RESEARCH PAPER

Government preferential procurement policy: Catalyst for or inhibitor of innovation?

By:

firstprinciples
Company No. 621344-U

May 2006

AUTHORS

Julian Ding, Director of **firstprinciples,** holds a LL.B (Hons) (Lon) and a Master of Public Policy and Management (Monash) (Australia)

Cheah Chee-Wah, Director of **firstprinciples,** holds a B.Econ. (1st Class Hons) (Malaya) and a Ph.D. (Econ) (Hawaii).

.

DISCLAIMER

TABLE OF CONTENTS

EXECUTIVE SUMMARY

A few governments have adopted preferential procurement policies to try to bolster or jump-start domestic industries. In that context, we have undertaken this research to examine the effects of such policies on innovation in the marketplace, particularly with reference to the software industry.

One approach in preferential procurement polices is when governments decide to purchase certain types of products or services – e.g. computers, telecommunications services, or cars – from one domestic supplier in an effort to create an industry "national champion". Preferential procurement can also take the form of "market reservation", a policy requiring government to buy certain products or services only from domestic firms, without designating one chosen supplier.

There has been much debate about the contribution of preferential procurement policies to the performance of a national economy. Supporters of such policies argue that they can be used to steer and support the specialization in high-tech industries, thus reshaping a country's comparative advantage in an increasingly open and global economy. On the other hand, critics of such policies argue that the ability of a government to systematically identify and pick "winners" that merit preferential treatment is at best doubtful and at worst erroneous.

This paper examines case studies of various forms of preferential procurement policies that were adopted by five different countries – Brazil, United Kingdom and India on the computer industry, France on Minitel, and the United States on automobile airbags. The cases studied provide lessons for governments considering preferential procurement policies, and identified the existence of paradoxes that result from such policies.

Government preferential procurement policies may have some short-term benefits. However, our review of international experiences reflects that product-based procurement preference policies have adverse long-term effects on domestic economic growth, competition and innovation. This is despite the best of intentions in implementing such preference policies. This is because:

(i) any advantage in competitiveness that is given to a preferred firm in an insulated market environment is transient in nature;

(ii) preference policies create a sheltered environment where preferred players become inward-looking, complacent and uncompetitive internationally;

(iii) preferred players generally lose their incentive to innovate and to invest in the future; and

(iv) preferential procurement encourages "rent-seeking" activities (i.e. efforts to further a firm's own goals by entrenching or broadening government preference policies) more than it promotes efficient production by the favored industries.

The case studies reveal that preferential procurement policies can and do distort market efficiencies, increase consumer cost and prevent the development of a competitive and vibrant industry, because rivals are discouraged from competing on merit. They have even created entrenched positions that can lead a country's industry to miss the development of new instrumental technologies, even in the face of an opportunity. When competition is distorted in an important industry such as information technology (IT), there are often negative spillover effects to other industries in the country, especially when IT is used broadly in enhancing productivity.

Nevertheless, from the case studies, we observe that occasionally a preferential procurement policy can benefit both the public and private sector. This may be in the form of an outcome-based procurement preference policy that encourages positive results – such as spurring innovation or improving consumer welfare, as in the United States case that required automobile airbags for safety – instead of dictating preferred products, services or technologies (e.g. in dictating a specific type of airbag.) It fosters a competitively neutral approach that allows all businesses, whether privately-owned or government-backed, to find the best and most cost-effective solution that brings about the desired outcome. However, even in these instances, policies need to be very carefully defined so as to bring about the intended outcomes. Hesitation to abolish or reform outdated preference policies, especially in a fast-paced industry, can create market distortions.

Overall, the study of the cases in this research points out the existence of the paradox of preferential procurement policies, namely:

1. While in the short term, product-based preferential policies can nurture and even sustain the growth of a targeted industry, they will, in the long run, distort the generation of innovation.

2. Preference procurement policies are intended to support domestic growth. Yet, they distort efficiencies and the readiness of firms to compete over the long term.

3. In trying to pick "winners", governments frequently end up picking "losers".

We thus conclude from our research that firstly, when governments have implemented preference procurement policies, more often such policies have back-fired and have negatively impacted economic growth, competitiveness and innovation. This is particularly true in sectors subject to rapid changes such as IT, where the market, rather than government, is best able to keep pace with such change and is inherently better suited to respond to the needs of consumer. In such fast-paced and dynamic environments, we believe that governments must focus more on strategy (i.e. promoting innovation) than on operational matters (i.e. selecting "winners" in terms of products, services or technologies). Otherwise, we have found that the winners they have chosen often end up losing in the marketplace over the long term.

Secondly, supporting preferred products or suppliers is akin to picking technology winners or protecting domestic producers, which requires both very careful and close monitoring of the economic situation and technology market both domestically and internationally, a task that most governments are ill-equipped to do well. To do so requires a heavy financial burden which few governments are prepared to bear. Our study shows that the selection of products and services is best left to the market to respond as efficiently and effectively as possible. Consumer choices expressed in the marketplace will naturally lead to the selection of the "best" product, service or technology of the time. More importantly, preferred domestic firms need to have the discipline to have an international outlook and attitude, something which, as history has shown, can be and is done better with market incentives than government intervention.

Finally, the question to ask is not whether or not governments should introduce preferential procurement policies, but what is the role of government. The rapid changes in the market may render redundant the need for such preferential procurement policies. A better and more effective approach is for governments to play a role that supports and facilitates innovation and efficiency, not preferred products or services.

1. INTRODUCTION

Government procurement – the purchase of goods and services by various levels of government from private firms – is a "big business". Governments often spend a significant share of a country's gross domestic product (GDP) procuring goods and services, from oil to paper to computers. In many developing countries and transitional economies, where the size of the public sector is large compared to the private sector, the share of government procurement in GDP is higher than it is in developed countries.

As a major consumer in the marketplace, governments sometimes exercise discretionary buying power by giving preferences to specific suppliers. Some governments also require public agencies at all levels of government to standardize on the use of a preferred local provider of products or services to help bolster the local economy.

Governments that makes use of their purchasing power may "*induce industry to use its imagination to make safer, more ingenious, efficient, and environmentally-friendly products,*" according to Nader, Lewis and Weltman (1992).[1] The authors argue that procurement preferences can also enable the creation of higher quality markets, reduce secondary or external costs to firms, the economy and consumers. They add that:

> *It is the big marketplace consumer saying to the marketplace sellers: here is what we want to buy – take it or leave it. Purchasing savoir faire of this scope may even restore citizens' confidence that their tax dollars are buying products that benefit them in more than one way.*

Discriminating between preferred and non-preferred products or suppliers – be they domestic or international firms – may help governments achieve economic or even social policy objectives in the short run. However, such policies may also diminish the contribution that efficient, non-preferred domestic and international suppliers can bring to the development of a competitive national economy. A preferential procurement policy may prevent public agencies at all levels of government from buying the best possible goods and services at the lowest possible prices. The restrictions on market entry by international or local competitors leaves the preferred supplier or group of suppliers without competitive threats and pressures and, by extension, a lack of motivation to be more efficient, to develop new products and services, or to innovate.

This paper considers the effects of a *policy* of preferential government procurement under various conditions and evaluates the impact on domestic economic growth, competition and private sector innovation over the long term.

1 Ralph Nader, Eleanor J. Lewis and Eric Weltman, "Shopping for Innovation: The Government as Smart Consumer", *The American Prospect*, Fall 1992, pp. 71-78 (available at http://www.prospect.org/web/page.ww?section=root&name=ViewPrint&articleId=5221 (accessed on 10 February 2006)

2. FORMS OF PREFERENTIAL PROCUREMENT

The formulation of a government's procurement policy involves a complex set of choices *vis-à-vis* what to buy, who to buy from, and how to buy.[2] The choices of "what to buy" and "who to buy from" are predetermined or mandated when government decides to take a preferential approach targeted at particular suppliers or industries. In our view, there are two principal forms of procurement preference that may be mandated by policy makers:

- **A product-based preference** is the preferred procurement of a good or service. This includes goods that meet a specified technical or quality of service standard, or relate to a given quantity.

- **An outcome-based preference** is the preferred procurement of a good or service that delivers an outcome sought by government.

2.1. Product-based Preference

A product-based preference mandates or compels the procurement of a product or service based on **nationality** (*viz.* domestic or international), **specific identity of the supplier** (e.g. the "national champion"); and/or a **specific type or group of product or service**.

Product-based preferences may require specific standards, quality of service or localized spending. To qualify for a preferential procurement program, the domestic-based development and manufacturing costs of a firm may have to meet a set percentage (e.g. 50%) of the product's market value. In situations involving intellectual property rights, the preferential policy may require the copyright to be owned by a legal domestic entity or be registered first in the country in question. These elements of a product-based preference are usually targeted at nurturing, promoting or supporting a particular sector of domestic industry.

However, a product-based preferential policy, if not well-conceived, may lead to outcomes that run contrary to the intent of the policy. For example, if the product-based preference constrains domestic firms from taking advantage of technology transfers or partnering with more innovative international companies, then the preferential policy will weaken – rather than strengthen – the domestic firms' ability to compete effectively in an open global market.

A product-based preference can be product-specific, by, for example, calling for the use of specific brands of personal computers (PCs) and not others. The preference can also be product generic, excluding potential substitution, such as mandating fixed-line telecommunication services and excluding wireless or Voice over Internet Protocol as substitutes. Mandating the procurement of a specific product may attract more firms into the market to produce or manufacture the preferred product. On the other hand, mandating the procurement of a specific product runs the risk of excluding public agencies from searching for and using a more cost-effective solution. Furthermore, the policy may cause firms in the marketplace that are providing a competing but non-preferred product to alter their investment and production decisions. A drop in supply of competing products due to such preference policies limits the options available to purchasers who are not subject to the

2 The question of 'how to buy' revolves around the form of contract which ranges from fixed-price to cost-plus contracts, with incentive-based contracts in the middle. The different forms of contract have different implications for risk-sharing between government and the supplier, as well as different impacts on efficiency incentives.

dictates of the preferential procurement policy, e.g. private businesses and consumers, and potentially produces a risk of oversupply of the preferred product.

2.2. Outcome-based Preference

When government is a major buyer – or in some cases the only buyer – of goods and services, it can structure its procurement policy to achieve an outcome of benefit to all consumers. This is an outcome-based procurement preference. For example, in the 1980s the U.S. government sought to improve the safety of government-owned vehicles for its employees (i.e. the outcome) by procuring only cars equipped with airbags. Cars with this safety feature were not produced at that time even though the technology was available to automobile manufacturers.[3] The U.S. government's outcome-based procurement preference influenced the production decisions of car manufacturers, which resulted in the availability of safer vehicles for not only government workers but for consumers, as well. The U.S. government used the preference policy to achieve this desired outcome.[4]

An outcome-based procurement preference may not be appropriate when the desired outcomes are not carefully considered. Procurement of goods and services from a particular segment of the domestic economy that is designed to grow that segment may have detrimental impacts on other segments of the economy, increase costs to consumers or reduce innovation. Therefore, careful determination of the types of outcomes that can be achieved is important to ensure success of the policy.

Outcome-based preferences can be designed to result in innovativeness, increased consumer welfare (through better products), or minimizing transfer of surpluses from consumers to producers. However, this form of outcome-based preference has not been prevalent based on the literature to date.

3 We examined this procurement approach by the U.S. government in greater detail in Section 4.4 *post*.

4 This is akin to situations where government intervenes to correct a specific failure of the market, *viz.* the under-supply by private firms of a good or service that has positive spill-over effects on all consumers.

