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Working Paper

Informal Values and Formal Policies: A study of Japanese Technology Policy and Significance for India

Working Paper, No. 219

Provided in Cooperation with:

Indian Council for Research on International Economic Relations (ICRIER)

Suggested Citation: Bhaduri, Saradindu; Chandra, Janashruti (2008) : Informal Values and Formal Policies: A study of Japanese Technology Policy and Significance for India, Working Paper, No. 219, Indian Council for Research on International Economic Relations (ICRIER), New Delhi

This Version is available at:

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Working Paper 219

**Informal Values and Formal Policies:
A study of Japanese Technology
Policy and Significance for India**

**Saradindu Bhaduri
Janashruti Chandra**

July 2008



INDIAN COUNCIL FOR RESEARCH ON INTERNATIONAL ECONOMIC RELATIONS

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Foreword

Japan's lead in many modern technologies is now well recognized. It is also accepted that Japan's emergence as a techno-economic superpower has been the outcome of concerted policy effort. This paper, taking a non conventional stance, attempts to explain the process of policy evolution and implementation by looking at the role of prevailing informal institutions such as customs and cultural norms of Japanese society. In this regard this study explores the extent to which cultural norms and values may have influenced policy making exercises. Moreover, unlike other studies, this takes a more flexible definition of culture, admitting that cultural norms have cognitive underpinnings, and are, therefore, more amenable to change. Finally, an attempt has been made to identify the relevant lessons, if any, for India.

The paper is a part of the series being brought out under ICRIER's Japan Project, which is funded by the Sasakawa Peace Foundation (SPF), Tokyo. It was presented at a Conference on *"Politics and Civil Society in India and Japan"* organized by ICRIER on February 20, 2008 at New Delhi at which useful comments were received. Our thanks to SPF and to the participants of the conference.



(Rajiv Kumar)
Director & Chief Executive

July 31, 2008

Abstract

The main objective of this paper is to analyse some aspects of Japanese policy in the post World War-II period and understand how the various informal institutions (shared mental models) have influenced key dimensions of technology strategy with regard to the nature and trajectory of activities it sought to promote. Previous studies have mainly focused on industrial policy on the basis of the White Papers published by the Ministry of International Trade and Industry (MITI). Our study, in contrast, focuses exclusively on technology policies by examining the White Papers on Science and Technology (*Kagakugijutsu Hakusho*) published by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). We then endeavour to understand the significance of our findings for policy making in India. However, the limited scope of this undertaking makes our results indicative in nature.

Key Words- *Informal values, institutions, culture, norm, technology, MITI*

JEL Classification- *O17, O31, Z13*

Informal Values and Formal Policies: A study of Japanese Technology Policy and Significance for India

Saradindu Bhaduri[#] and Janashruti Chandra^{*}

1. Introduction

Recent theories in development economics admit the importance of institutions in shaping the development trajectories of a country (Adelman 2002). Such an understanding has, however, resulted in an attempt to transfer the institutional framework of successfully developed economies to other countries in the belief that such relocation would promote economic development in the latter (Ensminger 1996). Although the importance of institutional learning across countries remains an important source of institutional change, a growing amount of literature in modern institutional economics often points out that such transfers may fail to achieve desirable outcomes. This vision contradicts the views expressed in orthodox economic theory, where transfers of institution or policy from one country to another have been justified purely on the basis of its performances in the “donor” countries. Recent trends in the institutional and evolutionary theories of institutional change, on the other hand, argue that formal institutions, law and policies are often grounded in various informal norms and belief structures of a society (which, in turn, forms an accumulated body of knowledge), and may become quite ineffective if transferred to societies/countries having a different set of customs and belief structures (North 1990, 1993). Recent progress in development theory also acknowledges that policies

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imposed from outside often lead to undesirable consequences, if they do not allow people to grow “using their own intelligence” (Stiglitz 2002).

Japan’s technological superiority in many modern technologies is now well recognised (Shishido 1983). It is also accepted that Japan’s emergence as a technoeconomic superpower has been the outcome of concerted policy effort (Lall 1981, Freeman 1987), which continues to be a prime driver of Japanese technological development in the era of globalisation (Fransman 1995). Our paper intends to explore how some of these policy elements have been guided or shaped by prevailing informal institutions (customs and cultural norms) of Japanese society. It may be noted that exploring the role of cultural factors behind Japan’s industrial success has been a popular research agenda (see Johnson 1999 for a review). However, our study deviates from such studies in two important respects. First, instead of relating culture to economic performance, we explore to what extent cultural norms and values may have influenced the policy making exercises.¹ Secondly, unlike many other studies, we take a more flexible definition of culture, admitting that cultural norms have cognitive underpinnings, and are, therefore, more amenable to change. Indeed, defining culture as a “latent variable” having a “tight network of a few abstract central themes” (DiMaggio 1997: 4) makes it a watertight compartment of beliefs and customs, and, therefore, less amenable to change. For the purpose of our analysis we draw upon a more recent conceptualisation of cultural norms as cognitively-mediated, socially-shaped “shared mental models” of individual members in a society (Johnson-Laird 1983, Denzau and North 1994). In our view, such a conceptualisation makes

¹ Ideally, a two way process can be conceived of, where formal policies also influence informal social norms and values. We do not explore this causality in detail.

cultural norms more flexible and captures the possibilities of cultural change through cross cultural learning and other political economic feedback.

We have organised the paper in the following way. In the next section (section 2) we develop our conceptual framework of institutions and shared mental models. Section 3 analyses the factors, which, in our view, have crucially shaped the so-called shared mental models of policy making in Japan. The methodological approach is discussed in section 4. Section 5 analyses the links between informal values and formal policies. Finally, section 6 draws the significance for India and concludes.

2. Institutions and shared mental models: a conceptual framework

Offering a comprehensive definition of institution has always been a challenging task. In its broadest sense, institutions are defined as “regular, patterned behaviour of people in a society”, and the... “ideas and values associated with these regularities” Neale (1994: 402) and North (1990) make a distinction between formal and informal institutions. Formal institutions refer to rules, laws, and the constitutional framework of a country. Informal institutions, on the other hand, refer to the existing norms of behaviour, conventions and self-imposed codes of conduct in a society (North 1990, 1993). Nevertheless, both sets of institutions can be conceptualised as humanly devised constraints (enabling or otherwise) that shape human interaction (North 1990, Noteboom 1999). In a nutshell, therefore, institutions can be defined as a set of normative social rules that outline human interface (Mantzavinos 2001).

