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Institutions, regulations and sustainable transport: a cross-national perspective

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Institutions, Regulations and Sustainable Transport: A Cross-national Perspective

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ABSTRACT *This paper examines institutional and regulatory aspects of sustainable transport from a cross-national perspective. While institutions appear to play an important role in the economic success of many countries, it is not so clear that they also support sustainable development. A number of examples of the role of institutions in transport are discussed. Particular attention is focused among others on the themes of institutions and technological change, institutions and the organization of production, and territorial aspects of institutions. Regulatory trends are also reviewed including devolution patterns and the growing importance of supra-national organizations.*

Introduction

Transport in any country is a complex system composed of the infrastructure, logistics and information systems that manage and direct the actual movement of vehicles, ships and aeroplanes. Such transport systems and related markets have an international dimension. For example, there are only two large suppliers to the global market for aeroplanes; most infrastructure networks such as railways and highways have an international orientation, and given the increasing distances at which spatial interaction takes place, a growing share of the flows of passengers, freight and information cross national borders. This tendency towards internationalization calls for increasing coordination of activities in and among countries. Despite the international character of transport, countries differ substantially in the routines used to deal with transport problems. These differences are related to factors like the differences in physical and geographical conditions: low-density countries tend to have different transport problems than high-density countries, and economic development as high-income countries usually put greater emphasis on the environmental impacts of transport than low-income countries. Another reason for differences among countries is that institutional arrangements differ as shown in Table 1 between Europe and the USA.

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Table 1. Institutional differences between Europe and the USA

Institutional issue	Europe	USA
Use of taxation to address sustainability problems	intensive	not intensive
Stimulation of public transport	high	low
Role of rail for passenger transport	large	small
Deregulation of transport markets	slow	fast
Emphasis on equity versus efficiency in policy-making	equity	efficiency
Land-use policies	strong	weak

The roles assumed by the public and the private sectors vary considerably among countries in general, and between Europe and the USA in particular. The present paper analyses these differences in more detail elaborating further on a theme already developed by Stough and Rietveld (1997). Special attention is directed to the theme of sustainable transport. Sustainable transport is a social construct. In the present paper, sustainable transport is defined as the maintenance of mobility and accessibility at some socially predetermined level subject to selected social and environmental constraints, e.g. maintaining predetermined levels of environmental residuals. This definition suffers from a lack of specificity regarding what are the sustainable socially determined level of mobility and environmental residuals. However, making a determination of what are these levels is beyond the scope of the paper. Suffice it to say, this definition specifies sustainable transport conceptually. The central question to be addressed is to what extent institutions and regulations contribute to sustainable transport (or whether they detract from it).

In the second section, definitional issues and the relationship between institutions and transaction costs are discussed. An important finding is that while institutions play an important role in the economic success of many countries, it is not as clear that they also support sustainable development. In the third section, some examples of the role of institutions in transport are discussed. In particular, attention is focused on issues such as institutions and technological change, institutions and the organization of production, and territorial aspects of institutions. The fourth section examines regulations and regulatory regimes, and the fifth section provides conclusions.

Institutions

Institutions can be defined as socially devised constraints that shape human interaction (North, 1990). A related definition is to describe institutions as social rule structures. These structures can be both formal and informal. An obvious example of a formal institution is a property right specified by legislation. However, there are many informal institutions both within and between organizations. Examples include management practices, governance and rules on who takes the initiative in large infrastructure projects. The essence of institutions is that they structure incentives in human exchange and interaction.

Institutions, as defined here, are not identical to organizations. Organizations are groups of actors that share a common interest or goal; institutions structure and define the relationships between actors and organizations. Organizations and institutions are often closely linked. For example, 'higher education' is the institution

corresponding to the university organization. The Sorbonne in Paris, France, is an organization that operates generally in tune with rules that define the institution of higher education. The relationship between 'governance' and 'government' is similar. Institutions and organizations are mutually related. On the one hand, institutions lead to the emergence and maintenance of organizations. For example, international agreements between governments of countries are often a necessary condition for the existence of international firms. On the other hand, the behaviour of organizations may result in institutional change. For example, pressure groups may wish to strengthen environmental property rights through lobbying and legislative means.