3. THE POLICY DIMENSIONS OF PREFERENTIAL PROCUREMENT

3.1. Preferential Procurement and Industrial Policy

From an economic perspective, a preferential government procurement policy is a subset of industrial policies that seek to provide special advantages or assistance to particular industries or firms. These policies can take the form of direct or indirect subsidies, tariffs or other forms of trade protection. The rationales for preferential procurement policies are similar to those of industrial polices, *viz.* protection of infant industries, national security, nurturing an efficient industrial structure, promoting economic growth or improving national welfare.

In the late 1980s, governments around the world responded to the accelerating pace of globalization and technological innovation by extending preferential procurement policies to deal with strategic issues of international competitiveness, economies of scale and first-mover advantages. These strategic issues often pertained to "high-tech" industries, which affect technical progress with spill-over effects on the rest of the economy.

The procurement advantages conferred upon, or assistance given to particular industries, are forms of government policy intervention to achieve certain economic or social objectives.[5] Bekar and Lipsey (2002) refer to the U.S. government as being particularly successful in using public procurement policy to incentivise suppliers to develop innovative solutions. They cite as examples the government's encouragement of the development of the software industry and the government's willingness to purchase from small new firms rather than from large established firms.[6]

Nonetheless, the contribution of a preferential procurement policy to the performance of a national economy was and still is the subject of debate. One of the key claims by proponents of preferential procurement policy is that it can be used to steer and support the specialization in high-tech industries, thus reshaping a country's comparative advantage in an increasingly open and global economy.

On the other side of this argument, critics are doubtful of the ability of a government to systematically identify and pick "winners" that merit preferential treatment. This is due to the rapid pace and uncertain outcomes of technological change and innovation. Any ill-informed choice or misguided attempts can make matters worse, for both the favored industries and the overall economy. Other critics say preferential procurement encourages "rent seeking"[7] activities more than it promotes efficient production by the favored industries. Government defeats the purpose of spurring the economy by preserving favored but inefficient industries incapable of being "winners" or "national champions" on their own.

---

5 In the international trade literature, a preferential government procurement policy is regarded as a form of non-tariff barrier that is subject to WTO rules and/or other forms of trade agreements.

6 C. Bekar, and R. G. Lipsey (2002), "Clusters and Economic Policy", available at http://www.isuma.net/v03n01/bekar/bekar_e.shtml#r_note44 (accessed on 9 February 2006)

7 "Rent seeking" is a term used by economists to refer to the government lobbying efforts of vested interest groups to establish or to seek the continuance of a favorable government action or policy that would allow the interest groups to earn or sustain monopoly-like profits.

3.2. Procurement preference and Innovation

An oft cited rationale for procurement preference policies has been that it will enable domestic firms to become more innovative. Innovation occurs within an economy because of the interaction of three different factors – the ability of innovators to extract a return from their innovation, the dynamics of the market demand and the nature of the industry. The effect of a procurement preference policy on the interaction of factors that influence innovation needs to be carefully considered and weighed. There is a risk that preference policies may actually distort the innovation factors or even hinder the key capabilities from emerging in the firms.

Coase (1992)[8] and North (1991)[9] have argued that the institutional environment created by government policies and interventions have a direct bearing on economic development, particularly in developing countries. In these countries, there are strong links between businesses and government, and often businesses require pro-active and promotional assistance. This means that there are trade-offs between promoting innovation and promoting preferences, and these trade-offs should be made on a sound and informed basis.

3.3. Competition and Sustainable Competitiveness

In a more open and global competitive environment, one line of reasoning for the need for preferential policies is that the entry and presence of international firms in domestic markets make it difficult for domestic firms, especially in start-up industries, to fully develop. The argument goes that government should therefore reserve a market for such firms by a preferential policy of "buying local". Faced with intense competition in global markets, domestic industries should be re-organized with the aim of allowing a more integrated (and preferred) firm to take full advantage of the available economies of scale and scope. This will enable the preferred firm to compete effectively in international markets.

There is no guarantee that an industry that requires substantial fixed and sunk costs (e.g. airline industry) will develop the capability of standing on its own despite substantial government assistance and protective measures, unless it is subject to a degree of competitive discipline and incentives. A "picked winner" that has no competitive advantage in the industry is unlikely to attain a sufficient level of international competitiveness despite preferential government treatment.

Contrary to the thinking that domestic competition needs to be curbed to allow the preferred firm or industry to flourish, it is the very dynamic process of competition that exerts constant pressure on a firm to adjust to changing market conditions, to innovate and to improve efficiency. Any advantages in competitiveness that are given to or acquired by the preferred firm in an insulated market environment are transient in nature. The continuance of an ineffective preferential policy could distort resource allocation and impede long-term economic growth.

---

8 Ronald Coase (1992), "The Institutional Structure of Production", *American Economic Review*, 82:713 – 19

9 Douglas North (1991), "Institutions", *Journal of Economic Perspective* 5:97 - 112

According to Porter (1990), any advantages acquired by a firm in a competitive environment in terms of better price and quality of product or more efficient utilization of resources will provide a sounder base for sustaining international competitiveness.[10] The implication for preferential policy is that it should take into account the role and importance of domestic competition in promoting efficiency-enhancing industry structures and, more importantly, in spurring innovation and efficiency.

Meyer-Stamer (1997)[11], points out that at the firm level, competitiveness is measured in terms of the ability to satisfy simultaneously four criteria, i.e. (1) supply of products of adequate quality; (2) competitively priced; (3) sufficiently differentiated products; and (4) it must be able to respond quickly to changes in demand behavior. If it is able to satisfy these four criteria, it would be competitive. Yet, to be profitable, it would also need to develop an effective marketing system and establish a brand name.

These criteria, the incentives to innovate and the competitiveness of the environment may be hampered by the introduction of procurement preference policies.

3.4. Competitive Dynamics

Firms in the market often complement one another in terms of their respective product lines, and yet still compete against each other in the vertical layer of the market. Such competition is termed "vertical competition".[12] As an example of vertical competition, a firm that produces high-density DVD discs complements the DVD recorders produced by another firm. However, the DVD disc producer may also start manufacturing DVD recorders that compete directly with those already in the market.

Vertical competition manifests itself in a variety of forms:

- Attempt by a dominant firm in one particular market to turn the complementary product in a neighboring market into a more competitive product. For example, the more users there are of the Windows-based Word Perfect software, the greater is the demand for the Windows operating platform.
- Attempt by a dominant firm to incorporate some or all of its rival's products as features in its own product.
- Manipulation of interface standards to disadvantage a rival in the marketplace, e.g. a firm with a first-mover advantage may deny or frustrate interoperability to maintain its competitive edge.
- Rapid innovation simply to keep up with rivals. The development and introduction of Internet Explorer by Microsoft as a response to Netscape is a case in point.

---

10 M. Porter (1990), "The Competitive Advantage of Nations", New York, The Free Press.

11 J. Meyer-Stamer (1997), "Technology, Competitiveness and Radical Policy Change: The Case of Brazil", Frank Cass, London (at p.2)

12 The concept of "vertical competition" is synonymous to the concept of "co-opetition". See A. Brandenburger and B. Nalebuff (1996), *Co-opetition*, New York, Doubleday.

Domestic firms in today's open and globally-integrated economy can no longer be insulated completely from competition, even if government were to focus exclusively on developing and growing domestic markets. A preferred supplier designated under a preferential procurement policy is still vulnerable to competitive threats even if it has a market that is protected under such policy.

Non-preferred firms can innovate around the protected market (i.e. a "work around") by incorporating a preferred product's features into its own product design. This, in effect, defeats the usefulness of the preferential procurement policy. Yet, this ability to "work around" such policy limits is often ignored or overlooked. Preferential procurement policy makers need to look beyond policies designed to steer domestic demand towards the preferred products or services, to reserve domestic markets to preferred suppliers, or simply to protect domestic players from international competitors. A preferential policy that steers demand only works if government is also able and committed to intervening across neighboring layers of markets long enough for the "network effects"[13] to materialize.

[13] The economic value of a network is enhanced when an increasing number of users join that network. This is referred to in the literature as a direct network effect. For example, when more and more business users choose the same word-processing program, it would make it easier and less costly (transactional-wise) to exchange or transfer files between businesses. Indirect (or market-mediated) network effects can also arise, primarily through the availability of complementary goods or services. For example, the more applications that are developed to run on an operating platform, the more attractive that platform would be for users and, by implication, the more attractive that platform would be for software suppliers or developers.

4. CASE STUDIES

We will examine below the past procurement preference policies of five countries – Brazil, France, United Kingdom (U.K.), United States (U.S.) and India. These five countries were selected to provide a comparison between developed and developing countries, as well as comparing policies of countries from different geographical locations, and in different areas of technology. As the intention is to determine the effects of preference policies, we relied on past policies to identify the effects.

4.1. BRAZIL – COMPUTER INDUSTRY[14]

Brazil introduced import-substitution and preferential procurement policies in the 1970s and 1980s[15] which were designed to develop and nurture a Brazilian PC industry. The PC market segment was restricted to local producers only, whilst the mainframe computer market was open to international participation. This became known as the "market reserve" policy and it was designed to protect the Brazilian PC industry from direct imports and, therefore, competition from the world's leading computer makers.[16] Although international companies were kept out of the domestic market unless they were in joint ventures with local firms (with the local firms having majority control), a number of international firms entered the local market through the use of "work around" measures.

As part of this policy, Brazil restricted the transfer of technology from abroad to local firms, if their hardware or software technologies were similar to those being developed by Brazilian companies. Brazilian firms that had emulated software such as MS-DOS and UNIX operating systems were given a strong preference bordering on monopolistic rights.

Furthermore, the restrictions on technology transfer imposed by the government required (a) that technology transfer agreements be registered with a government authority; and (b) that the terms of these agreements conform to prescribed requirements, such as no restriction on sub-licensing to third parties and full disclosure of technical know-how. These restrictions on technology transfer meant that accessibility to technology was limited because technology owners feared that licensing or transfer agreements would cause them to lose control. As illustrated by **Figure 1**, this limited the industrial know-how acquired by Brazil and the number of collaborative agreements arranged from 1980–1991 (when domestic producers had preferential procurement) compared to after 1991 (when that preference was lifted).

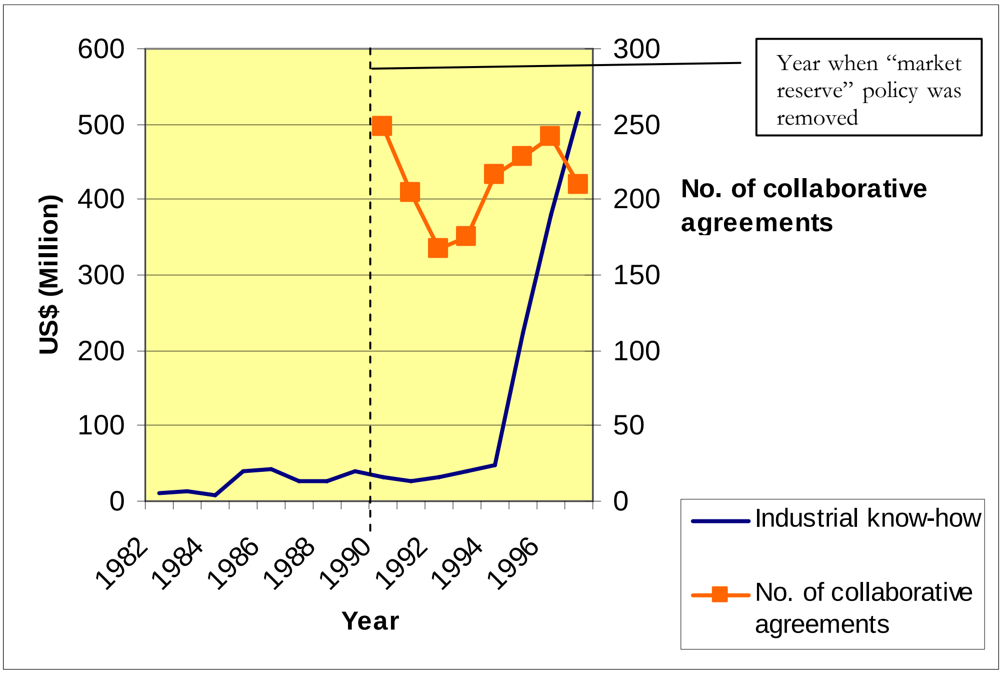
---

14 A. Botelho, J. Dedrick, K. Kraemer, and P.B. Tigre (1999), "From Industry Protection to Industry Promotion: IT Policy in Brazil", Centre for Research on Information Technology and Organisations, University of California, Irvine, Berkeley.