In principle, although, formal institutions can be (are) created and altered by official fiats, their dynamics are often shaped /constrained by informal institutions. Unlike the former kind, informal institutions often emerge and change ‘spontaneously’ through inter-personal interactions and collective learning (Mantzavinos et al 2004). Understandably, this group can be changed at a speed which is much slower than the pace with which formal institutions are modified. It is this relative inflexibility of informal institutions, which, according to many, may render any transfer of formal institutions (through official fiat) ineffective in the long run. Thus, one may safely argue that inter-cultural differences in informal institutions explain much of the diversities in formal institutions, and constrain the possibility of automatic, smooth transfer of institutions, as is often envisaged in neoclassical economics (North 1993). To summarise, institutional change is a path dependent process, and its root often lies in the culturally-shaped, ‘spontaneously-evolved’, informal institutions of a society.

Recent development in cognitive science and social psychology has provided some mechanism to understand the way informal institutions are formed and evolve. These studies insist that a change in cultural parameters (conventions and norms) seem to take place through cognitive systems of individuals, which “constructs models of the problem space that are then mentally run or manipulated to produce expectations about the environment” (Holland et al 1986: 12). The concept of mental models is important in this context. Mental models (Johnson-Laird 1983) are the symbolic (subjective) representation of the environment, and are constructed through diverse experience, observations and cognitively mediated learning. Such mental models develop into a shared mental model through communication between people, and help perceive the solutions to recurrent problems of social interaction in a similar way.

However, evolution of shared mental models through such direct interaction (learning) is a slow process. Socially mediated indirect learning assumes high importance in this context. The speed of the formation of shared mental models can be increased through such indirect learning. Thus, common interpretation of a social reality would be achieved faster, helping in turn, to prescribe how the environment ought to be structured (Denzau and North 1994, Mantzavinos 2001: chapter 6, Zweynert 2006). Factors like language, social values, and intellectual tradition are important in this regard.² In the next section we elaborate on these factors in the context of Japan.

3. Intellectual tradition and social values in Japan

3.1 Intellectual tradition

A pioneering attempt to understand the way intellectual tradition shapes the shared mental models with reference to the direction of institutional change is made by Zweynert (2006).³ The paper argues how the post Second World War system of social capitalism in West Germany was based on a long intellectual tradition of socialism and romantic movements of previous centuries. In fact, a striking similarity between Russia and Germany has been the prevalence of a deep-rooted intellectual tradition upholding the various ideals of socialism and romanticism. Consequently, the apparent failure of Russia to embark on the path of free market economies in recent years has also been attributed to the absence of an intellectual tradition supporting

² These factors are not always clearly separable, and there may be significant interdependence between the three components.

³ In the Japanese context, Gao (1997) also explores how economic ideology has shaped Japan's industrial policy in the post second world war period. However, he does not refer to the concept of shared mental models.

liberal, laissez-faire philosophies. For our analyses, we confine our discussion only to the intellectual tradition in the domain of economics.

Unlike in the West, where laissez faire and neoclassical thought emerged as the dominant school of contemplation in economics from the twentieth century, Japan has had a strong tradition of drawing its economic agenda from a heterogeneous body, predominantly non-laissez faire, of economic reflection. As a result, for a long time, economics in Japan was believed to have national grammars (Johnson 1999: 22). To understand the rationale behind technology policymaking in Japan, one should, therefore, comprehend the dynamics of economic thought prevalent there.

The term for economics in Japan is *Keizai*, which means “*administering the nation and relieving the suffering of the people*” (Morris-Suzuki 1989: 13-14). Intrinsically, therefore, the shared mental model of Japanese society acknowledged an active role of the State in economic decision-making, and economics as a subject perceived as being engaged with the welfare of people. Even in the Tokugawa (pre-Meiji) period, the word, “ching-chi-hsueh”, used for economics is synonymous with the term “political economy” (Ejiro 1946, as in Burks 1950: 395), with emphasis on administration, government and livelihood (ibid). Economics in Japan has, thus, always revolved around the concept of institution, as opposed to the concept of “homo economicus”, propagated by the Liberal economists. Another characteristic feature of their traditional economic thought, in the Tokugawa period, has been a non-separation of economic theory from applied economics, once again a, system of thought not much prevalent in liberal economic thinking (ibid). We argue that the shared mental models developed through such a conceptualisation of economics in the Tokugawa

period, shaped the way Japan embraced more modern western economic thought after the Meiji Restoration, reflecting a path dependency in their attitude to economic problems (see also Burks 1950). Indeed, it is perhaps not a surprise that among many competing western economic thoughts, the German Historical School found easy acceptance among economists in particular, and academia in general, in Japan (Morris-Suzuki 1989, Nishizawa 2001).⁴

The German Historical School represented a conglomeration of ideas bordering on laissez-faire on one extreme and Marxism on the other. A key difference between the proponents of this school and the free-trade discipline lies with respect to the role of government. The Historical school is opposed to reducing the role of the State to a mere regulator. The Historical School also criticised British classical economics for its over-emphasis on deductive theorisation. According to Gustav von Schmoller, a prime architect of the Historical school, collection and analysis of factual economic data should be the main occupation of economists, rather than deductive theorisation (Morris-Suzuki 1989: 62-63). At the other extreme it was opposed to Marxian thought, on the issues of rapid transformation of society through revolution, and on the principles of property rights. Unlike the Marxist school, it supported the system of private property rights for economic development and did not see much merit in revolutionary change of a society. A detailed analysis of the German Historical School is, however, beyond the scope of this study. We, instead, present a summary of the salient features of this, rather heterogeneous, body of economic theories as

⁴ Please note that Keynesian, Classical, as well as the Marxist school had also had important influence in the evolution of economic thought in Japan (Morris-Suzuki 1989). However, for the particular aspects of technology policy we are interested to explore, the contribution of the German Historical School seems to be more important. This is not, however, to deny that the presence of diverse schools of thought had enabled them to take an innovative approach to the various policy issues.

described in “A History of Political Economy” authored by John Kells Ingram (1888: chapter 6).⁵

The proponents of the German Historical School unanimously proclaimed that the economic system, the conception of economic theory and jurisprudence, are interrelated and results of some definite historical development. According to the German Historical School, therefore, the emergence and growth of laissez faire economics in Europe and USA was an outcome of some specific historical developments in those countries, which gave credence to the principle of individualism. One may note that the principles of laissez-faire economics draw heavily upon methodological individualism. In contrast, the individual's role, according to the Historical School, is to be located within the community.⁶ Contrary to the Walrasian theory of general equilibrium, where socio-economic norms of an economy remain unchanged (Schumpeter 2005), the Historical School viewed the economic system as intrinsically dynamic in nature. A third important building block of the Historical school was, perhaps, the attempt to explicitly relate economics with ethics. They propounded that economics is “not a morally neutral positivist science, but a means to the achievement of a healthy and harmonious society” (Morris-Suzuki 1989: 63) through inclusion of moral and ethical dimensions of a society in the domain of economic analyses. Finally, the Historical School favoured more active state intervention in economic decision-making than that of a mere regulator, as

⁵ The book is available online at <http://socserv2.mcmaster.ca/~econ/ugcm/3ll3/ingram/contents.html>. Last accessed on 15 March 2008.

