to invest and remit profits and royalties. Firms wishing to establish new plants no longer have to obtain permission from the Industrial Policy Council and demands establishing a minimum level of locally purchased components and requiring technology transfer have been removed. Foreign investment is still prohibited in petroleum production and refining, public utilities, media and other sectors, but restrictions are likely to be reduced in the next constitutional review. A new patent law, granting more protection to industrial property and extending it to sectors not included before, is now being voted on in the

Congress. Brazil is now accepting most of the demands of the US Government to recognize intellectual property and to open the economy for foreign trade and investment.

The liberalization of the Brazilian economy included the information technology sector, the last stronghold of independent technology policy in Brazil. The IT policy managed to "put national interests first" (Bastos, 1992:239) by excluding direct foreign investment in some areas of the professional electronics industry. The results of this policy are well documented (Evans, Frischtak and Tigre, 1992; Schmitz and Cassiolato, 1992) and evaluations are mostly favourable. But import liberalization has severely affected local technological development and manufacturing activities.

In short, Brazil is already adopting a neo-liberal policy. The argument being made here is that although in many cases these reforms were needed, the results will not contribute to a more flexible and efficient state. The price has been high. From 1990 to 1992 per capita GDP decreased from US\$ 3,338 to \$ 2,823 while unemployment rate increased from 4.28% to 6.21%. The state is now unarticulated and lacks confidence to develop new policies. Personnel are underpaid and no re-skilling scheme is being considered. The new techno-economic paradigm requires the state to undergo a process of "creative destruction". What we have now is destruction without creation.

##### *5- Changing State Strategies*

Government intervention has played a central role in promoting the industrialization of Brazil, since market forces alone would not encourage private investment in risky and long term manufacturing activities. Brazil is now among the ten most industrialized countries in the World. During the 60s and the 70s, despite the pitfalls of government intervention, often leading to wrong incentives, policy making capabilities and leadership were available in key state institutions. In the last fifteen years, however, government capacity to formulate and implement sound industrial and macroeconomic policies has deteriorated substantially. This section will summarize major problems and challenges affecting government policies.

## Textos para Discussão

*Macroeconomic Stabilization*

The aim of growth at all costs led to very serious and unresolved macroeconomic problems. High inflation rates and public debt reflect longstanding government unwillingness and political inability to introduce adjustment policies and reduce public expenditure. Since 1981 the government has usually adopted stiff monetary policies often leading to very high real interest rates, but has failed to promote fiscal and budget adjustments to grant public finance balance. In such a large, heterogeneous and socially disastrous country, public expenditure cuts have been shortlived. Even after redemocratization in 1984, the absence of a major political force led the central government to follow clientelistic policies in exchange for political support from Congress and States.

Stabilizing inflation is an essential step for creating a more favorable environment for investment. Sustained growth could only be achieved with a more stable and predictable economic environment. Table 7 below shows that in other Latin American countries, inflation has been already reduced alongside with recovering economic growth. This paper will not discuss the policies adopted by these countries but only recognize the crucial role of economic stabilization for competitiveness.

Table 7

Latin America Inflation and real growth 1991/92

Country	Inflation (% per year)	GNP Growth (%)
Chile	17.0	4.2
Argentina	47.0	8.0
Mexico	17.1	3.3
Venezuela	34.0	8.6
Bolivia	19.2	3.4
Brasil	754.9	0.0

Source: Conjuntura Econômica, April 1993

*Inward Orientation and Export Promotion*

The industrialization pattern of Brazil can not be strictly defined as inward oriented, because export promotion policies have been adopted since the late 1960s. However, in a comparative perspective with other developing countries Brazil has presented an anti-export bias. Import substitution was not disciplined by international prices and the wide range of protectionist policies adopted to face foreign exchange restrictions have encouraged a non-selective industrialization. Consequently, the competitiveness of local products has been negatively affected by the use of a high proportion of locally-purchased inputs irrespectively to their costs, quality, delivery time or adaptability to customer's needs. Essential imports were charged with high tariffs and nontariffs barriers, including a complete ban on imports when local production of similar products existed, long import licenses approval delays, long term import credits requirements, and other "punishments" to importers. Export promotion policies usually attacked these distortions by creating duty drawback schemes and subsidies to reimburse exporters for tariffs paid on inputs. But these compensatory schemes offset only part of the anti-export bias. Subsidies created public financial problems and were often allocated to favored sectors and economic groups, leading to rent-seeking.