15 See the 1981 Decree of Ministry of Communication, where the Ministry reserved 50% of the market from the Tropico family of digital switching systems even before the technology was actually available. Thus, only 50% of that market segment was available to full competition. The 1984 Law of Informatics (7232/1984) created the market reserve policy where IT products manufactured by Brazilian companies (which definition covers incorporation, location, management, ownership of technology and control of capital and technology were Brazilian) were given a direct preference to domestic firms (which is an example of a "product-based preference").

16 In essence, this policy mirrored the infant industry policy that developing countries had adopted around the same period or earlier, such as India (1950s) and Korea.

Figure 1: Comparison of know-how acquisition from 1982–1997



Source: Mani (2001)[17]

Change and liberalization

The 1980s saw a decade of economic stagnation in Brazil and this produced the impetus for a change in policy[18] in the 1990s when domestic firms lost their protection and became exposed to international competition. Law 8248/91, according to Botelho *et al* (1999), removed the "market reservation" but introduced two different incentives, namely:

- Fiscal benefits comprising waivers of taxes or discount on certain taxes if certain defined activities (such as R&D) were undertaken by the firm concerned; and
- A government procurement policy that favored domestically produced goods, if they had similar prices to imported ones.

At the end of the 1980s, despite its market reserve policy, Brazil had attracted a set of international IT corporations that brought significant local market presence and job creation. Among the 50 main IT firms involved in hardware production, total employment increased from 43,000 in 1984 to over 74,000 in 1989.

---

17 S. Mani (2001), "Government, Innovation and Technology policy, an analysis of the Brazilian experience during the 1990s" available at http://www.globelics-beijing.cn/paper/Sunil%20Mani_Coping%20with%20Globalisation%20.pdf (accessed on 25 February 2006)

18 See the 1991 Deregulation Law (No. 8248/1991), which abolished the market reserve policy but set up a procurement preference policy in its place where domestically produced goods were to be preferred, and Resolution 155 of 1999, which applies to procurement of telecommunications goods and provides for a "soft preference", meaning that both domestic and foreign produced goods compete equally but in the event of a tie between the two, preference will be given to domestic goods.

Figure 2 illustrates growth in three IT sub-sectors – hardware, software and services – during the two procurement preference phases, i.e. 1981–1991 (market reserve) and 1991–1999 (mere domestic preference). Revenues of local computer hardware producers grew from less than US$200 million in 1979, to more than US$4 billion in 1990.

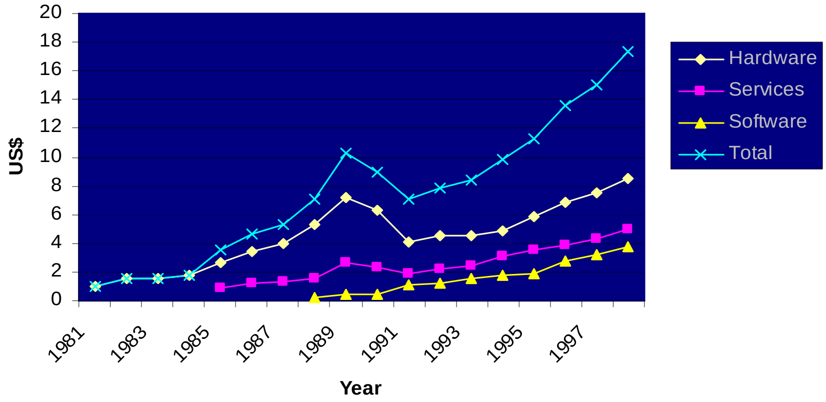


Figure 2: Computer sector sales (US$ billions current), Brazil, 1981–1998[19]

Yet, whilst sales grew, exports have remained fairly stagnant and since 1991 evidenced a decline as shown in **Figure 3** below.

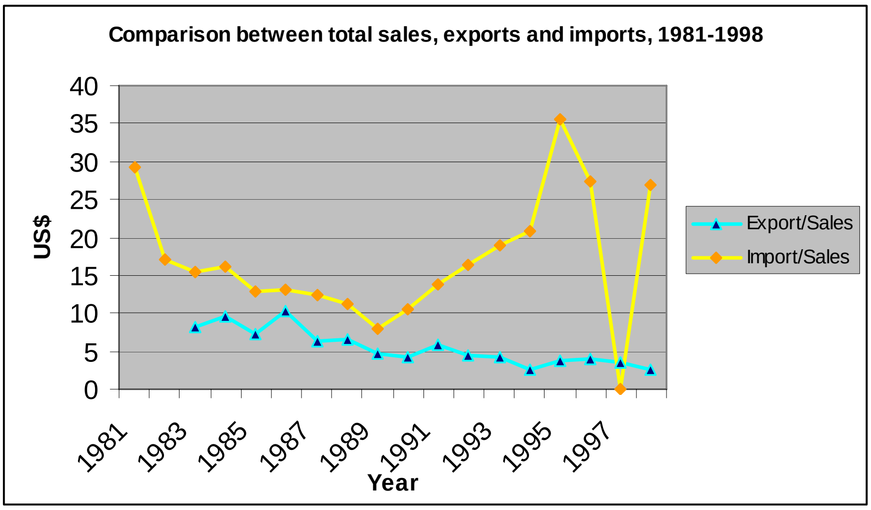


Figure 3: Comparison between total sales, exports and imports[20]

19 Sources: Panorama do Setor de Informática – V. 1 N. 1 – Set./91 SCT – Depin, Resultados da Lei n. 8248/91 – Dez. 1998 MCT – Sepin, The data was obtained from the International Labour Organisation's World Employment Report 2001, Chapter entitled "Information and telecommunications systems in Brazil" available at http://www.bib.ulb.ac.be/cdrom/wer_lawitie/back/bra_5.htm (accessed on 25 February 2006)

20 The data was obtained from the International Labour Organisation's World Employment Report 2001, Chapter entitled "Information and telecommunications systems in Brazil" available at http://www.bib.ulb.ac.be/cdrom/wer_lawitie/back/bra_5.htm (accessed on 25 February 2006)

4.1.1. Assessment

The Brazilian market reserve policy[21] of the 1980s was not effective in achieving the very objective that motivated the preference policy – to nurture Brazilian firms that would be able to sustain and compete with international firms. In fact, the policy impaired the competitiveness of Brazilian firms in the international arena.

Lack of competitiveness

Although the "market reserve" policy initially created an environment for domestic firms to thrive and grow, its inward-looking approach meant that these firms were protected from, rather than being encouraged to prepare for, the dynamic technological change that was taking place in the international IT industry in the 1980s. Only during the second period from 1991, when the highly protectionist policy was abandoned and replaced by a lesser preference policy, did sales volume begin to grow substantially.[22] However, a closer examination of the pattern and trends in total sales, exports and imports (as shown in **Figure 2** and **Figure 3** above) reveals a more troubling picture, namely:

- Once the market reserve policy was removed in 1991, domestic firms were unable to hold domestic market share for PCs in the face of direct international competition.

- During the market reserve period, domestic firms did not prepare to compete in overseas markets as evidenced by low export sales (see **Figure 3** above). Low export sales meant that either Brazilian products were of lesser quality, more costly or not technologically on par with international counterparts.[23]

- Given access to a large and protected domestic market, Brazilian firms had less incentive to export hardware during the market reservation phase (1981–1991), as shown in the declining hardware exports (see **Figure 3**). The lack of incentive to export contributed to the domestic firms' lack of preparedness for competition at home.

- The preference policy succeeded only to the extent that it enabled firms to thrive during 1981–1991. However, these firms lacked sustainability once the policy changed, because there were few incentives for domestic firms to compete internationally, and they were not prepared for it.

21 Referring to the policies of import substitution, procurement preference and control on access to technology, as identified earlier.

22 The increase in sales of hardware indicates that the prices of such goods became more affordable, thus increasing the spread amongst Brazilian people and firms.

23 The industry was in part a victim of its own remedy: to avoid local backward solutions, hardware smuggling levels rose to such a level that at one point, it accounted for close to half of total sales.

Lack of innovativeness or incentives to innovate

During the market reserve period, the preferred firms either did not have the incentives to innovate or exhibited a lack of innovativeness as shown by the artificial growth in domestic R&D caused by the difficulty in securing technology transfer agreements. Local firms developed their own products based on reverse engineering or in-house design, and yet it was not sustainable.[24] Domestic products were costlier and less sophisticated than international counterparts and Brazil was one-step behind what was being developed globally:[25]

Rent seeking incentives

The market reserve policy also caused domestic firms to engage in "rent-seeking" behavior (e.g. influencing regulatory decisions in their favor) instead of pursuing greater production or manufacturing efficiencies.

The low export of domestically produced hardware reflects the attitude of the preferred firms who were content to supply the domestic market. This, in turn, had long term effects of dulling the competitiveness of the domestic firms when the market reserve policy was liberalized in the 1990s, leading to their demise.

Timing for change

The state's ability to continue preferential procurement policies was severely affected because of external shocks such as the financial crisis and the economic downturn in Brazil, as well as pressure from other governments to lift preferences. Change was compelled by external factors, rather than by the timely evaluation of the original policy itself. Policy makers were unprepared to discard policies. Policy makers may be resistant to change, and are likely to allow policies to remain until they are forced to change.

Firms outside the preference actually grew

Whilst Kreamer and Dedrick (2004) point out that "*the idea of promoting a domestic computer industry behind protective barriers is not tenable in an industry marked by rapid technological change and dominated by multinational companies who control global standards,*" an interesting anomaly is the Brazilian banking software industry, which is thriving and globally competitive.

The possible reasons for this are that (a) the industry was never part of the market reserve policy and so had to compete with international players; and (b) the lack of preference actually enabled them to be more competitive and innovative.

24 After the liberalization and removal of the market reserved policy, the hardware manufacturing sector effectively closed down and ceased to exist even till today.

25 See in particular Kraemer and Dedrick (2004); A. Botelho *et al* (1999)

Impact on other sectors of the economy

The software industry emerged in the late 1980s in Brazil and followed the same strategic orientation with the development of copycats of the most popular programs. During the period of hardware market reserve, software users were hampered by an increase in the cost of hardware, delaying and reducing the scope of IT diffusion and, more importantly, blocking their early development into sophisticated and mature software users. Emerging software firms faced higher barriers to entry and a bias towards segments that could afford the extra hardware cost, such as banking and finance (Botelho, 1998). On the policy front, the hardware focus of the IT policy made software a mere sub-product of hardware sales, unworthy of dedicated measures (Evans, 1995). The industry languished until the mid-1990s when it grew proportionally to other sectors (see **Figure 2**).