⁶ It may be noted that this particular view of locating individuals within a community was not an exclusive feature of the Historical School. The old institutional school of thought prevalent in America, as well as the socialist stream of thinking in economics was based upon such an understanding of a society. Things however, changed much during the second half of the last century with the emergence of neoclassical economics as the dominant school of economic thought. See, for instance, Mayhew (1994: 118-119)

viewed by the laissez-faire economists, whose primary job is to protect its citizens from violence and fraud. The Historical School propagated that the State should explicitly engage itself in various activities ranging from promoting intellectual and aesthetic culture, to protecting the weaker sections of society to, in particular, securing labour rights.

The introduction of the ideas of the German Historical School to Japan, perhaps, dates back to 1888 in the writings of Kanai Noburu, and, later on, through the interventions of economists like Tokuzo Fukuda (Morris-Suzuki 1989: 65, Nishizawa 2001: 155). The reception and the subsequent diffusion of the principles of the Historical School in Japan was more than mere coincidence and can be related to some situational similarities between Germany and Japan.

Among the situational factors, Germany and Japan were following a path of rapid industrialisation under a strong State at the turn of the 19th century, which led to social dislocation. There was, therefore, some logic in arguing for governmental policies to mitigate the adverse effect of dislocation and prevent the possibilities of social unrest. However, we go beyond such situational comparison and argue that the main reason for accepting the ideas of the Historical School lay at the prevalent shared mental models towards economics and policymaking in Japan.

Although the intellectual development along the lines of the Historical School could not continue smoothly after World War II, it left a lasting impact on the trajectory of economic thought in Japan (Johnson 1999, Nishizawa 2001). Except for a brief period, Japanese academicians, were, as a result, never comfortable with a laissez-

faire economic system and the historical framework of neoclassical economics (see Morris-Suzuki 1989: 91-94, 180-188). This influence was particularly discernible in the attempts of some leading Japanese economists to accord priorities to welfare issues over simple price-based market dynamics.

3.2 Social values

Values ingrained in society too play a pivotal role in shaping a shared mental model by providing a common understanding of what ‘ought to be done’. Two things, however, need to be clarified at this juncture. First, whether the whole of Japan can be treated as a single cultural entity, and second, how one conceptualises the term ‘culture’. On the first point, it may indeed be difficult, at times, to equate Japanese social values with the homogeneity of Japanese culture. However, the broad, overarching social values we would like to examine in formal documents can safely be assumed to fall outside such a domain of disputes. On the second point, we have already mentioned that we would like to conceptualise culture rather loosely, where “individuals experience culture as disparate bits of information and as schematic structures that organize that information” (DiMaggio 1997: 1)

Such a conceptualisation has two distinct advantages. First, it emphasises that culture is essentially a cognitive process, and, as a consequence, the mechanism of cultural change can be assumed to lie within the cognitive processes of individuals. As a result, secondly, the social values derived from culture can be equated with the concept of shared mental models, which too is developed through a cognitive process. In other words, cultural change involves a learning process, which helps develop a

scheme for a problem situation. Often such a scheme may develop while dealing with situational problems, like late development, lack of resources as highlighted by Benedict. Indeed, Benedict argues that culture, besides being inherent in a social system, can also be learned from day to day living (1946: 11). Conventionally, nevertheless, situational motivations have been sought to distinguish from “basic values” (Johnson 1999: 8). Defining culture as schematic representation of problem situations, on the other hand, takes away much of the merit of such distinction. It can, consequently, be argued that any situational motive may become a ‘social norm’ or ‘code of conduct’ in a society, once it has been successful, perhaps repeatedly, in solving a particular situational problem.

The dominant values we would be examining have been a part of Japanese society for quite some time to be of importance in shaping a Japanese rationale. Below we discuss some of these values, which are important for our research.

3.2.1 Adhering to hierarchy

Japanese society, according to many sociologist and cultural anthropologists, has a ‘vertical’ orientation with many tiers of hierarchy where the interpersonal bonds between the superior and the junior are strong and carry much significance (Nakane 1970). The reflections of this can be seen in language and everyday situations like the junior asking for advice or confiding in a senior than to a person who is in the same bracket as himself in the hierarchy.⁷ The Japanese do not, however, view this rigid hierarchical structure as a negative constraint : this dependence on the part of the

⁷ In a horizontal society, on the other hand, the tendency would be to bond with one’s peer rather than a senior.

junior is believed to instil a sense of duty and responsibility in the senior. The junior also gains from the experience and feels taken care of. This socially accepted interpersonal dimension not only helps find a solution amicably but the knowledge arrived at from past experience of the senior gets passed on. For both the junior and the senior there are duties assigned by such social conditioning, which have to be carried out in earnest.

The hierarchical nature that defines present-day Japan probably has its roots in the social division of labour in the *uji* (clan), the earliest form of agrarian society seen in the country. In course of time, clans unified to form bigger provinces with a similar social network at play. A bigger administrative unit required more complex feudal ties. In Japanese cultural tradition, once a master-follower relationship is established, it is presumed to remain harmonious and not be openly challenged at any cost. The hierarchical ordering of society was legitimised by the *Ie seido* in the 16th century under the Tokugawa regime. The word *Ie* stood for a concept that transcended the idea of ‘family’ as ‘a group of individuals living together’. Besides the constituent members of the unit called ‘family’ at a particular time, it referred to the position of the ‘family’ with respect to the others in the village or the town at any frame of time, in the past or the present (Fukutake 1982).