In sum, the wide protectionist policies adopted in Brazil have not created a favourable environment for exports. With the exception of information technology, multinationals were granted protection without any export performance requirement. Also, overprotection led to large price distortions in favour of production for domestic market. Changing these policies towards a more open and export oriented trade regime is a major challenge for Brazil. The contrasting experiences of trade liberalization adopted by Southern Latin American countries on the one hand and East Asian nations on the other, can provide guidance for Brazilian future policies. The orthodox neo-liberal policy adopted by Argentina, Chile and Uruguay during the 70s have provoked extensive desindustrialization and high social and political

costs and consequently is not an adequate model to Brazil. The alternative strategy adopted by South Korea based on selective (and often temporary) import liberalization is far more successful in supporting exports and preserving local industrial investments. Subsidies and protection were strictly tied to achieving export success within a defined period (WB, 1991:101). Unlike Latin American countries, Korea preserved incentives for technological change and maintained international and domestic competition by imposing performance requirements in return for any credit subsidies, import protection, or restrictions on domestic entry.

### *Structural Changes*

Brazil has often adopted misguided approaches to market failures, leading to structural weakness. Government intervention was usually based on import protection. This simply hid competitiveness weakness rather than contribute to overcome structural market distortions such as lack of skills, obsolete equipment, low quality of inputs and organizational problems. Instead of fighting the source of problems the government protected inefficiency. Protection is a necessary policy to promote infant industry, but the ability to terminate special treatment when intervention fails is also critical.

The neo-liberal and the neo-Schumpeterian thought present quite contrasting policy alternatives towards competitiveness. Neo-liberals tend to believe that the most effective way to attain sustained development is to eliminate all controls on external trade so the market can determine the most profitable activities for a country to specialize in. Also, the state must reduce to a minimum its intervention in the economy, not only in terms of its regulations and controls but also in investments in physical and social infra-structure. Such policy can succeed in promoting sectors in which competitiveness is based on the endowment of natural competitive advantages. However it can be a disastrous policy for more valued-added, technology and capital intensive sectors where competitiveness are built upon the creation and sustaintion of competitive advantages. Simply removing

protection without overcoming key structural problems can lead to desindustrialization.

A neo-Schumpeterian approach, by contrast, would intervene in the source of the (market) distortion. For example, to subsidize education and skill acquisition rather than use long term protection when the problem is lack of human capital. Also, for international political considerations, government structural are preferable than subsidies for industrial firms since explicit export subsidies are becoming more vulnerable to retaliation, mainly from the USA. Understanding the needs of each sector is essential, since different economic activities demand different endowment of skills, technology, access to capital goods, inputs, credit and phisical infra-structure. Table 8 below explore technological and strategic needs of major sectors of the Brazilian industry.

Table 8

Critical Resources, Impacts of Globalization, Key Innovations and Strategic Needs in Major Export Sectors of Brazilian Economy.

Sector	Critical Resources	Globaliz. Impacts	Key Innovations	Strategic Needs
<u>AgroIndustry</u> - pulp - soybeans - poutry - orange juice	Natural Resources; Management	Low	Biotechnology	Quality
<u>Process Indust.</u> - stee - petrochemical	Scale Vintage K Integration	Low/ Medium	Incremental Otimization	Cost-reduction Minor Innovat.
<u>Durable Consumer Goods</u> - automobil - electric app. - electronics	P&D Flexibility	High	Incremental/ Radical innov. Just-in-Time Microelectronics	Shorter product cycles; Automation Organizational Innovations

Source: Own elaboration

## Textos para Discussão

Selective social and physical infra-structural investment aiming at promoting technological capabilities and diffusion, transport, communication and to facilitate access to imported inputs can structurally change the competitiveness of key industrial sectors. Selection must bear in mind the needs of the private firms and prioritize those sectors with higher export potential. Adherence of government policies and firms strategies is also essential. Government initiatives to stimulate new industrial sectors must be preserved, but intervention must closely respect existing international and local restrictions to autonomous development. The private sector must participate with innovation projects since the very beginning in order to assure its further commercial development.

Despite large investments in infra-structure development undertaken during the 60s and 70s, Brazilian industry relies on a poor and deteriorated infra-structure. Insufficient investment in education, telecommunication services, roads, ports and other public utilities often results in low quality and high costs.

The accumulation of human capital through education has played an important role in the industrialization of Eastern NICs such as Korea, Singapore and China as table 9 shows. Brazil, by contrast presents a poor record of education enrolment and high proportion of the adult population are either semi-literate or illiterate.