4.2. FRANCE – *GRAND PROJETS* – MINITEL

French industrial policy relied in a large part on the promotion of national champions, i.e. firms selected by the state as "*instruments of a policy of industrial patriotism.*"[26] The use of national champions evidences the influence that Colbertism has had on French industrial policy. Colbertism[27] came to mean a policy of supervision and intervention by the state, as well as a policy that required state intervention in industries, whether it be for "catching up" to confront international competition, or otherwise.

The late 1960s saw increasing political pressure to upgrade the aging telephone network in France. The network modernization programme was a *grand projet* and required:

- The Direction Générale des Télécommunications[28] (DGT) to borrow funds to finance investments instead of using internally generated funds as in the past;
- The picking of "winners", i.e. Alcatel and Thompson;
- The transfer of digital technology developed by the *Centre National d'Etudes des Telecommunications* (CNET) to Alcatel, in order to spur Thompson to invest in R&D to produce another digital system, thus creating "managed competition";
- The use and implementation of a "closure" strategy where the DGT supported these two suppliers by exclusively purchasing equipment from them (i.e. a "buy French" policy), assisting the export of their products, providing financial assistance and the excluding non-French suppliers from the French telecommunications market.

The network modernization policy increased the number of telephone lines from four million in 1969, to 20 million lines in 1980. By 1980, according to Sachwald, (1997) "*France had caught up with other industrialized countries.*" This enabled the network modernization programme to be regarded as a success.

The innovation policy of the DGT through the existence of two national suppliers was frustrated by a merger between Alcatel and Thompson, a decision not favored by DGT but pursued by CGE, the parent company of Alcatel. The result of the merger reduced the choice that was specifically crafted by DGT.

26 J. Hayward (1995), "Europe's Endangered Industrial Champions", in *Industrial Enterprise and European Integration*, J. Hayward (ed), Oxford University Press, Oxford, England

27 Some characteristics of Colbertism are (i) a unique role of government in the economic system – which Cohen (1995) identifies as "offensive protectionism" where the state creates the means of accumulation of scientific and financial resources, by providing the national champions with grants, secure markets through public procurement policies and prevents foreign entry; (ii) state ownership in firms; (iii) large and prestigious public sector; (iv) state initiated technology projects (i.e. *grand projets*), (v) monumental infrastructure projects (i.e. *grand projets*) and (vi) innovation encompasses changes in operating procedures, institutional forms and technical reappropriation and not only R&D in science and technology. Cohen, E., (1995) "France: National Champions in Search of a Mission" in *Industrial Enterprise and European Integration: From National to International Champions in Western Europe* ed. J.E.S. Hayward (1995) Oxford University, New York, USA.

28 An autonomous unit of the Ministry of Posts and Telecommunications.

On the back of the success of the *grand projet* for telecommunications, the Minitel project was introduced by the DGT as a result of a report (the Nora-Minc report[29]) prepared in 1978 on the impact of the development of computers on society. In essence, the Minitel system[30] is a dedicated end-user terminal connected via the telephone line, and allows access to content (usually in text format) through traditional narrow-band copper telephone lines. The telephone company bills the user for usage charges and for the price of the content that is viewed. The Nora-Minc report forecasted the advent of the information society, in the convergence of telecommunications and computing. At the same time, it concluded that IBM was becoming a world "big brother". The report suggested that the DGT play a leading role in organizing a national telematics programme.

DGT was also impressed by the success of the Japanese VHS recorder and sought to emulate it by mass-producing a product, thus lowering its cost, and trying to export the product. The policy also called for a rapid diffusion by distributing the product free-of-charge, and required that 30 million terminals be distributed over 15 years. Back then, the telecommunications provider was a state-owned monopoly and the Minitel policy required that a procurement preference be granted. The state-owned monopoly developed and deployed the product, but faced opposition that delayed the programme and reduced its size.

By 1993, nearly 12 years after the programme started, only 6.3 million Minitel terminals were deployed. The distribution of Minitel terminals free-of-charge in France spurred the take up – by 1994, Minitel provided more than 30,000 services. It generated revenues of US$1 billion per annum in the 1990s with about half going to service providers and the balance going to France Telecom[31], the owner of the Minitel network and terminals. However, revenues declined because of the Internet, and were only US$500 million in 2003. Profitability remained doubtful – as Sachwald (1997) estimates, revenues were only 10% greater than costs.

However, the Minitel system remained a domestic product with very few exports. The lack of exports can be attributed to the low technological system of Minitel. The lack of domestic competition also played a factor in the product's inability to find an export market.

4.2.1. Assessment

The two *grand projet* typifies French industrial policy of that era that "*constitutes one type of closure pattern* [Cawson et al (1990)]*, that is to say one type of strategic action aimed at securing a dominant position in the market* … [which is] *dominated by the State which controls the government-industry relationship and chooses which firms to include and which to exclude* … [and] *is necessary for the* [policy] *to succeed.*"

29 This report was written by Simon Nora and Alain Minc, both high level civil servants in France. S. Nora, A. Minc (1978), "L'Informatisation de la société", Paris, La Documentation Francaise/Seuil cited in F. Sachwald (1997) "Colbertism in ICT: Lessons from the French experience", available at http://www.tcf.or.jp/data/19971011_Frederique_Sachwald.pdf (accessed on 12 January 2006). Nora and Minc coined the word *telematics*.

30 A description of the Minitel system is available at http://www.minitelfr.com/Uk/divers/autres_info.html or at http://www.sutherla.dircon.co.uk/minitel/.

31 France Telecom was, until 1990, a state-administered organization, when it was then transformed into a public corporation and separated from the postal branch of the Ministry of Posts and Telecommunications. See T. Vedel (undated), "The French Policy for Information Superhighways: The end of High-Tech Colbertism?" available at available at http://www.crito.uci.edu/GIT/PUBLICATIONS/PDF/PAC-091.PDF (accessed on 5 March 2006)

Yet, the results of these two *grand projet* are quite the opposite. One possible explanation may be that timing was an important factor. The time when the telecommunication *grand projet* was undertaken was when most telecommunications service providers were state-owned monopolies or private monopolies (e.g. the U.S.). The telecommunications product market at the time was global but had a limited number of buyers (who were primarily bureaucrats and not businessmen) compared to when the Minitel project was introduced.

Whilst the telecommunication modernization project is recognized as a success in France because it modernized the network, the project failed at that time to spur French telecommunication equipment manufacturers to compete globally.

Sywulka (2001)[32] points out that whilst the Minitel policies may have had many commendable aspects, they lacked the key characteristics (*viz.* competitiveness, non-obsolescence and lack of universal accessibility) which are essential for a nationwide network to remain effective in increasing the social and economic development of the country. The absence of these characteristics created stumbling blocks or impediments to the emergence of incentives to innovate and improve the Minitel technology.

By examining of the data set out in **Table 1** below, it is clear that despite the usefulness of Minitel early on, the emergence of the Internet leap-frogged over Minitel in terms of the number of users, the number of access devices and the revenue generated.

Table 1: Comparison of growth of Minitel and the Internet in France

	Minitel	Internet
Access Devices (Terminals/PCs)	6,500,000 (as at 1993)[33]	29,410,000 (PCs as at 2004)
Users	17,000,000 (peak numbers as at 1997)[34]	25 million (as at 2004)[35]
Internet hosts / Content Providers in France	30,000 services	2,335,625 (hosts as at 2004)[36]
Broadband connection		6,300,000 (as at 2004)[37]
Revenue generated		26 times greater than Minitel in 2006[38]

32 B. Sywulka (2001), "What we can learn from France's Minitel system about building effective national networks" available at http://ben.sywulka.com/research/minitel.pdf (accessed on 21 February 2006)

33 This was the peak number of Minitel terminals distributed in France. Since 1993, it has declined.

34 Source: The Internet Index available at http://www.treese.org/intindex/95-10.htm (accessed on 21 February 2006) and at http://ben.sywulka.com/research/minitel.pdf. The number has declined to 15 million users in 2000 and is evidencing a downward spiral.

35 Source: ITU Database

36 Source: ITU Database

37 Source: ART (French telecom regulator) Annual Report for 2004.

Table 1 also shows that Minitel was unable to compete with the Internet on several fronts – (i) access devices; (ii) users; (iii) providers; and (iv) revenue. Yet, despite the challenge that the Internet brought about, the providers of the Minitel system did not have the incentive to reform the system so as to better handle the competition from the Internet.

Incentives to Innovate and Innovativeness

The degree of innovation within the Minitel system was lower compared to the Internet, and according to Sutherland (1990)[39], the Minitel system itself has been left relatively unchanged since its introduction. This lack of innovation may be attributed to the Minitel technology, the fact that it was not designed with PCs in mind, and that "[v]*ideotex was designed to be accessed by dedicated terminals with no other purpose than supporting that service.*" [40]

Another factor that reduced incentives to innovate the Minitel system was the emergence and introduction of other telecommunications systems, particularly wireless.[41] France Telecom, according to Vedel (undated at p. 14), wanted to get "*rid of the Minitel model …* [because of] *the impossibility to select and control information providers* [which] *resulted in an overall poor quality of the system and a deteriorated image … as well as additional costs* [with] *no corresponding benefits.*"

As the Minitel separated the network and the services offered, more service providers offered competitive services to customers, while at the network level, there was no competition. This reduced incentives for France Telecom to be competitive at the network level, and to offer competitive prices or improve customer welfare. These incentives were weak, if not non-existent, in the environment created by the preferential policy.

Sachwald (1997) argues that the structures of telecommunications, electronic and computer industries increase the scope of **interfirm cooperation** (*emphasis ours*) domestically and internationally, which reflects the importance of knowledge spill-over effects. This is particularly reduced or lost when preference in various forms is present, because a preference addresses only one side of the cooperation arrangement (i.e. of the preferred supplier) but not the incentives of the other party to cooperate.

---

38 Source: France Telecom citing Jupiter MMXI – available at http://www.francetelecom.com/sirius/rd/en/ddm/en/technologies/ddm200203/index1.php#hautdepage (accessed on 21 February 2006)

39 E. Sutherland (1990), "Case study – Minitel: The resistible rise of the French videotext" available at http://www.sutherla.dircon.co.uk/minitel/ (accessed on 21 February 2006)

40 Dybvik, "Listen to the Internet" available at http://www.w3.org/People/howcome/p/telektronikk-4-93/Dybvik_P_E.html#KREF10 (accessed on 21 February 2006)

41 France has continuously experienced a decline in the fixed line telephony market since 1998, with a 4.1% fall in value and 4.2% drop in volume (minutes) in 2003. However, according to ART, the French regulator, "growth of around 12% in value in the mobile telephony and Internet business easily offset the structural decline in the fixed line market". See Autorité de Régulation des Télécommunications (ART). Annual Report 2003. Available at www.art-telecom.fr.

Technology preference produces "ring fencing" effect

The "ring fencing" effect, a term we coined, refers to a situation in which a firm, government or user remains within the confines of the fence and does not have the ability to change or exit the fenced area. They can see the changes outside the fence but appear to be powerless to leave the fenced area. Technology selection by the government runs the risk of producing such ring fencing effects, particularly when the incentive to innovate is low, or the ability to innovate is similarly curtailed.

The service providers that built businesses around Minitel wanted the system to continue. One "ring fencing" effect reduces the ability or desire of a firm to want to change, despite knowing that they can by looking out of the fence. This phenomenon makes preferential procurement selection based on technology extremely risky, as technology evolves rapidly.

Another "ring fencing" effect of the Minitel system was the inability of users to customize the solution for their own needs. The service determined how information was presented and how users interacted with the service. Users were unable to change the way information was presented to them through the Minitel system, although they were able to see that others (e.g. users of the Internet) could change the presentation of the information. Effectively, the solution became tied to the technology, without the option of allowing users to make any changes.