The *Ie* consciousness required individuals to subordinate their own interests to those of the collective interest of the entire household. The will of the household head was likely to prevail in deciding any important matter. The head was expected to be thoroughly involved with matters concerning the family’s interests, mobilize them and take responsibility. The same dynamics were preserved not only at the household

level but at any social collective grouping. For example, the local *daimyou* (feudal lord) was responsible for the vassals under him while the Shogun at the administrative head was in charge of the local *daimyous*.

Interestingly, the process of modern state building also involved the same ‘familist’ ideals being expanded to the level of the State. The *Kazoku- kokka* (family state) was conceived by the Meiji government leaders and backed by Confucian moral principles. Confucian thought was introduced to Japan from China as early as the 12th century. In essence, Confucianism gave the guidelines of proper forms of conduct, especially in family and social relationships. Based on filial piety and humanity at its core, government based on Confucian values was bound to be a moral government. Though bureaucratic in nature, this form of governance was benevolent towards the people. Confucianism was revived time and again in Japan to gain control over the groups that did not accept the ruling authority.

Many other belief systems such as Buddhism and Taoism were incorporated into the Japanese milieu from China but of them all the Confucian spirit remained strong and meaningful to the Japanese. Of the five Confucian values, loyalty to the head was given more importance in Japan than China. In the traditional ethos of supremacy to the household the Japanese understanding of Confucianism fitted in well.⁸ Though, it can be argued that revoking Confucianism was adopted as a political strategy of the times, it cannot be denied that Confucian values reinforced the societal order.

⁸ Also, ideals of Confucianism proved to be a deterrent to the absolute supremacy of the abstract God of Christianity, when the religion tried to establish itself in Japan.

Through the Imperial Rescript on Education (1880), primary school education had to give importance to the ethics course wherein submission to authority was reinforced. In this manner the education imparted in pre-war times may have strengthened the value of adhering to hierarchy (Sigurdson and Anderson 1991: 93).

After defeat in the Second World War, which was fought in the name of the Emperor, the feudalistic family system on which the ‘national entity’ rested was legally abolished. However, legal change did not immediately mean an alteration in reality and as a social value the *Ie* system lives on today. The Emperor was reduced to a symbol of the unity of the Japanese people by the New Constitution, but the function of an authority above the “subjects” was transferred from the Emperor to the State. This Japanese tendency to allow supreme authority to become purely symbolic demonstrates their preference of group over individual leadership and may also be an indication of the prevalent values of modernization and their understanding of democracy. The attachment to the value of submitting to hierarchy could not be mitigated easily.⁹ The State had a definite duty and responsibility towards the people who voluntarily abided by the decisions. The conventional worth of adherence to hierarchy can be explained as a factor on why Japan favoured the German Historical School. The German Historical School, as we have discussed in Section 3.1, not only opposed reducing the role of the State to a mere regulator but propounded the supremacy of the State in most economic decision-making.

⁹ Today, enterprises are portrayed as families, the State as ‘family of families’, thus investing the notion of ‘Japan Inc’ with legitimacy in the country (Lebra 1976).

3.2.2 *Working as a group*

One of the most conspicuous differences between the West and Japan is the desire of the Japanese to be identified with a group. “With group-consciousness so highly developed there is almost no social life outside the particular group on which an individual’s major economic life depends. The individual’s every problem must be solved within this frame” (Nakane 1970: 10) Japanese culture has long viewed the intricate web of interdependencies as a fundamental fact of human relations. According to the moral code of traditional Japan, all problems ---personal and otherwise ----are expected to be solved within one's group.

This tendency towards collectivism is expressed by an individual’s identification with the collective goal of the group to which he belongs. This too probably can be traced back to the communal cooperation in a rice farming civilization discussed above. Also, the Confucian heritage of the nation has shaped Japanese groupism by stressing more on belongingness than individualism. The word *kojin* (individual) did not figure in the Japanese lexicon till 1891 (Yanabu 1982: 42). Japanese are keenly aware of the discrepancy between *honne* and *tatemae*. *Honne* (Private self) means the natural, real or inner wishes an individual may have, whereas *tatemae* (Public self) refers to the standard, principle or rule by which one is bound to the group vis-à-vis one’s ranking in the vertical order. In interpersonal relations the public self is given more weight than the private identity because group spirit is highly esteemed in a collectivist society like Japan. Collectivism involves cooperation, solidarity and the sentimental desire for *ittaikan* (feeling of oneness) with fellow members of one’s group, thus preparing the ground for informal channels of networking and information- sharing

that would benefit the entire group. The group in Japan has been central to the functioning of the country. Radical historical events, such as the fall of the Tokugawa regime and the total defeat in World War II, may have altered the exterior of social organizations but the pattern of group behaviour in Japan stays on. Note that the German Historical School which was a part of their intellectual tradition, as discussed before, also maintained that the individual's role was located within the community.

In a society such as this, where the key value is harmony, either conforming to group values or avoiding conflicts becomes essential. A consequence of Collectivism is the culture of guilt, (Doi 1971) where a non-conforming action may result in the guilt of betraying the group. Therefore, gaining consensus (within a group) becomes very necessary. Decisions are arrived at by consultations and committee work. *Ringisei* (a kind of consensus-building measure), found in bureaucracy and the corporate world alike, ensures that superiors do not force their ideas on juniors; instead, juniors present their views to superiors and have them adopted after deliberations.

3.2.3 Attitudes towards adaptation and assimilation

The Japanese are known for their eagerness to borrow indiscriminately. They look for models in other countries, absorb the idea and reproduce variants of the standard as products for domestic consumption. Historically, with a powerful neighbour like China, many ideas ranging from those of script, religion, arts, literature, and architecture were directly imported. Subsequently such cultural borrowings were internalised to suit internal sensibilities. For instance, the *kana* script has evolved from complex Chinese characters. The Taika reforms in the year 645A.D, borrowed from the Chinese model,

were perhaps the first attempt to adjust superior alien techniques to familiar indigenous conditions. This need for Japanisation of the imbibed knowledge can be regarded as a social value. After the Meiji Restoration, when Japan encountered the more ‘developed’ Western nations, she did not hesitate to import the superior technology the West had to offer. The 4th and 5th articles of the Charter Oath (April 1868) adopted at the time of the Meiji Restoration called for shedding ‘evil customs of the past’ and searching for knowledge even if it meant learning from the outside world to ‘strengthen the national polity’. However, Japan had *Wakon-yousai* (Japanese spirit with western learning) at the core of her modernisation. The slogan was advocated by the enlightenment leaders, who realised the need for balance. The Japanese spirit was not to be overlooked at any cost while embracing the technological and academic progress of the West. This policy was adopted as a responsive measure to preserve national identity. This Japanese cultural trait was succinctly summed up by Tagore, when he noted that, “Japan cannot altogether lose and merge herself in the scientific paraphernalia she acquired from the West and be turned into a mere borrowed machine. She has her own soul...and that the process of assimilation is going on has been amply proved...” (Tagore 1917, 2002: 7-8)