An important reason why one cannot do without institutions is that they provide a basic level of justice and equity in society. Issues of justice, however, are not the only reason institutions exist. Coase (1937) and North (1990) have called attention to the economic importance of institutions through the concept of 'transaction costs': when transaction costs are high, institutions matter. To make transactions, several types of costs occur such as the search for a supplier, contract negotiations related to measuring or defining the attributes of what is exchanged, and the enforcement of agreements. An example of the first type is that lack of easily accessible information on supplier timetables may discourage customers from using the service. An example of the second type of cost concerns the determination of product quality, an issue relevant in every transport-related decision (the safety standards of roads being used, the quality of a car bought, a guaranteed service or a or delivery time, etc.). The third type of transaction cost is equally obvious: in each transaction, cheating is a possibility, suppliers may not supply what has been agreed upon once the customer has paid; and the customer may refuse to pay after consuming the transport service. It is concluded that in the field of transport, a high level of transaction cost often implies that transactions that are potentially beneficial will nevertheless not occur or occur less frequently and therefore impact market efficient outcomes.

The importance of institutions is that they provide the structure for exchange that determines the cost of both transactions and transformation. For example, laws defining property rights will reduce transaction and production risks. The level of transaction cost will also have a strong impact on the formation of organizations and their structure. For example, large vertically integrated firms may be viewed as a response to high levels of transaction costs between firms.

Institutions and Sustainable Transport

Institutions and Sustainability

Economic historians have called attention to the fact that the economic success of a country depends critically on its institutions (cf. North, 1990). For example, political rules including checks and balances, well-defined property rights, and an emphasis on impersonal or 'weak' ties are usually considered important factors explaining the economic success of a country. Thus, institutions matter in the explanation of economic growth. An important question is whether institutions also matter in the achievement of sustainability, and, in particular, sustainable transport. Movements towards sustainable transport are influenced by institutional conditions. In some cases, these conditions appear beneficial;

however, in other cases, they appear to hamper favourable development toward sustainability. A few examples to illustrate this point are as follows.

- Technological change has the potential to make a considerable contribution to sustainable transport. However, institutions may hamper such development. An example is legislation concerning underground transport. When property rights of land below the surface are not well defined, investments in underground transport infrastructure have a higher risk premium.
- International agreements on taxation may hamper the introduction of fiscal instruments resulting in undesirable fiscal treatment of transport modes. An obvious example is aviation where fuel taxes for international flights are zero, which is surprising given the local and extra-local environmental effects involved.
- Mobility rights can be considered as informal citizen's rights in most countries in the sense that they can travel as much as they like. Thus, governments are confronted with difficult challenges. For example, the obligation to ensure that the elderly and handicapped have access to adequate transport services. Another example is that efforts of governments to restrict mobility rights are difficult to realize because citizens often consider them violations of fundamental rights such as the right to park at particular places, to have access to particular zones or to use certain infrastructures at particular times of the day without a charge.
- Property rights on environmental quality. The 'polluter pays' principle has been introduced to ensure that pollution is taken into account as a cost component in transport. At the same time, it is a principle of equity because it says that it is not the victim that must pay, but the polluter. One of the consequences of this principle is that infrastructure cost has increased substantially because victims request adequate compensation. As the 'voice' of the potential victims has become more powerful, it has become a substantial decision factor, sometimes even leading to the cancellation of the construction an airport expansion or highway.
- Taboos on policies. Transport policies affect the welfare or profit of households and firms that in turn will try to influence these policies. This leads to the development, over time, of political processes with both formal and informal rules constraining the room that governments have to manoeuvre. Sometimes these limitations acquire the character of a taboo. In the USA, the political party that dares to increase taxes (fuel or otherwise) will not win the next election. Plans to build large expressways in urban areas that were met with strong and successful resistance in the past will not easily be proposed a second time. This is not to argue that the political arena is inflexible. Especially after extremely large accidents, e.g. the suicide attacks of 11 September 2001, an oil crisis or a large natural disaster, suddenly policies are feasible that would not be possible otherwise (cf. Rietveld, 2003). These taboos may at times support sustainability; however, the reverse also holds.
- Rules on who pays for transport. The guest of a family expects that a free parking place is part of the hospitality of the host. Just like he expects that he will not have to pay for the dinner for which he has been invited. On the other hand, the host would be surprised if the guest asked him to pay for his travel costs. A similar distribution of roles on who is expected to pay the travel cost takes place with shops and business services: guests usually expect the shop

keeper or service provider to supply free and accessible parking, whereas guests usually pay transport costs. With commuting, the distribution may be different, as in some countries commuters pay for a parking place provided by the employer, and in others, employers compensate commuters for their travel costs. The above examples make clear that the question of who pays what transport costs may be answered differently. In particular, with respect to work-related traffic, employers may define their roles quite differently. The sustainability consequences are evident. Several of these issues are discussed below in more detail.