Cost as a disincentive

Equipment renewal incurs costs that affect the incentive to update and replace. The Minitel terminals are fairly durable assets (with a life span of seven years) and because no profit was made from distributing terminals, the provider, France Telecom, was less willing to incur costs to upgrade or renew the terminals for existing customers. The provider in fact wanted to extract as much revenue as possible out of the investment rather than incurring further capital costs to change these terminals. This is particularly the case here since France Telecom was giving Minitel terminals away for free, coupled with the fact that it was difficult to recover the cost of the service and terminals by usage fees and service charges. The low recovery of capital costs and the high cost of the terminals became a disincentive to the provider to renew the equipment to enable better services to be provided.

An opportunity missed

The case of Minitel reflects the difficulties faced by governments in trying spot the right emerging technologies to steer the industry into, and after that to sustain a "national champion" in the identified area. The artificial apparatus created by preference policies to support the "national champion" and the comfort level so created limited the ability of the French industry to truly adapt to a rapidly evolving environment. The vision foreseen in the Nora-Minc report might have given the French IT industry a significant head-start in developing innovative products and services tailored for the information economy and the Internet age, if not for the absence of fully competitive forces within the information services sector in France to encourage the players to venture out of their comfort zone and to recognize the potential of the worldwide market.

4.3. UNITED KINGDOM – INFANT COMPUTER INDUSTRY

In the formative years of the British computer industry in the late 1950s through 1960s, the government was motivated to imbue the national economy with technological competence. It took a proactive role in fostering a strong local computer industry by:[42]

- "Picking winners" through R&D funding and advocacy of industry consolidation of electronics, computer manufacturers, and data processing firms in 1950s–60s; and

- "Buy British" government procurement preference from 1964 on, culminating in the creation of a "national champion" in 1968.

The government efforts, however, wound up back-firing. Policy makers put all of their eggs in one basket by promoting one national champion, but they proved unable to anticipate the direction of the developing computer industry. In the end, the national champion was not only unable to compete internationally but failed also to satisfy domestic needs.

R&D funding, industry consolidation and "picking winners"

In the 1950s and early 1960s, the newly established National Research Development Corporation (NRDC) provided R&D funding for the development and production of computer hardware and equipment. It also fostered – and in some instances compelled – the horizontal mergers of electronics and office computer equipment manufacturers in order to achieve economies of scale by pooling the production and marketing expertise.

The first major merger among these manufacturers was in 1959 when BTM joined with Powers-Samas (both office equipment businesses) to form International Computers and Tabulators (ICT). ICT was formed to compete with IBM in the market for punch card based office machines and it became the largest data processing machine manufacturer in Europe. A further wave of mergers took place between 1960 and 1963 involving a group of electronic equipment and control businesses that included Ferranti, English Electric, GEC, EMI and Elliot Brothers. NRDC's proactive role in these mergers was, according to Coopey, tantamount to "picking winners". NRDC "*supported Ferranti through R&D funding and purchasing guarantees (having switched support from Elliott Automation) in developing the Star Mark I and the later Pegasus, the latter built to a design partly specified by the NRDC* ...."

"Buy British" policy and creation of a "national champion"

In the early 1960s, the British domestic market for computers was protected by a 15% import surcharge and by restrictions on the export of computer goods manufactured using international know-how or equipment. Both of these trade protection measures were not entirely effective. The import surcharge did not curb demand imports significantly because of the importance of non-price (e.g. quality, state-of-the-art technology) factors in the purchasing decisions of British buyers. The export restrictions, on the other hand, hampered the ability of British firms to compete effectively for export contracts.

42 See R. Coopey, "Technolgoy Gaps and National Champions: The Computer Industry and Government Policy in Post-War Britain" available at http://www.icfcst.kiev.ua/SYMPOSIUM/Proceedings/Coopey.pdf (accessed on 8 February 2006)

The ineffectiveness of the trade measures and technological advancements led to further government-influenced restructuring of the industry. In 1968, the year ICT was created, IBM introduced a new computer (the 1401) that provided more reliable electronic data processing supported by good software and peripherals. In response, a new British Ministry of Technology (Mintech) encouraged the creation of a consolidated company, International Computers Ltd (ICL), to become a "national champion". The government not only influenced the company's structure, but also the design of products that were to compete with – rather than be compatible with – the then-dominant IBM machines.

Mintech tried to use government clout to create a market for the British-made machines and products. It established a Computer Advisory Service to centralize procurement for public sector bodies, including the nationalized industries, local authorities, research councils, universities and other educational establishments. In addition to a "buy British" preference, the government set new criteria for procurement, including an assessment aimed at curtailing the purchase of imported machines at prices that were (in Mintech's view) excessively discounted. The government even went so far as to set up a National Computing Centre to advise computer users outside the public sector and act as a clearing-house for software development. Criteria for new software projects included that they be novel, have long-term commercial potential and that "*the outcome of the work is both in the national interest and in the overall interests of the British computer industry*."[43]

The "buy British" approach was eventually reversed by the Treasury on the grounds that any procured computers should be "*those which by ordinary commercial standards were judged to be the best suited for the jobs to be done and the best value for money*."[44] The British-made machines and software never succeeded in international markets and eventually lost ground to rivals, such as IBM, at home.

4.3.1. Assessment

The British government's policies of "picking winners" and a "national champion" during the formative years of the computer industry were neither effective nor successful. In creating a single national champion, the government failed to take into account the fact that the computer market was already competitive, despite the apparent dominance of IBM. The preference policies discouraged other British companies from innovating to develop new products and therefore were unprepared for the PC revolution of the 1980s.

In addition, the government's role in shaping the national champion's product line, focusing on products and services that were not compatible with the predominant standard, undercut the company's international competitiveness. Given the rapid development cycles in the nascent computer industry, the British government tried unsuccessfully to second-guess the direction of the industry by choosing a winner – and lost.

---

43 I. Maddock, "Stimulating Technological Innovation in Industry: The Role of the Ministry of Technology", in *Proceedings of the Institute of Mechanical Engineers*, 182(32), p. 691, The Ministry of Technology Ministry of Technology May 1970 p.46.

44 "Computer Programme for Government Offices", Treasury Press Release, 2 January 1965.

4.4. United States – Safety First: Cars with Airbags

Motor vehicles sold in the U.S. during the 1970s–1984 were not equipped with airbags on the driver side, which comes standard in most vehicles sold today. Patents on airbag technology were first issued in the 1950s and 1960s. The slowness to adopt airbags appears to be because automobile industry executives were hostile to federal safety programs. Thus, motor vehicles sold to the U.S. government – and consumers – before 1984 lacked airbags.

In the mid-1980s, however, the U.S. government General Services Administration (GSA), which was in charge of government procurement, issued a federal procurement specification for automobiles with driver-side airbags, despite the lack of cars with airbags on the market. The Ford Motor Company was more willing to fill large government fleet orders, effectively breaking the logjam of automaker opposition to airbags while giving Ford a head start on its competitors.

Ford submitted the winning bid for 5,300 Tempos, which prompted the company to offer optional airbags in Tempo and Topaz models sold to the general public. An industry rival, Chrysler, was also prompted to offer as standard driver-side airbags on several models. Other companies followed suit, leading to the eventual widespread adoption of safer airbag technology.[45]

4.4.1. Assessment

This case illustrates how an outcome-based procurement policy can change the industry, decrease resistance, introduce new incentives and improve consumer welfare overall. The automobile industry's resistance to introducing airbags, despite the available technology, was lowered by proper economic incentives. A key factor that underpins GSA's success with its outcome-based preferential policy approach is its use of a "competitive tender" approach to select, not a *preferred* supplier (as would be the case with a product-based preferential policy), but a supplier who is the *most efficient* in both price and quality-adjusted terms.

Competition in the automobile market then (and more so today) took place along both product quality and price dimensions. Ford saw an opportunity for a head start on product quality dimension. Once the order was fulfilled, Ford offered airbags as an optional extra for consumers. This was subsequently countered by Chrysler, who made airbags standard. The government policy resulted in an industry-wide change – as all manufacturers then made airbags standard and increased consumer safety.

The U.S. government's procurement power can be an incentive to firms to innovate if no product-based preference exists. Use of government's buying power to (i) encourage the production of innovative products, or (ii) change market behavior (as in this case) produces more overall benefit than product-based preference. Firms innovate in response to an incentive for government business. Using buying power in an outcome-based preference is more likely to improve overall economic welfare than mere input-based preference.

45 Details are available from Ralph Nader, Eleanor J. Lewis and Eric Weltman, "Shopping for Innovation: The Government as Smart Consumer", *The American Prospect*, Fall 1992, pp. 71-78 (available at http://www.prospect.org/web/page.ww?section=root&name=ViewPrint&articleId=5221 and at http://www.nader.org/history/bollier_chapter_2.html (both accessed on 10 February 2006)

Even so, one should note that if the U.S. government's procurement policy continued to require specifically the incorporation of airbag technologies in cars, rather than specifying more generically the requirements for innovative car safety features, eventually car manufacturers might be satisfied with airbag technology and opt not to invest in further safety research that might lead to a better safety innovations than airbags..

The U.S. case study also exemplifies the care which governments need to take when designing procurement preference policies – namely the market changing effects of such policies. Producers of products will focus on the elements that are the subject of the preference, if that is what the government wants when the market is not producing such items. However, when the procurement preference is for an outcome (without specifying technology or product) then such policies appear not to distort the market. Thus, identifying a "good" outcome (as opposed to any outcome) is what matters.

In addition, if such outcome-based preference policies are properly deployed, it can produce positive results, such as having industry changing effects for the better. In the U.S. case, the government used its buying power to move an industry to introduce a feature which would produce greater consumer welfare (better safety features that would have reduced healthcare cost to government) rather than promote the airbag producing industry. However, the wielding of such power must be exercised with great care, since this is where the danger of a technology-specific preference lies, even when the preference may not be product-specific. Outcomes need to be defined in a manner that can best bring about the intended policy effect, and the policies need to be kept updated for them to serve their purpose, and retired when they are no longer required.

Thus, this U.S. case study clearly illustrates two key points – (1) governments need to exercise caution when designing preference procurement policies; and (2) the great power that governments wield must be exercised carefully since market changes or distortions can be produced.

4.5. India – ICT Evolution

The case study pertaining to India relates to two parts of a network industry – hardware and software production in India. Each of these two very different situations merits analysis.

4.5.1. Hardware

India's economic policies in the years after its independence were influenced by concerns for national security and self-reliance and growth without dependence on international aid. The Indian government implemented a strategy of import substituting industrialization (ISI), in which the local industry was to produce manufactured goods to replace imports.

This resulted in the introduction of import substitution policies, but more importantly since the 1970s, the government acted as both regulator of the private sector in the field of computer products manufacturing as well as the producer of competing goods.

The government exerted tight control over the private sector by requiring government permission to import capital goods, to license technology, and to access foreign exchange. Furthermore, high tariffs and license requirements limited imports and created a protected market for domestic producers, without the need to create a specific market reservation.

However, India found itself unable to develop many key industries due to a lack of technology and capital equipment. Yet, during the 1980s, India would be considered successful in building an indigenous domestic computer industry capable of producing hardware for the local market.[46] Further, government procurement was used as a tool to bring about technology changes and support of domestic producers (through the requirement that indigenous sources be used when available), particularly as 60% of all IT purchases in India are from government or the public sector.

In the 1970s, through the India Department of Electronics (DOE), a state-owned "national champion" was created in a company known as Electronics Corporation of India Ltd (ECIL). Two things occurred after the creation of ECIL, namely (i) DOE made it very difficult for private competitors to obtain licenses to enter the market ECIL was in; and (ii) ECIL obtained almost all of the government's computer development funding. This approach gave ECIL a protected market, as there were high entry barriers for non-favored firms. It also provided ECIL with access to capital, which was made difficult for private firms.