The attitudinal dimension of this dynamic process of assimilation is governed by yet another subset of social values.

a. Setting goals and Kaizen

Meticulous planning has been a quality attributed to the Japanese. This social value may have emerged from dealing with ‘situational’ hurdles such as the country’s geographical limitations. To combat these constraints and decide on the future course of action there was always a need for an objective or a goal ahead. Whether it was to

catch up with the West after the Meiji Restoration, or turn into an imperialist power, or achieve the Income Doubling Plan of 1960, they were all aspirations comprehensible as a component of broad national vision and its public declaration. Once the target had been decided it was not difficult to motivate the people towards the achievement. However, the steps taken to achieve the long-term goal were incremental in nature. It becomes, thus, essential to understand the value Japanese people attach to 'Kaizen'.

Popularly, Kaizen refers to a quality control strategy recognised with the management practice associated with the Toyota Production system. However, the word originally had philosophical associations with Taoism/Zen. (Kojien 5th edition) Literally, the word translates to small change for betterment. The betterment implied here is not benefit to an individual, but to the society.

In a goal-driven 'futuristic' society, Kaizen methodology includes making small changes, monitoring results, and then adjusting. Large-scale pre-planning and visualization or projection of radical change is thus comprised of small-scale incremental changes. On an experimental basis minor changes can be adopted, and if successful, rapidly adapted. In this sense, the direction of adaptation is one of continual improvement. It may thus also be conjectured that the Japanese mental model towards continuous adaptation and minor improvement in all spheres of economic activities was in line with the view of the Historical School that economic systems are inherently dynamic in nature.

b. Thrust on miniaturisation (*Keiryōka* / *Kogatana*)

The most obvious reasons of miniaturisation is economising in space. But, while miniaturisation of consumer items such as automobiles and refrigerators can be explained by their motive to economise on space, miniaturisation of items like mobile phones cannot readily be explained by space economy alone. A more comprehensive explanation in the Japanese case would probably be that miniaturisation implies a kind of aesthetic value addition. The same principle has also guided Japan's electronic industry. One of the most overarching visions driving Japan's electronics industry has been achieving market success by developing trendy, portable variations of a product design. Since Sony's introduction of the pocket-sized radio in 1955, the concept of miniaturization spread in Japan, where lifestyles and small homes support rapid market acceptance of the concept¹⁰

Indeed, miniaturisation has been an important part of Japanese aesthetics and can be seen in their art of bonsai, boxed gardening. It speaks for their refinement in details. Their literary tradition of the 17 syllable haiku and poems praising smallness are examples for their preference for smallness.

This social value can thus be both a culturally ordained worth and also one that has its origin in the, so-called, 'situational' motivation.

¹⁰ The *Nippon Keizai* newspaper described Japan's miniaturization trend in 1982 with the term *kei-haku-tan-sho* (*kei*, lightweight; *haku*, thin; *tan*, short; and *sho*, small).

c. Love for Nature

Despite many natural disasters, nature has been a blessing to the people of Japan. The sense of oneness with nature underlines the Japanese ethos. Their indigenous faith, Shintoism, has nature worship as its core. Also the agrarian nature of society was governed by nature and thus the sensitivity towards it.

In the Hellenistic tradition, the idea of ‘conquest of nature’ existed in the West. In the East, this idea of subjecting nature to the commands or service of man according to his selfish desires has never been cherished (Suzuki 1988)

Nature has played a major part in Japanese literature and art as well. ‘Naturalism’ in Japan is not the recognition of nature as independent of human beings, but an appreciation of the interaction and affinity between people and nature. “She (Japan) does not boast of her mastery over nature, but to her she brings, with infinite care and joy, her offerings of love”. (Tagore 1917, 2002:27) The Japanese people’s love of nature has always been a reflection of their innate aesthetic sense for things beautiful. Later, Zen too gave an immense impetus to the feeling for nature.

3.3 *Language*

Given that human beings do not live in an objective world, language, being the medium of expression, becomes an important tool through which outer environment is understood, interpreted and structured (Doi 1986). The symbols, words, and expressions used in a language mirror social norms, and, at the same time, shape the pattern of social interaction. It may be noted that Japan has been successful in

implementing a single language system which may be assumed to expedite the evolution of any shared mental model among individuals.

4. Methodology

The four most important organizations for Science and Technology policymaking in Japan are the Prime Minister's Council for Science and Technology (CST), the Science and Technology Agency (STA), and two ministries: the Ministry of Education, Culture, Sports, Science and Technology (MEXT)¹¹ and the Ministry of International Trade and Industry (MITI). Key issues to be addressed for strengthening Japan's science and technology capabilities are done in consultation with these official bodies. The CST was set up in 2001 and serves as the headquarters for the promotion of science and technology, besides formulating comprehensive basic policies and conducting their overall co-ordination. STA too is a more recently established organization that has a definite role in disseminating scientific information. MEXT and MITI have been handling policy making since the reconstruction of the Japanese Economy after World War II. MITI played a key role in deciding technology policy to meet the requirements for industrial development in the 1950s and later shifted primarily to promoting international trade in the 1970s. Studies so far to understand Japan's policymaking have focussed, mostly, on the Industrial policy and the role of MITI.¹²

As ours is a short-term indicative study we have not exhaustively covered the role of MITI, but, instead, confined ourselves to the White Papers on Science and

¹¹ Before 2003, MEXT was known as Monbusho (Ministry of Education)

¹² See, for instance, Gao (1997).