Institutions and Technological Change

The potential of technological change to contribute to the development of a sustainable transportation system is considered to be high. Large investments are usually needed for research and development (R&D) to bring about technological-induced change. Institutions such as the granting of property rights of new inventions (patents) are instrumental to further technological development. There is no guarantee, however, that technological change will support sustainability. The major driving force in innovation and R&D is the profit-seeking goal of entrepreneurs in response to a potential market demand. When market signals are not sustained, technological change by coincidence will only have a sustainability orientation. Therefore, institutions are needed to drive technological change towards sustainable outcomes. As indicated by Geerlings (1999), this may call for government action, not only to correct for environmental effects via taxation policies, but also as a partner in public-private collaboration to facilitate technological change aimed at improved infrastructure.

There is also another side to the relationship between institutions and technological change. On the one hand, institutions have an impact on the direction of technological development; on the other hand, technology affects the structure and form of institutions. Consider, for example, the technology-related aspect of the non-excludability of various types of transport infrastructure. This implies institutional arrangements for infrastructure supply whereby public-sector initiatives are dominant. For example, the emergence of smart cards and electronic tolling has had a strong impact on the transaction costs of infrastructure when the goal is for users to pay. Technology leads to a reduction of transaction costs implying that private suppliers may also become active in the field of infrastructure operations. A broader adoption of information technology will also likely have profound effects on public transport operations. Smart card technology may considerably enlarge possibilities for customers to pay for transport options flexibly, implying new partnership possibilities and roles for public transport operators. Competition between transport modes will increasingly more be determined by the extent to which information and communication technology applications can be used to increase the quality of these modes.

Production Processes, Transaction Costs and Institutions

The emergence of the vertically integrated firm is a response to high transaction costs, which arise as a consequence of the many transactions between firms producing inputs and intermediate products for non-vertically integrated firms. In the past, the costs of command and control of large and complex organizations

have limited the growth of vertically integrated firms. Two developments can be observed in this respect. Technological change in the information and communication sectors makes it easier and less costly to control these complex organizations. This has stimulated the emergence of global players in many markets. On the other hand, the disadvantages of large conglomerates have also become evident. Lack of explicit market signals leads to inefficiencies in these large firms. Therefore, outsourcing has become a major recent strategy. As indicated by Fukuyama (1995), in economies where market partners trust each other and institutions are favourable, transaction costs may be low, thus implying an alternative way for organizing the production processes. This means, for example, that there is a growing share of firms that outsource transport and distribution functions. This is a relevant development in view of the sustainability of transport: specialized logistics firms are better equipped to achieve efficient transport performance in many cases. They are in a more flexible position to combine shipments, to find demand for return freight and to choose transport modes than are more integrated production-oriented firms that provide their own transport.

Another now wide development is the emergence of just-in-time production processes that has led to new arrangements between subcontractors and outsourcers, and a spatial reorientation of production activities. The introduction of just-in-time production leads to smaller stocks and more frequent deliveries. This may easily increase the environmental burden of freight transport as the warehouse function becomes part of the transport system.

Territories, Institutions and Transport

Formal institutions are an important part of institutional systems. Since governments of nation states have been major actors in creating formal institutions, institutions have some similarity across countries. Two trends can be observed in this respect. On the one hand, in many countries, sub-national regions have become more independent giving them broader scope to follow their own policies and formulate their own regulations. On the other hand, supra-national organizations are gaining power. In Europe, for example, this has led to a shift of emphasis in legislation, and thus institutional change, away from national governments and toward the Union.

The institutional and cultural differences between countries, however, are still pervasive. This leads to higher transaction costs for international transactions compared with domestic ones (Van Houtum, 1998). Thus, national borders generally have a negative or dampening impact on the intensity of spatial interaction, implying a bias towards domestic partners in transport and transactions. This favours short-distance transport patterns, which may be environmentally positive. The increasing importance of the European Union may be expected to lead to reduced border friction and thus to broader spatial interaction patterns (Rietveld, 2001). The resulting negative effect on the environment may be compensated, as stronger supra-national organizations will be better equipped to impose environmentally friendly transport policies. An example would be the introduction of a fuel tax for international aviation and shipping.