Table 9  
Percentage of Age Group Enrolled In Education (1988)

Country	Primary (*)	Secondary	Terclary
Argentina	n.a		
Brasil	84	74	41
Mexico	99	38	1
China	100	53	15
Malaysia	n.a	44	2
Korea	100	57	7
Middle Income countries	89	77	37
World	91	55	17
		54	16

Source: World Bank (1991:260)

As far as technology is concerned, government policies have been largely unarticulated with industry needs. The available resources have been oriented towards R&D, mainly conducted by public institutions. Recently, however, some steps have been taken to promote quality and productivity through technology diffusion. Existing programs (7) aim at increasing industry awareness on quality requirements but lack the appropriate mechanisms and resources to support technology diffusion. The diffusion of new technologies and organizational processes throughout the production chain is essential to systemic competition, since competitiveness can not be achieved with low quality and unreliable input suppliers. Innovation through industrial R&D must also be encouraged since innovation and diffusion are never entirely separable.

As the international experience shows, the private sector can participate in the development of infra-structure. Privatization and deregulation of public monopolies such as telecommunications and electricity have attracted private capital worldwide. We must recognize, however, that in a country where the population is largely poor, the market can only play complementary role in the provision of public services.

#### Role of government

There is a growing recognition that the state must reduce its participation in the economy either by privatizing state-owned firms or reducing its interference over economic activities through deregulation. State-owned firms are typically less flexible than private firms to restructure its activities to cope with technology change and competition. They played an important role in developing new sectors which were either too risky or required an amount of investment beyond private financial capacity. But the new paradigm requires capabilities like innovative capacity, flexibility and a type of organizational structure that can be better achieved by private firms. Also, privatization is a way to save public money to social needs.

However, deregulation and market freedom does not eliminate the government responsibility for managing the economy, but

simply shift its role. Examples of activities where state responsibility is actually increasing are education, environment and international relations. With the increasing convergence of technology and trade policies (Mowery and Rosenberg, 1989:274) and regionalization, the state must be more active in international bilateral and multilateral forums.

Changing state strategies and formulating new objectives and policies may be achieved with adequate policy making capabilities. Much more difficult, however, is to change existing structures to cope with the required changes. The Brazilian state today lacks skills, organization, resources, confidence and instruments to promote industrial development. Until the late 70s, the newly-empowered governments used to create new institutions, including development agencies and state-owned firms to pursue their priorities. New dirigents used to blame the lack of skills, low salaries, civil servants' corporativism, and adverse political strongholds in existing agencies to create new ones, thus duplicating groups and functions within the state. However, this policy is no longer possible since the state is now being pushed to reduce its size and cut costs. Consequently, restructuring existing agencies, retraining their personnel and introducing organizational changes in order to cope with the new techno-economic paradigm, are of major importance for the government. These include adopting less bureaucratic and centralized control mechanisms, flexible and adaptable procedures, and network interaction within the state and private sectors. The competitive process have induced firms to undergo a process of creative destruction. But the state also must undergo this process to preserve its fundamental role in economic development.

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*Notes*

(1) The expression is Toye's (1987)

(2) For a review on new manufacturing techniques see Schonberger 1986; Bessant, 1991. Ferraz et al (1992) analyses the difficulties and opportunities for diffusing these techniques in Brazil.

(3) The financial sector reform included a fiscal reform to modernise taxes and protect fiscal revenue from inflation, adjusting state enterprises' prices and the establishment of compulsory saving funds for investments in infra-structure and housing, in addition to the creation of a central bank. In the private financial sector, new non-banking institutions were created and old ones reformed (Moreira, 1993:19).

(3) "On the export side, manufactured export were exempted from indirect and income taxes, granted product-specific fiscal subsidies, a system of drawback was implemented, and heavily subsidised export credits were made available" (Moreira, 1993:21).

(5) Brazilians became so frightened of economic "packages" that recently a tour operator fearing bad publicity announced that his company will no longer use the word "package" to describe its tours.

(6) In April 1993, CSN was sold by public auction for only US\$ 1 billion, 97% of which was paid in "rotten currency", an expression created at the stock exchange referring to long term or unpaid public debt bonds which are priced in the market at less than one-third of their face value. The estimated investment needed to build a similar plant, by contrast, is US\$ 12 billion (Jornal do Brasil, 11/3/93) and the company is actually making profits.

(7) The Brazilian Program for Quality and Productivity (PBQP) was introduced in 1990.