Technology (*Kagakugijutsu Hakusho*) of Japan, which have not been the usual focus of analysis earlier. These documents are available from the year 1958 (Shouwa 33)¹³, in the official website of the Japanese Ministry of Education, Culture, Sports and Technology. With some gaps in the beginning, these White Papers have been an annual feature since 1969. Till the year 1988 they appear only in Japanese, after which the English versions are also available. Owing to constraints of time and resources, we did not go through each of them. Instead, we first identified some key years for Science and Technology Policies in Japan based on our understanding of Japanese economic history and various important world events. Some such years marked by important world events are 1964 (Tokyo Olympic), 1973 (the First Oil Crisis) and 1997 (Kyoto Protocol). Besides, the year 1960 is taken as an important year in Japanese economic history, when the country announced the ‘Income doubling plan’. Similarly, the years 1969 and 1995 are important earmarks in the history of patent and intellectual property rights in Japan. While in 1969, they amended their patent laws to promote technological capability of the domestic industry, they became a signatory to the World Trade Organisation in 1995. The year 1996, being the year when Japan embarked upon her first Basic Plan for Science and Technology, was also identified as an important benchmark for our study. In all such cases, the years before and after these years were taken up for study. It facilitated an understanding of the trend and the follow-up actions the country took. The White Paper of 1986 carried a table of summary of new targets and achievements which proved to be a corroborating insight into the direction of our research. In aggregate, the White Papers of the following years have been analysed for the present study: 1958, 1962, 1964, 1969, 1971, 1972, 1973, 1974, 1981, 1986, 1995, 1996, 1997~2007. The White

¹³ Japan follows the Nengo system, where the era changes with every new Emperor. It was in the year 1925 that Emperor Hirohito came to the throne and it was thus the beginning of the Shouwa period. The 33rd year of the Shouwa would translate to 1958.

Papers are usually subdivided into different headings such as present circumstances, identifiable problems, budget allocations, research directions, sectors to prioritise, promotion of research activity, technology trade statistics, domestic and international trends and so on. From these headings that recur, trends could be inferred which were then substantiated by informal discussion with the researchers in the Embassy of Japan.

We have also, from time to time, made use of information available on the websites of NISTEP (National Institute of Science and Technology Policy) and the Japan Science and Technology Agency that plays a crucial role in promoting public understanding of Science and Technology in Japan.

5. Informal values and formal policies- An analysis

Based on the discussions of the above sections we analyse the influence of informal values, encapsulated in ‘shared mental models’, on formal policies. We divide this section into four subsections. Section 5.1 explores the influence of shared mental models on policy directives on the nature of technological change. Section 5.2 explores how shared mental models influenced the policy toward the direction of technological change. Section 5.3 discusses the influence of shared mental models on the trajectory of policymaking. Finally, section 5.4 analyses how shared mental models has shaped the overall objectives of policymaking in technology and industrial development in Japan.

5.1 Shared mental models and policies on nature of technological change

As early as 1958, Japan's White Paper on Science and Technology documents that Japan would carry out its acquisition of technological capability through '*kenkyuuno kenkyuu*' (chapter 3, section 2.3). The policy document also clearly states that the research priority at the time was to focus on commercialisation of technologies, through assimilation and incremental innovation. The White Paper of 1964 (chapter 2, section 2.2) reiterated the conviction that such capacities to assimilate and improve upon acquired technologies would be crucial for achieving international competitiveness.

However, until recently, standard economic theory did not consider incremental innovation to be of much importance for a country's economic competitiveness. The dominant theoretical paradigm of that time revolved around the framework offered by the product cycle and technology gap theories. Both these theories focused only on radical innovations and predicted that only industrialised, technology-leader countries could have comparative advantage in high technology sectors. Less developed countries, on the other hand, were seen as recipients of old technologies in the matured phases of product cycles, solely due to their low labour cost advantage.¹⁴ In such a framework, therefore, less developed or developing countries, were not seen to derive their international competitive advantage through innovative activities, but only through low labour cost advantages in matured technologies. Rosenberg and Steinmuller (1988) indeed argue that economists, for a long period, had held the view that Japan's international competitiveness in the automobile sector was based on its

¹⁴ See also Franks (1999: 186).

low labour costs advantages. Only later, it was recognised that the true reason behind the competitive strength lay in the capability to invent through minor innovation and reverse engineering.¹⁵ Freeman (1987), in this context asserts that the Japanese effort towards acquisition of technological capability through minor innovation and reverse engineering did not start with the automobile. Evidences of minor innovation and reverse engineering were also present in their technological effort to absorb imported technologies in the field of textiles in the nineteenth century. Yamauchi (1986) points out that such activity was rather uniquely Japanese and it gave Japan an edge over other Asian nations in the cotton industry during the pre-War era. However, such achievements were not exclusive to the cotton industry. The evidence of ‘home made’ technologies by ‘modifying’ imported technologies became evident in ‘almost all industries’ (Freeman 1987: 32-3).

To summarise, Japan had a rather long history of incremental innovation and reverse engineering. The literature on economics of technology on the other hand, started emphasising the issues of minor innovation and technological capability only in the 1980s with the pioneering work of Sanjaya Lall, Chris Freeman and others¹⁶. The shared mental model for incremental innovation could not thus have been based on the then existing paradigms of economic thought. It may, thus, be safely argued that Japan’s thrust on incremental innovation and technological absorptive activities reflects the shared mental models developed through the prevalent social values of ‘kaizen’ to achieve a long-term goal of technological capability.

¹⁵ In a rather oversimplified manner, such activities have traditionally been seen as imitation, devoid of much creativity and R&D. Teece (1981) made a pioneering attempt to point out that imitation is neither automatic nor costless and involves creative engagement with technological learning. Surely, the Japanese case provides supporting evidence of this view.

¹⁶ The development of this theory perhaps, therefore, owes much of its intellectual debt to Japan’s successful experimentation along these lines. However, establishing a definite linkage calls for a much detailed research on this issue.

Note that the White Papers of 1981 set a new goal for technological activities. Departing from its earlier policy goal to focus, predominantly, on assimilation, modifications, and improvement of acquired technologies through reverse engineering and incremental innovations, the policy document of that year announced its intention to focus on fundamental research. Two factors may have motivated such a shift in their policy goal. First, their eagerness to develop knowledge-based industry from the mid 1970s may have necessitated such a shift. Second, it may have been thought of as a natural next step to engage in research which would push the technology frontiers, after achieving mastery in reverse engineering.

5.2 Shared mental models and policy on direction of Technological change

Along with the nature of technological activities, the White Papers on Science and Technology also contain evidence of how policy interventions shaped the direction of technological change in Japan. Among many such possible directions, we examine how some of the formal policy proposals demonstrated informal values of affining with nature and aesthetic appreciation of miniaturisation.