Comparing the USA and Europe, territorial differences are especially interesting because in Europe there are so many countries within the European transport network that additional costs for transport across borders is a historical legacy. One telling example is European air traffic control that is still organized based on

the territories of individual countries. This has huge consequences in terms of the costs, safety and capacity of the airways. Another clear example is freight transport by rail in Europe, where rail has a much smaller market share than in the USA. This has to do with the large discrepancies in technology used in the various countries (voltages, equipment, railway security systems, gauge). Another factor is that the influence of the national railway companies in Europe is still very strong, and entry barriers for international railway companies are high, both of which produce negative impacts on the quality and price of international freight railway services.

Equity Rules in Transport

Institutions have an important role in safeguarding equity and justice in societies. They also have immediate consequences for sustainability. Consider, for example, the following list of equity principles that may govern the behaviour of actors with respect to transport policies:

- An equity concept with considerable appeal is 'transport users should pay their way'. As indicated by Gomez-Ibanez (1997), this principle is usually interpreted in terms of average costs implying that the collective of all transport users exactly pays for the aggregate costs. For car users, this principle would imply that what they pay in terms of car-related taxes should be spent for their benefit in terms of maintenance and construction of roads, surveillance, etc. The sustainability dimension becomes relevant when environmental effects are also included as costs: transport users pay their way, including environmental and other external costs.
- Progressive taxes are preferred above regressive taxes. This rule follows from the well-known Dalton principle, which says that a transfer of somebody with a high income towards somebody with a low income (and that keeps the ranking of individuals according to income unchanged) improves equity. The income tax usually has a progressive structure with high-income earners paying a relatively large share of their income in the form of taxes. On the other hand, value added taxes are proportional to expenditures (as long as there is only one tariff). The incidence of specific taxes such as those on tobacco or petrol depends strongly on the consumption pattern of households. Those who drive little will not be affected, whereas those who drive much will be hurt. In some countries, there may be a tendency for increases in the fuel tax to be regressive because the expenditure share of low-income households is higher for transport and travel. Thus, sustainability oriented policies may have adverse distributional effects that may make them difficult to implement.
- The well-known polluter pays principle has both efficiency and equity implications. The efficiency element is that it incentivizes the polluter to reduce pollution to optimum. The equity element is that it is not the victim who pays, but the polluter: an alternative principle would be that the victim pays, which would mean that the victim compensates the polluter for measures to reduce pollution. The principle has gained wide acceptance in environmental policy. It is nevertheless important to realize that in many negotiations the right to produce external effects is considered a property right, and that the introduction of the principle leads to negotiations where polluters request compensation. For example, an increase in the tax on diesel fuel because of

environmental effects will probably lead to claims from transport companies for compensation in the form of tax reductions in other fields.

- All persons should have equal access to transport services. In this extreme form, the principle has little appeal. For example, people living near a hub airport by definition have higher access than do others. Another objection is that people have different needs, so that it does not make sense to aim at equal access. A more moderate principle is that 'all persons should have access above a certain minimum standard' or 'public transport must be affordable for all citizens'. The latter principle leads to public transport subsidies in many countries. However, the positive effect on income distribution is smaller than one often thinks because high-income recipients may also be intensive users of public transport. A second effect is that the subsidy may lead to excessive consumption, which is unfavourable from a sustainability viewpoint.

Regulations and Regulatory Regimes

Transport systems are complex and involve major roles for the public and private sectors, individual operators and travellers. It is not, therefore, surprising that there are vast, convoluted, and often ambiguous and contradictory regulatory systems that define how these systems and conveyances (vehicles, aeroplanes, ships) are constructed, maintained and used. Despite the great depth and breadth of regulatory systems, interest focuses more on gaining insight into the differences between the regulatory regimes found among the different countries of North America and Europe. There are important differences in these regimes, and if understood, they could be used fruitfully to inform policy and practice. At the same time, it is recognized that making such comparisons at such a high level of aggregation runs the risk of being somewhat artificial.

The discussions on regulatory reform have been rather silent on sustainability. Many countries are witnessing regulatory reform in transport implying more limited government involvement in public transport activities and a larger emphasis on competition. This is expected to lead to greater efficiency of public transport systems. The implications for environmental issues are less clear. They may be beneficial when regulatory reform would lead to increased vitality of transport modes that have positive environmental performance. However, the opposite may also be true, e.g. when deregulation in the aviation sector leads to an increased supply of services competition in terms of price and frequency.