The effect of favoring ECIL was that between 1973 and 1977, its market share grew from 43% to 50% of computer installations in India, but by the end of the 1970s ECIL's ability to compete domestically was seriously affected. ECIL could not produce a technologically sophisticated computer, nor be price competitive, nor deliver on time.[47] Over the same period, the government's attempt to ensure that IBM complied with local investment rules[48] caused

46 "Growth in domestic hardware production has averaged over 70% per year. Hardware prices have dropped dramatically since the mid-eighties and Indian companies have come to market with leading products, such as 386-based PCs, soon after they were introduced in the industrialized countries." Dedrick and Kraemer (1993), "India's Quest for Self Reliance in Information Technology: Costs and Benefits of Government Intervention" available at http://www.crito.uci.edu/git/publications/pdf/pac-005.pdf (accessed on 14 March 2006)

47 Dedrick and Kraemer (1993), "India's Quest for Self Reliance in Information Technology: Costs and Benefits of Government Intervention" available at http://www.crito.uci.edu/git/publications/pdf/pac-005.pdf (accessed on 14 March 2006)

48 Which required that IBM sell down to 40% equity in its Indian firm.

IBM to exit the Indian market.[49] The vacuum left by IBM was quickly filled by ICL, the Tata-Burroughs joint venture as well as new privately-owned domestic firms such as HCL, DCM and ORG.[50] These new privately-owned firms were able to compete more effectively with ECIL and gain market share,[51] despite the lack of preference given to them. The situation in India illustrates that when there is no competition, the incentive for the favored firm or monopoly to produce superior products is missing.

Promoting rent-seeking effects

The results of such regulation produced negative incentives. Firms realized that success in the market depended largely on gaining access to import licenses, foreign exchange, operating permits, and other government favors, rather than on their ability to improve the quality or reduce the price of products. The result was many firms became "rent seekers", attempting to gain favorable treatment from policy makers rather than relying on innovation. Dedrick and Kraemer (1993) point out that "[m]*anufacturers rarely achieve economies of scale in production and have had little incentive to invest in technologies to reduce cost or improve quality. Consumers are forced to pay high prices for inferior items. Labor unions have fought automation which might threaten jobs and have supported the status quo regarding imports, since unionized workers prosper in protected industries. Finally, state-owned enterprises have remained generally inefficient and unprofitable, dominating key industries and hampering the growth of the private sector.*"

Consequently, this rent-seeking phenomenon experienced in India diverted the resources and assets from investment in innovation through research and development, to investment in policy-preservation to ensure that current practices are maintained in the interest of the rent-seeker (i.e. the preferred firm or firms).

Low R&D incentives

Dedrick and Kraemer (1993)[52] observed that R&D by Indian companies has largely focused on adapting imported technologies to domestic requirements, and in some cases has helped Indian companies to develop their own technology. They further point out that "*interestingly, joint ventures spend more on R&D than Indian-owned enterprises, and among Indian enterprises, those who license technology do more R&D than those who do not.*"[53] This suggests that technology transfer stimulates, rather than replaces, domestic R&D, a finding which contradicts prevailing development theories.

---

49 IBMs share of the domestic market prior to its exit was 73%.

50 These firms were given permission by the government to enter the market.

51 ECIL's market share fell from 40.3% (1973-1977) to 10.3% (1979-1980) whilst HCL, DCM and ORG's market share increased from zero (1973-1977) to 40.5%, 27.5% and 7.3% (1979-1980) respectively.

52 Dedrick and Kraemer (1993), "India's Quest for Self Reliance in Information Technology: Costs and Benefits of Government Intervention" available at http://www.crito.uci.edu/git/publications/pdf/pac-005.pdf (accessed on 14 March 2006)

53 Dennis J Encarnation, "Dislodging Multinationals: India's Strategy in Comparative Perspective", Ithaca, NY: Cornell University Press, 1989, cited by Dedrick and Kraemer (1993), "India's Quest for Self Reliance in Information Technology: Costs and Benefits of Government Intervention" available at http://www.crito.uci.edu/git/publications/pdf/pac-005.pdf (accessed on 14 March 2006) at page 13

Effects of the policies

Dedrick and Kraemer (1993)[54] summarize the effects of the aforementioned policies as being of "*considerable cost to other sectors of the economy, to sub sectors of the IT industry, and to the long-term viability of the domestic IT industry.*" The costs of such policies include the following:

(1) Other industries cannot obtain low-cost computing, since prices remain about two and a half times higher than world prices. This limits application of IT to improve efficiency of those industries.

(2) Policies to protect domestic hardware producers have hurt the software industry by limiting its access to needed hardware and to software development tools. Higher prices due to import protection have also limited the diffusion of computer hardware, limiting local demand for software.

(3) Policies to prevent monopolization of the market have created a fragmented computer industry with over 200 producers of PCs, none of which achieve economies of scale necessary to match international prices.

(4) Hardware production consists mainly of assembly of imported components, with little or no value added in India.

4.5.2. Software

Dossani (2005)[55] points out that "*Indian policy in the 1970s was appropriately described as 'statist, protectionist and regulatory.' (Rubin, 1985) In IT, the state was the main producer of products and services. Its strategy was to create 'national champion' state-owned enterprises (Sridharan, 1996). These were granted monopolies.*" The attitude of government towards the software industry was hostile. Import tariffs on hardware were 135% and on software were 100%. Software was not considered as an "industry" by government and this meant that such firms could not access capital easily and bank finance for exports were not available. Essentially, the government was "hands off" and did not take any active steps to assist or promote the Indian software industry.

During the same period, laws were introduced that set the maximum equity percentage that international firms could own at 40%. This led to IBM leaving India despite having more than 70% of the domestic market, but other firms like ICL of the United Kingdom and Burroughs had entered into joint ventures and stayed. However, the departure of IBM meant that "*the door to product software development by TNCs*[56]" was closed, according to Dossani (2005).

This "closure" combined with the hostile environment that private firms found in India, resulted in the export of Indian programmers to host countries.[57] This had several effects:

---

54 Dedrick and Kraemer (1993), "India's Quest for Self Reliance in Information Technology: Costs and Benefits of Government Intervention" available at http://www.crito.uci.edu/git/publications/pdf/pac-005.pdf (accessed on 14 March 2006)

55 Rafiq Dossani (2005), "Origins and growth of the Software Industry in India" available at http://iis-db.stanford.edu/pubs/20973/Dossani_India_IT_2005.pdf (accessed on 14 March 2006)

56 TNC – means Trans-national corporation as opposed to a multi-national corporation.

57 In 1974, mainframe manufacturer Burroughs asked Tata Consultancy Services (its local India partner) to send several Indian programmers to the U.S. to install system software for a client. This also led to more foreign firms (even those who had Indian joint ventures) to do similarly.

(a) programmers learnt global skills that were not known in India – e.g. project management;
(b) programmers sent overseas more often than not did not return to India; and
(c) forced firms to be more export-orientated or internationalized.

Towards the end of the 1980s, the industry landscape evolved with the introduction of the PC, and the software industry was increasing seen as a separate industry from hardware. The software industry started to take off – its rise, particularly over the 1990s, represents one of the best success stories and achievements for the Indian economy. **Table 2** below shows the Indian software industry has grown from total revenue of US$ 243 million in 1990–91 to a US$ 10.1 billion industry by 2001–02, of which exports account for 68% of total revenue. The software industry success was achieved in spite of the various early policy initiatives[58] of the Indian government.

Table 2: Sales and Exports in the Indian Software Industry (in USD millions)

Year	Exports	Domestic Sales	Total Revenues	Domestic Sales / Exports
1987–88	52	74	126	142%
1990–91	128	115	243	90%
1991–92	164	112	286	74%
1992–93	225	165	390	73%
1993–94	330	225	555	68%
1994–95	485	339	824	70%
1995–96	735	487	1,222	66%
1996–97	1,110	712	1,822	64%
1997–98	1,790	981	2,771	55%
1998–99	2,650	1,203	3,853	45%
1999–00	4,000	2,195	6,195	55%
2000–01	6,230	2,173	8,403	35%
2001–02	7,680	2,420	10,100	32%

Source: Veloso *et al* (2003)

4.5.3. Assessment

The growth of the Indian software industry sharply contrasts with that of the hardware industry. The many obstacles placed in the path of Indian software entrepreneurs by government did not cause the industry to whither away. In fact, such adversity appears to have increased its innovativeness. Firms developed ways to circumvent restrictions, such as export-

58 A summary of the Indian Government's policy initiatives over the period 1970–1990 is in the appendix.

ing programmers when international firms were discouraged from entering India and exporting activities when the domestic market was weak and could not support the industry.

Secondly, government policies did not help the infant industry grow. No procurement preference policies aided domestic software firms. In fact, the converse was true. Government had set up rival businesses to compete in certain segments. All foreign hardware maintenance was only to be undertaken by a monopoly created by the Indian government, called the Computer Maintenance Corporation.

Thirdly, Veloso et al (2003) conclude that as "*India has* [had] *the longest track in software policy … it seems that learning has occurred with positive impacts in policy orientation reversal from top-down, directive to reactive to bottom-up demands.*" There is a change from command-control approaches to strong public-private cooperation, and this has contributed to a more focused and responsive overall policy.

Fourthly, the software industry exhibited the benefits of knowledge spill-over effects when it exported programmers to the countries where customers were located, thus enabling these people to learn new skills, such as project management and turnkey projects, which were not available or known in India at that time. This enabled the firms to move up from mere exporters of programmers to the development and export of services, such as the growing market in IT outsourcing that India provides for global firms today. Certainly, some of the work is considered low level[66], but it illustrates that when government's direct intervention is minimal, industry is better able to respond to market demands.

It is ironic that the hardware sector, which the Indian government tried to help, failed miserably, while the software sector that the government tried to disadvantage succeeded phenomenally. This is one of the unwitting paradoxes of preference policies – the more one tries to help, the less one in fact helps.

66 Export software services in India, is roughly divided into 55% for on-site services and 45% for offshore development (see Nasscom, 2002). Most of on-site and part of offshore work involves low-level skill activities such as testing, debugging, a tedious and uncreative work. Whilst those who have entered the business of turnkey projects accounted for 37% of software exports in 2001 (daCosta, 2003), such activity requires greater skill because it entails the design and high-level systems integration work.

4.6. Summary of Lessons

There are lessons from the case studies we outlined above that can serve as useful guidelines for policy makers in developing government procurement preference policies. The points are summarized in **Table 3** below.

	Lessons	Country case study reference
1.	Government-protected industries often fail to become internationally competitive. Entrepreneurial culture and attitude diminishes in preferred firms, leaving them unable to compete. Goods and services produced are often of poor quality and technologically inferior.	Brazil, India, France
2.	Preferences can encourage preferred enterprises to "rent seek", while other firms will find legal and illegal ways to work around preferences.	India, Brazil
3.	Innovation is low when preferences exist. Technology selection and ring-fencing reduce incentives to change and innovate. Preferences close off opportunities for other participants to develop based on merit. This stunts long-term industry growth.	Brazil, United Kingdom, India, France
4.	Using preferences to steer industry to improve its products and services based on well-defined outcomes can benefit both the government and citizens.	United States
5.	Government-picked winners have a higher rate of failure than market winners.	Brazil, India, United Kingdom, France

Table 3: Summary of lessons from case studies

5. THE PARADOX OF PREFERENTIAL PROCUREMENT

Governments should think carefully about the use of preferential procurement policies either as stand-alone strategies or as components of an industrial policy. The case studies, literature and the analysis above point out the existence of the paradox of procurement preference policies, namely:

1. Product-based preferential policies can nurture and even sustain the growth of a targeted industry (a short-run benefit), but it will also distort the generation of <u>innovation</u> (a long-term disadvantage).