Affinity to nature

With the state-defined national goals of rapid industrialisation for reconstructing the economic base in the post war period, deterioration of the living environment was, perhaps, inevitable. With the main thrust on manufacturing industries, environment concerns were sidelined. However, it was soon realised that such a path of industrialisation would prove to be damaging for the environment (Freeman 1987). In fact, grass-roots pressure groups started emerging from the 1960s itself to present the

discontentment of civil society against rising environmental problems. A series of lawsuits were also filed in the early 1970s accusing the industry of being responsible for damaging the environment. Subsequently, Japan began in the early 1970s to combat pollution on an official governmental level, with the establishment of the Environmental Agency. What is more interesting, and perhaps unique to Japan, is the proclamation of the Japanese Government to switch its path of industrialisation as a means to combat pollution. In 1971, the White Paper on International Trade and Industry announced a shift from “pollution-prone” and “natural-resource-consuming” heavy and chemical industries towards “clean” and “brain-intensive” industries. (Ozawa 1974: 11).

Appreciation for miniaturisation

The appreciation for miniaturisation has also shaped Japanese technology policymaking. The 1970 White Paper (Chapter 2, Section 1v) demonstrates the same with an example of microelectronics which shows 70% reduction in the size of electronic parts compared to those that existed in 1907. Graph (1-9) in the same text indicates that Japan’s introduction of IC in electronic products from 1968 further facilitated the downsizing process. Another instance of miniaturisation can be found in the White Paper of 2005 which discusses at length how the weight of a mobile phone changed from 750gm in 1987 to 70gm in 2005. Along with the inherent social value of appreciating smallness, the German Historical School’s insistence that the State be involved in promoting aesthetics may have also contributed to the formation of a shared mental model of miniaturisation.

5.3 Shared mental models and trajectory of policy making

It was observed during the course of our study that since 1969 there have been annual publications of White Papers which address, discuss and analyse problems the country faces.

The annual publication of White Papers also indicates the attitude towards setting of goals and their achievement in a step- by- step manner, as we discussed in the section on social values. Much before the Oil Crisis made it mandatory to economise on energy intensity, Japan had, in fact, initiated the process of shifting away from traditional energy intensive industrialisation to the knowledge intensive path of industrialisation, arguably to save the environment.

The annual publication of White Papers also reflects Japan's preference for small incremental policy changes over rapid discontinuous ones. There is less uncertainty in small policy changes and help develop consensus in the society more easily. The fact that such a course of policy making has been quite effective can be understood from a relatively less number of policy reversals in Japan.¹⁷ We found another manifestation of Japan's preference for consensus building in our readings of the White Papers. Normally, the indication of a policy change is made much ahead of its actual implementation. Specific cases of this type of policy dynamics include the stated intention to address the issues of ageing society (first announced in 1962), and a policy shift to creative research (announced in 1981) from the path of applied R&D. It

¹⁷ This point was first brought to our notice by Y. Furukawa, the First Secretary, Japan Embassy, New Delhi

may be safely conjectured that this time gap is used effectively to develop a consensus on concerned issues.

The White Papers also prove to be excellent examples of meticulous planning with ‘futuristic goals’ (Dore 1987: chapter 10). The aspect of meticulous planning is reflected in the thrust on technology foresight surveys, which are conducted on a regular basis to reduce the scope of the unintended consequences of a new technology. The emphasis on ‘futuristic goals’ is evident in the White Paper for 2005, which carries Japan’s 21st century vision and future prospects (chapter 1.3; column 19). Such long- term broad visions are set as targets and achieved over a period of time in an incremental manner. With long-term prospects in mind the policies are fashioned to achieve time-bound goals.

A careful study of the White Papers also reveals Japanese enthusiasm on learning from other countries in a manner consistent with their adaptive and assimilative spirit. The White Papers of 1958 draw inspiration from technological trends in the United States, England, the former USSR and West Germany. White papers of a later time period cover the direction of many more countries from South East Asia, Latin America and Africa.

5.4 Shared mental models and objectives of technology policy

It is common knowledge that modern economics justifies policy intervention only to allocate resources for ‘public’ goods in the face of externalities and market failure. Interestingly, nevertheless, despite being one of the pioneering countries to adopt

industrial and technology policy, such reasoning did not find much space in the policy debate in Japan for a long time (Komiya 1999: 80). From time to time, various scholars have tried to describe state interventions in Japan in terms of some popularly understood notions such as “nationalism”, “developmentalism”, or a “plan rational” (see Gao 1997, Johnson 1999 for a review) The documents of the MITI, however, claim that industrial policy in Japan “simply grew” and attempts to theorise such interventions began only after 1960s (Johnson 1999: 27-8). Our analysis also indicates that the scope and the dimensions of policy interventions were, perhaps, much broader, to be grouped, exclusively, under any of the abovementioned classifications. Technological policies pervade almost all aspects of the interaction between technology-economy and society. Providing guidelines with respect to the nature of technological change (incremental innovations), directing the paths of technological activities through the promotion of aesthetic values of miniaturisation, establishing harmony with nature (Ojimi 1970), maintaining the social fabric (through consensus building effort) and so on have all have been given due care in technology policy making in Japan. Moreover, Japan also pioneered the concept of protecting “depressed industries”, to which many other countries did not pay much attention, sound economic justifications attached with such interventions notwithstanding (Peck et al 1999).¹⁸

To capture the all the nuances of technology policy in Japan, one has to study the complex interplay of various informal institutions and ideological thinking which gave legitimacy to authoritative interventions by the State in almost all spheres of Japanese social and economic life. From our discussions, the social values pertaining

¹⁸ For instance, lack of mobility of capital between sectors, divergence between social and private rates of discount etc. See Peck et al (1999) for details.

to “adherence to hierarchy” and the lasting impact of the German Historical School can be identified as two major factors contributing to the evolution of such a shared mental model.

The influence of the social norm of “adherence to hierarchy” is rather straightforward. Hence we try to try only to explain the influence of the German Historical School. In our discussion of the German Historical School in section 2, we have pointed out that the State was supposed to promote the intellectual and aesthetic culture of a country. Furthermore, the State should also extend support to the weaker section in general, and labour in particular. While aspects like thrust on miniaturisation can be grouped under the State’s responsibility to promote aesthetic culture, the State’s role in protecting the interests of the weaker sections and rights of labourers can be seen in policies related to ageing population and protection of depressed industries. As Freeman (1987) points out, the need for a long-term policy to generate a strong base of ‘mental capital’ (intellectual capital or human resource) can also be linked to the ideological tradition of the German Historical School (pp. 98-100). Freeman (1987) also summarises the views of Fredric List, leading scholar in the German Historical School, to emphasise that there is a need to link technology guidelines to industrial and education policies. Please note that ever since Japan clarified its objective of shifting gradually from reverse engineering-oriented applied exploration to creative research, she has also stressed the need to overhaul her education system to augment necessary “mental capital”. Interestingly, the Ministries of education, culture, sports and science and technology have been merged to form MEXT in the year 2003. The two points mentioned above perhaps give credence to the claim that Japan’s

policymaking exercises, even today, are deeply influenced by the shared mental models developed through the influence of the Historical School.

6. Concluding remarks: Significance for India

Our study, therefore, indicates that informal institutions and intellectual tradition, encapsulated in ‘shared mental models’, influenced the technology policy of Japan in many important ways. Any interpretation of our results should, however, be done with, at least, the caveat that the ongoing process of globalisation under WTO significantly limits the scope of a national government to frame policies according to the prevailing social norms. In the current global order, therefore, much is left to the innovativeness of policy makers to incorporate social norms in a judicious manner.

Drawing on the significance of such a study, which attempts to explore the compatibility between social norms and formal institutions, for India is always difficult owing to the sheer diversity of social norms and cultural predispositions found in the country. Indeed, barring the history of the last two centuries of British-India, such pluralism did translate into a very diverse institutional framework and legal pluralism in various spheres of economic and social activity. It may be worth analysing whether such a policy framework can be re-introduced in formulating modern day science policy in India.

Compared to Japan, and many other countries, India has a longer and, arguably, richer history of cultural exchange, making it even more difficult to pinpoint the social norms which are “predominantly Indian”. The limited scope of this study also

prevents us from exploring such dimensions in detail. However, two characteristics of Indian society would clearly stand out. First, Indian society has always been open to “accepting other cultures” thereby demonstrating an inherent capacity, like Japan, to “adapt and assimilate” from diverse sources. Japanese policy making has incorporated this attribute in shaping its technological, as well as, policy trajectories. The White Papers of Science and Technology consistently devote a section on the experiences of an assorted set of countries, in order to draw relevant policy lessons for Japan. In India, however, the merit of such an exercise is, perhaps, less appreciated and quite often examples are drawn only from one or two leading countries in order to frame policies.

Amartya Sen (2005) highlights another (second) distinctive feature of Indian society, namely, *loquaciousness*. Two important implications for policy making would follow. First, consensus building through exchange of views should be taken as an important path to policy formulation. Debates and discussions in turn will generate more information required to analyse the problem situation that the policy addresses. This process would facilitate evidence-based, meticulous policy formulation. Unfortunately, however, our policy statements do not conform to these properties. For instance, the policy document, which made the radical departure from India’s old policy of inward looking development to liberalisation and globalisation does so, purportedly, on the basis of the following reasoning:

“But any added liberalization which effectively requires tariff cuts will also *likely* meet with a significant response for reasons suggested above. In fact it *seems very reasonable* to argue that revenues *may even rise* in view of the extremely high tariffs now. Thus, in ... the so called Laffer curve, the horizontal axis measures the average tariff rate and the vertical axis measures

revenues collected. When tariff rates are prohibitive, nothing gets imported, and there is no revenue. When rates are zero, no revenue gets raised either. So, the curve meets the horizontal axis at the origin and at high tariff that eliminates imports. In between, it rises and *must* fall. *Assuming only a single peak*, we can *plausibly assume* that we are to the right of this peak and will therefore increase tariff revenues by liberalizing consumer imports with QR expansions and tariff reductions” (emphases own, White Paper 1993: 38)¹⁹.

Mukherjee (2008) shows that some of the eventualities predicted above depend on a restrictive set of assumptions. Also, no evidence was used to justify the set of assumptions made in the statement (See Mukherjee 2008: 3-5 for detail). The fact that some of these purely academic points were not dealt with perhaps show the reluctance of the policymakers to incorporate the arguments of the academic community, let alone others, in a comprehensive manner while formulating policies.

Unfortunately, however, there is no reversal of this tendency and important policy changes are still being prescribed without adequate discussion and argument. The recent proposal to introduce intellectual property rights on public-funded research in Indian universities and government research institutes provide an example. Presumably, such a law would facilitate technology transfer from universities to industry by giving ownership to the scientists of their publicly-funded research outputs. However, the implications of protection of knowledge and entrepreneurial aspirations/capacities of academic professors vary across cultures (Gittelman 2006). Japanese professors have not been very proactive in exploring entrepreneurial options, even when they have property rights on their innovations (Toyama and Hasegawa 1982, Etskowitz et al 2000). There is also no study to establish that entrepreneurial aspirations/capacities are prevalent among members of Indian academia. One also

¹⁹ As quoted in Mukherjee (2008: 3)

needs to investigate how tax- payers would react to an arrangement which seeks to privately appropriate the results of ‘public’ funding.²⁰ Interestingly, even the complexities of such a scale have not inspired the policy makers of this “argumentative” country to invite discussion on this important procedure.

So, how do the academic community and the public at large, who belong to this argumentative tradition, feel on being relegated to the sidelines of debate on policy making? If Sen’s (2005) recollection of a poem by Ram Mohan Roy²¹ can be taken at face value , they cannot but feel helpless in death, because “Roy explains what is really dreadful about death” (ibid: 32):

*“Just consider how terrible the day of your death will be.
Others will go on speaking, and you will not be able to argue back”²²*

²⁰ In the United States of America this was a major concern of academia in the 1960s and 1970s, which constrained them from engaging in patent filing activities. See Mowery (2005) for details.

²¹ A leading reformer of 19th century India.

²² As quoted in Sen (2005): 33.

Acknowledgement

Many insightful discussions on the content and structure were held with Amit Shovon Ray. Madhav Govind gave important comments on Indian cultural parameters. The discussion with Sujit Bhattacharya on Indian policy making was particularly helpful. Informal discussions with Japan Science Secretary, Y.Furukawa and Researcher, Y. Machida, were very fruitful. T. Nishizawa obliged us by sending some important papers on the history of the German Historical School in Japan. A primary draft of this paper was presented in a seminar at ICRIER, and the valuable comments received have enriched our analysis. Usual disclaimer applies.

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ICRIER's founding Chairman was Dr. K.B. Lall who led the organization since its inception from 1981 till 1992 when he handed over the Chairmanship to Mr. R.N. Malhotra (1992-1996). He was followed by Dr. I.G. Patel who remained Chairman from 1997 to 2005 until his demise in July 2005. ICRIER's current Chairperson is Dr. Isher Judge Ahluwalia.

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