Prospect theory[59] – a concept put forth by Edmund Kitch in the late 1970s that drew an analogy between the patent system and prospecting for mineral claims – raises a problem with preference policies. A government that undertakes a preferential procurement policy provides public notice to competing firms that they should focus their R&D activities – or their prospecting – on a specific area.

Government's indication of the area in which firms should focus R&D efforts may appear to be useful when it comes to the production of the preferred product in the short term. However, in the long term, it takes away the incentive for firms to develop other innovative solutions.

Case studies from four countries (Brazil, France, India and the United Kingdom) have shown that when government plays an interventionist role in place of the market, revenue may increase to preferred firms in the short term. Over the long-term, however, the degree of innovation, incentive to compete and improvement in efficiency all decline and these firms are unable to compete internationally.

A preference policy can lead to unintended behavior or create unintended incentives when firms compete for government preference (e.g. India) as opposed to innovating. Firms may seek to granulize or harden the preference policy for more financial gain rather than to create new innovations, thus leading to long-term implications on the competitiveness of the firms within a country.

In a market environment where vertical competition is more intense, the competitiveness of a local technology-based firm depends on factors such as product design, quality, marketing, and after-sales service and less on technological knowledge and competence. A preferential policy aimed at protecting the domestic market for local suppliers will not necessarily help the development of local technologies, products or services that are competitive globally.

For instance, Taiwanese hardware firms have succeeded internationally based not only on supportive government policies, but on technological advancements, close links with international firms that provide complementary products or services (especially in Silicon Valley) and on their export and market orientation. The Taiwanese have succeeded in global markets, compared with Brazilian hardware firms in the 1980s or French attempts to export the Minitel, which failed in each case. The key lesson from these experiences is that government has a role in supporting a nascent domestic industry, but the policy approach should be more of a passive and supportive one rather than a directly protectionist or interventionist one.

---

59 First developed in E. Kitch (1977), "The nature and function of the patent system", *Journal of Law and Economics* 20(2): 265-90, and provides a justification for the patent system.

The telecommunications industry offers us another example of how innovation is affected by the absence and presence of competition in the market. Originally telecommunications services around the world were provided by either government-owned enterprises (as in Australia, the United Kingdom or Malaysia) or private monopolies (as in the United States) – in each case, a single provider with no competition. The basis for providing these services by the public sector (or private monopolies) was partly to allow such firms to adequately recover the huge capital investment required and partly to allow them to take advantage of economies of scale and scope. Yet, the degree of innovation and customer benefit in terms of pricing was low. The heavily-regulated prices of publicly-owned monopolies were set based more on affordability than on efficient performance. The incentive effects of competition were absent. Innovation, efficiencies and customer service were not priorities of these firms.[60] It was only after telecommunications markets were liberalized and then privatized that service providers became increasingly innovative in service offerings and new technologies – such as cellular phone service. The telecommunications sector demonstrates that if a competitive environment exists without any preference, then the national economy will witness innovation and an increase in consumer welfare.

2. **Preference procurement policies are intended to support domestic growth, but distort <u>efficiencies</u> and the readiness of firms to compete over the long term.**

In a market protected by government policies and often also protected by the uniqueness of the local environment (e.g. language requirements), local firms may adopt a behavior[61] that is solely striving for local leadership instead of becoming more efficient and productive. These firms avoid international competition and do not structure high-level technical and managerial capabilities that could propel the industry to drive economic growth. The result, as in Brazil, is the failure of these firms once the preference ends.

A preference policy may distort productive efficiency in the short run and dynamic efficiency in the long run, with the result being an over-emphasis on one area of development at the exclusion or expense of other meritorious areas (see case studies for Brazil, France and the United Kingdom). Product-based preferences result in industries producing more preferred goods, to the point of exceeding local market demand. More firms move towards the area outlined by the preference policy thereby foreclosing opportunities to develop products in other market sectors.

---

60 The time taken for a new subscriber to obtain an active telephone line varied greatly. In some countries, the period was years between request and activation. This illustrates an important point – that there was a lack of incentive on the public monopoly to respond quickly to new customer's request.

61 This is also known as a "satisficing" behavior, meaning a course of conduct that is satisfactory or good enough, but is not the optimal result. This includes behavior aiming for "share of market" or "fair price". It is usually contrasted with maximizing behavior, a term coined by Herbert Smith in H. Smith (1959), "Theories of Decision Making in Economics and Behavioral Science" in F.G. Castles *et al* (1971) *Decisions, Organizations and Society* Harmondsworth, Penguin.

Governments must also recognize that today's market environment is more open and globalized. For any product-based preferential policy to be successful, resources will need to be allocated on a scale that enables a "national champion" to compete internationally. This raises a serious question for government – do they have the resources to sustain the growth of a "national champion" in this manner and what are the costs if the venture fails? Preferential procurement policies create new incentives for firms to lobby for preferential status and "rent seek" rather than compete on their merits.

According to Evenett and Hoekman (2002), a policy that gives preferences to domestic firms reduces the effective competition they face from international firms and so induces domestic firms to raise their prices.[62] The reduction in effective rivalry has several effects,[63] most importantly, sheltering the domestic firm from competition and leaving them unprepared when competition is introduced. These firms focus on the domestic market, thus overlooking or ignoring the international market.

In Brazil, the firms that were encouraged to produce hardware did so merely for the domestic market and did not export many products overseas. Those firms could not survive when the market reserve policy changed. Melitz[64] says decisions to protect an industry "*should depend on domestic entrepreneurial culture, the industry's learning potential, the shape of the learning curve, and the degree of substitution between domestic and foreign goods.*"

Certain products – for example, computer operating system software – provide efficiencies for consumers and businesses in the marketplace based on the number of applications developed to support those products and the ease with which entities can do business with each other by using the same products. A government may adopt a preferential procurement policy to promote the development of a non-dominant software operating system under the belief that consumers are better off with a preferred competitor exerting price discipline on the dominant product. However, software operating systems are similar to telecommunications services, credit cards and e-banking services in that they are products with "network effects".[65] The value of such a network is enhanced to the economy when an increasing number of users join that network, i.e. use the product. Instead of leaving it to market forces, a government preference for one network product will penalize users of alternative products – and inadvertently cause a market failure.

---

62 Evenett and Hoekman (2002), "Government Procurement: Market Access, Transparency, and Multilateral Trade Rules".

63 These effects include (i) potential exclusionary effects on other firms that are not preferred; and (ii) slow down in effective innovation.

64 M. Melitz (undated), "When and How Should Infant Industries Be Protected?" available at http://econ.tau.ac.il/papers/macro/melitz.pdf (accessed on 4 March 2006)

65 See footnote 13.

A locally preferred firm may treat its status as an entitlement to earning monopoly "rents" in the domestic market. It may not seek to enter an overseas market horizontally or to compete vertically in the domestic market. And this is the dilemma for government: a locally preferred supplier that fails overseas should exit both the local as well as international market. However, given the shelter and protection of its preferred status (not to mention a readily available domestic market for its product), the preferred – but demonstrably inefficient – supplier is likely to keep to its *status quo*. Where this is the case, the preferential policy has the unintended and undesirable effect of a creating an exit barrier. Such an effect is completely contrary to the original purpose and intention of the policy, which is to grow and nurture an efficient domestic supplier that can also compete internationally.

3. **In trying to pick "winners", governments frequently end up picking "losers".**

As is evident in the Brazilian, French and Indian case studies, the rapid pace of technological change and its associated degree of uncertainty can and will set limits on government's ability to succeed with preferential procurement policies through a strategy of picking "winners", be it a specific technology or supplier of products or services.

Any local supplier would undoubtedly like to be designated the "preferred" supplier. The more important question for government is whether the designated supplier has the internal technological or marketing capabilities – i.e. the entrepreneurial culture – to compete internationally without additional government support or protection.

In today's environment, a preferred supplier or even a "national champion" will have to deal with vertical competition. If such firms lack an internal capability to make or take advantage of vertical relationships with other local firms that supply complementary products, they will not keep abreast of technological developments.

In the case of France's Minitel, picking a "winner" that turned out to be a "loser" in the marketplace had costly and negative consequences to the economy, *viz.* a vicious cycle of technology lock-in and, more importantly, dependencies. The policy resulted in firms building their businesses around Minitel and becoming wedded to Minitel, thus lowering their incentive to innovate and preventing experimentation with newer technologies.

Thus, if governments pick the wrong technology, the result may be an inability to secure first-mover advantages in the market, and this could lead to a reduction in innovation that negatively impacts consumer welfare and the economy. It also prevents the preferred provider from responding suitably to disruptive technologies, like the Internet, especially when the Minitel was driven by government preference policy, not consumer demand.

6. CONCLUSIONS

A preferential procurement policy can hurt the overall economy, damage the competitiveness of a national economy and the preferred firms, and distort the incentives for innovation. Preferring the "wrong horse" could lead an economy – in either developed and developing countries – down a mistaken and costly path as exemplified by the case studies involving France and the United Kingdom. Particularly with respect to the fields of technology, the rapid pace of technological change, market uncertainty, and fierce international competition can undermine even the most well-intentioned efforts in implementing preference policies.

Government policy makers can certainly consider procurement policies to nurture the growth of specific industries or lead to economic development. However, they should recognize that they may not have all the information they need to make such policies succeed. Responding to market change, uncertainty and technological advancement is best left to those who have an incentive (usually business leaders) and can respond as efficiently and effectively as possible. Furthermore, the appropriate duration of preference policies and the willingness of policy makers to abolish an outdated preference policy are critical to the policies' success.

In the rare case when procurement preferences have been successful, such as in the United States with vehicle airbags, they have been designed to encourage preferred outcomes and not preferred products or services. This is a tightrope for policy makers to navigate. They may believe consumers would be better off by creating – via a preferential policy – a competitive alternative to a dominant good or service in the market. However, they need to make certain that their choice of a preferred industry, product or service will not have the opposite impact and cause a market failure for other users. This is best done by a competitively neutral approach that allows all businesses – privately-owned and government-backed – to find the best and most cost-effective product, service or technology without constraints.

In most cases, governments must realize that procurement preference as a form of industrial policy may no longer be suitable in today's context, especially in a fast-changing field such as IT. The case studies above have demonstrated that policy makers have demonstrated poor judgment when they have tried to forecast the direction of technology markets, such as in the United Kingdom and France. The result was that those countries missed the boat in the development of instrumental technologies, such as the PC and the Internet, notwithstanding the window of opportunity that was before them.

Policy makers also have a tendency to hesitate to abolish or reform policies once they have outlived their purpose, which can be especially damaging in fast-paced and competitive sectors. This hesitation can create a distortion in the marketplace by entrenching the favored technology, product or provider. Instead, if the preferred technology is "better" than others, the market will naturally favor that technology more by consumer choice than by government intervention. A market-driven approach also avoids the risk of the effect of hesitations by policy makers.

The lessons we have drawn from past experiences with procurement preference policies point to a bigger and perhaps more fundamental issue – namely the appropriate role of government. Today, IT is effectively changing the role of government in many ways, from the ability of citizens to access information to greater reliance on the market to encourage efficiency and innovation. The picking of technology winners or protection of domestic producers requires both very careful and close monitoring of the economic situation and technology market domestically and internationally, a task that most governments are ill-equipped to do well. More importantly, it requires disciplining preferred domestic firms to have an international outlook and attitude, something which can be and is done better with market incentives than government intervention, as history has shown.

7. REFERENCES

"Computer Programme for Government Offices", Treasury Press Release, 2 January 1965

ART (French telecom regulator) Annual Report for 2004

A. Botelho, J. Dedrick, K. Kraemer and P.B. Tigre (1999), "From Industry Protection to Industry Promotion: IT Policy in Brazil", Centre for Research on Information Technology and Organisations, University of California, Irvine, Berkeley

C. Bekar, and R. G. Lipsey (2002), "Clusters and Economic Policy", available at http://www.isuma.net/v03n01/bekar/bekar_e.shtml#r_note44 (accessed on 9 February 2006)

A. Brandenburger and B. Nalebuff (1996), *Co-opetition*, New York, Doubleday

B. Carlsson, S. Jacobsson, M. Holmen and A. Rickne (2002). "Innovation Systems: analytical and methodological issues", *Research Policy*, 31, 233-245, cited in R. Dossani (2005), "Origins and growth of the Software Industry in India" available at http://iis-db.stanford.edu/pubs/20973/Dossani_India_IT_2005.pdf (accessed on 14 March 2006)

C.M. Christensen (1997), *The Innovator's Dilemma,* Harper Business, New York.

Ronald Coase (1992), "The Institutional Structure of Production", *American Economic Review*, 82:713 – 19

E. Cohen (1995), "France: National Champions in Search of a Mission" in *Industrial Enterprise and European Integration: From National to International Champions in Western Europe* ed. J.E.S. Hayward (1995), Oxford University, New York, USA

R. Coopey, "Technology Gaps and National Champions: The Computer Industry and Government Policy in Post-War Britain" available at http://www.icfcst.kiev.ua/SYMPOSIUM/Proceedings/Coopey.pdf (accessed on 8 February 2006)

A.P. da Costa (2003), "Uneven and Combined Development: Understanding India's Software Exports", *World Development*, 31(1), 211-226, cited in F. Veloso, A. Botelho, T. Tschang, A. Amsden (2003), "Slicing the Knowledge based economy in Brazil, China and India: A tale of 3 software industries" available at http://www.softex.br/media/MIT_final_ing.pdf (accessed on 18 February 2006)

Dedrick and Kraemer (1993), "India's Quest for Self Reliance in Information Technology: Costs and Benefits of Government Intervention" available at http://www.crito.uci.edu/git/publications/pdf/pac-005.pdf (accessed on 14 March 2006)

J. Dedrick, and K. Kraemer (1998), "Brazil IT Report, 1998" available at http://www.crito.uci.edu/git/publications/git-brazil-it.html (accessed on 25 February 2006)

Rafiq Dossani (2005), "Origins and growth of the Software Industry in India" available at http://iis-db.stanford.edu/pubs/20973/Dossani_India_IT_2005.pdf (accessed on 14 March 2006)

Dybvik (undated), "Listen to the Internet" available at http://www.w3.org/People/howcome/p/telektronikk-4-93/Dybvik_P_E.html#KREF10 (accessed on 21 February 2006)

Evenett and Hoekman (2002), "Government Procurement: Market Access, Transparency, and Multilateral Trade Rules" available at http://www.wto.org/English/tratop_e/gproc_e/gptran_symp_oct02_pdf_files/symp_oct02_2_hoe_eve_e.pdf (accessed on 16 January 2006)

France Telecom citing Jupiter MMXI – available at http://www.francetelecom.com/sirius/rd/en/ddm/en/technologies/ddm200203/index1.php#hautdepage (accessed on 21 February 2006)

N. Hamaguchi, J.C. Ferraz and C.F.L. Rocha (2003), "A Study on the Impact of Economic Liberalization in Brazil: 1995-2002" available at http://www.ide.go.jp/English/Publish/Las/pdf/04.pdf (accessed on 27 February 06)

J. Hayward (1995) "Europe's Endangered Industrial Champions", in *Industrial Enterprise and European Integration*, J. Hayward (ed), Oxford University Press, Oxford, England

I. Maddock, "Stimulating Technological Innovation in Industry: The Role of the Ministry of Technology", in *Proceedings of the Institute of Mechanical Engineers*, 182(32), p. 691; The Ministry of Technology Ministry of Technology May 1970 p.46

E. Kitch (1977), "The nature and function of the patent system", *Journal of Law and Economics* 20(2): 265-90

K. Kraemer and J. Dedrick (2004), "Liberalisation and the Computer Industry: A comparison of four developing countries", available at http://www.crito.uci.edu/git/publications/pdf/4countries.pdf (accessed on 23 February 2006)

Luciana Sá, Sabrina Marczak, Jorge Audy, Jairo Avritchir (undated), "Effectiveness Of Fiscal Incentives To Attract IT Investments: A Brazilian Case" available at http://www.is.cityu.edu.hk/research/ejisdc/vol15/v15r2.pdf (accessed on 26 February 2006)

S. Mani (2001), "Government, Innovation and Technology policy, an analysis of the Brazilian experience during the 1990s" available at http://www.globelics-beijing.cn/paper/Sunil%20Mani_Coping%20with%20Globalisation%20.pdf (accessed on 25 February 2006)

S. Mani (2004/2005), "Coping with Globalisation Public R&D Projects in Telecommunications Technologies in Developing Countries" available at http://www.globelics-beijing.cn/paper/Sunil%20Mani_Coping%20with%20Globalisation%20.pdf (accessed on 26 February 2006)

M. Melitz (undated), "When and How Should Infant Industries Be Protected?" available at http://econ.tau.ac.il/papers/macro/melitz.pdf (accessed on 4 March 2006)

J. Meyer-Stamer (1997), "Technology, Competitiveness and Radical Policy Change: The Case of Brazil", Frank Cass, London.

T. Murakam (1997), "The Impact ICT on Economic Growth and the Productivity Paradox" available at http://www.tcf.or.jp/data/19971011_Takeshi_Murakami_2.pdf (accessed on 5 March 2006)

NASSCOM (2002), "NASSCOM-McKinsey Report 2002: Strategies to achieve Indian IT industry's aspiration", New Delhi, India, cited in F. Veloso *et al* (2003) "Slicing the Knowledge based economy in Brazil, China and India: A tale of 3 software industries" available at http://www.softex.br/media/MIT_final_ing.pdf (accessed on 18 February 2006)

Ralph Nader, Eleanor J. Lewis and Eric Weltman, "Shopping for Innovation: The Government as Smart Consumer", *The American Prospect*, Fall 1992, pp. 71-78 (available at http://www.prospect.org/web/page.ww?section=root&name=ViewPrint&articleId=5221 (accessed on 10 February 2006)

S. Nora and A. Minc (1978), "L'Informatisation de la société", Paris, La Documentation Francaise/Seuil cited in F. Sachwald (1997), "Colbertism in ICT: Lessons from the French experience", available at http://www.tcf.or.jp/data/19971011_Frederique_Sachwald.pdf (accessed on 12 January 2006)

Douglas North (1991), "Institutions", *Journal of Economic Perspective* 5:97 - 112

M. Porter (1990), "The Competitive Advantage of Nations", New York, The Free Press.

M. Porter (2000), "Location, Competition, and Economic Development: Local Clusters in a Global Economy", *Economic Development Quarterly*, Vol. 14. no. 1 cited in C. Bekar and R.G. Lipsey (2002) "Clusters and Economic Policy" available at http://www.isuma.net/v03n01/bekar/bekar_e.shtml#r_note44 (accessed on 9 February 2006)

F. Sachwald (1997), "Colbertism in ICT: Lessons from the French experience", available at http://www.tcf.or.jp/data/19971011_Frederique_Sachwald.pdf (accessed on 12 January 2006)

H. Smith (1959), "Theories of Decision Making in Economics and Behavioural Science" in F.G.Castles et al, (1971) *Decisions, Organisations and Society*, Harmondsworth, Penguin.

E. Sutherland (1990) "Case study – Minitel: The resistible rise of the French videotext" available at http://www.sutherla.dircon.co.uk/minitel/ (accessed on 21 February 2006)

B. Sywulka (2001) "What we can learn from France's Minitel system about building effective national networks" available at http://ben.sywulka.com/research/minitel.pdf (accessed on 21 February 2006)

The Internet Index available at http://www.treese.org/intindex/95-10.htm (accessed on 21 February 2006) and at http://ben.sywulka.com/research/minitel.pdf.

T. Vedel (undated), "The French Policy for the Information Superhighway: The end of High-Tech Colbertism?" available at http://www.crito.uci.edu/GIT/PUBLICATIONS/PDF/PAC-091.PDF (accessed on 5 March 2006)

F. Veloso, A. Botelho, T. Tschang, A. Amsden (2003), "Slicing the Knowledge based economy in Brazil, China and India: A tale of 3 software industries" available at http://www.softex.br/media/MIT_final_ing.pdf (accessed on 18 February 2006)

World Employment Report 2002 available at http://www.bib.ulb.ac.be/cdrom/wer_lawitie/back/ind_2.htm (accessed on 14 March 2006)

8. APPENDIX

A summary of the policy initiatives of the Indian Government over the period 1970–1990:

	Year	India's Programme or Policy Initiatives towards Software
1.	1972	Hardware imports permitted if the hardware was used for software development purposes on condition that the cost was recouped from foreign exchange earnings over 5 years
2.	1976	Hardware import duties reduced from over 100% to 40%; faster clearance of software export applications; software exporters could take advantage of export incentives including locating in Export Processing Zones (EPZs); non-resident Indians allowed to import hardware for the purposes of software export with a 100% export obligation
3.	1981	Import duties on hardware were raised but firms were allowed to use the hardware for the development of domestic software as well as for exports; software exporters could also import "loaned" computers
4.	1984	The Computer Policy which: 1. reduced the tariffs on PCs from 135% to 60% and this led to higher number of PCs being imported; 2. recognized that software exports as a "delicensed activity" and this enabled the firms to be able to access bank finance for exports; 3. permitted international firms to set up wholly owned, export-dedicated enterprises; 4. planned to set up a chain of software parks and that would offer infrastructure at below-market costs; and 5. income tax exemption on net export earnings reduced from 100% to 50%.
5.	1986	The Computer Software Policy introduced and provided for Imports of hardware and software were further deregulated; anyone could import software at 60% duty. 100% export oriented software production units were permitted to import hardware duty-free; Indian firms were allowed to sell international software, i.e. they could become distributors; export obligations for hardware importers increased by 50% and the time in which to meet the obligations reduced to four years; the setting up of a Software Development Agency, and easing of entry restrictions into computer software industry through the removal of the licensing requirement.
6.	1988	Creation of software technology parks (STP) for the production of software for export together with special incentives such as zero import duty on import of all capital goods, a special 10 year income tax holiday, provision of infrastructural facilities like high speed data-communication links etc.
7.	1988	The Electronics and Computer Software Export Promotion Council was set up to provide marketing help to software companies in their exports. The

	Year	India's Programme or Policy Initiatives towards Software
		government also began programmes to assist exporters with provision of export credit and insurance.
8.	1991–1992	Economy-wide liberalization programme introduced, which included reducing import duties on software gradually to 10% by 1995. Software exports brought under the Income Tax laws and exempted exporters from income tax.

Source: Veloso *et al* (2003)[66]

66 F. Veloso, A. Botelho, T. Tschang, A. Amsden (2003), "Slicing the Knowledge based economy in Brazil, China and India: A tale of 3 software industries" available at http://www.softex.br/media/MIT_final_ing.pdf (accessed on 18 February 2006) and also at *World Employment Report 2002* available at http://www.bib.ulb.ac.be/cdrom/wer_lawitie/back/ind_2.htm (accessed on 14 March 2006)