Regulations and Institutions

Regulations may be classified as institutions because they are socially and politically defined rules that define and shape action and behaviour (North, 1990). They are either laws or official administrative orders that carry with them the threat of coercion or enforcement by a government body. They are thus formal institutions. Regulations like institutions vary considerably in nature, quantity and focus across organizations and for that matter across countries and even sub-regional parts of countries. For example, the more heavily market-oriented societies in the Anglo-Saxon tradition are less committed to regulatory approaches for managing complex systems like transport. This does not mean they shun regulations but rather that they leave more control up to market forces. Other countries in the Continental or Napoleonic tradition are more committed to government

intervention and, therefore, to a stronger regulatory approach. Lipset's (1990, 1996) view of American Exceptionalism offers an explanation in part for these differences. He sees the US's core values of individualism and anti-statism as evolving out of its frontier history and explaining why it is more market- and less regulatory oriented than most other countries.

Regulatory Regimes in Time and Space

The 20th century witnessed significant changes in regulatory regimes despite the fact that the USA has tended to be more market oriented while the Europe and Canada have been more inclined toward an interventionist approach. Despite this general difference in orientation, there have been periods where the regulatory commitment was similar. For example, as the Great Depression unfolded, all countries increasingly adopted interventionist and thus stronger regulatory approaches to economic management. Keynesian economic theory was a great legitimizing force for the increased government involvement in the macro economy on both sides of the Atlantic. However, during the last one-third of the century, national competitiveness issues loomed as the clear superiority of Japanese production systems were recognized through cross-country comparisons of productivity and Gross Domestic Product growth rates. Consequently, deregulation, liberalization and privatization became increasingly important.

The trend toward liberalization was signalled in Europe with the passing of the Transportation Act 1968 in the UK that deregulated trucking. Subsequently, airline and aviation policy was deregulated. The move to liberalize and privatize parts of the European transport system unfolded rather gradually over the next 30 years with, for example, the deregulation of airlines occurring in three phases. The third phase is now, after the turn of the millennium, being implemented.

In the USA, liberalization and deregulation began later, but once started, they unfolded very rapidly. The Aviation Deregulation Act of 1978 was perhaps the first major signal of the trend there toward a stronger market orientation. This was followed closely by the Staggers Act that was to liberalize the regulatory environment for railroads, bus deregulation and a movement to open skies agreements. This initial flurry of activity, all between 1978 and 1983, accelerated as the newly elected Reagan administration (1980) adopted as one of its first policy initiatives a strategy to outsource large parts of the federal enterprise to the private sector. In sum, Europe appears to have moved earlier toward a more liberalized approach but more slowly, while in the USA, a later start was punctuated by much more intense regulatory liberalization. The later start in the USA may have been because despite the early and mid-century trend toward a more interventionist approach in all countries, the USA remained more market oriented during this period and, thus, less prepared or sensitized to change.

Liberalization was also occurring in other countries including New Zealand, Canada and Chile where major efforts in deregulation occurred. Prominent and highly visible attempts to deregulate air transportation and its management occurred in New Zealand and Canada. Further efforts to privatize major parts of the national road system in New Zealand made headlines throughout the world and much of the transport system in Chile was liberalized and in some cases privatized. For example, urban transit in Santiago is extensively provided through a system of privately owned and operated, medium-sized buses called 'micros'. Yet, liberalization came much later to these countries.

A stronger market-oriented regime describes the regulatory dynamics of the last 30 years in the USA, Canada and Europe. Yet, by no means was the trend unidirectional. Throughout this period, environmental and safety issues grew immensely in importance and a strong interventionist approach dominated. For example, the Dutch National Environmental Policy Act of 1968, as well as the National Environmental Policy Act of 1972 in the USA, were followed every few years with new amendments designed to reduce the harmful effects of residuals from modern living, technology and production processes. A similar pattern unfolded in Continental Europe, but somewhat later. Further, a similar pattern has characterized policy and regulatory developments concerning transport safety issues.

The changing regulatory institutional setting has generally had a positive impact on efficiency in many economies, but it is less clear whether this also holds true for sustainability and equity issues. For example, Schipper (2001) shows that deregulation of aviation in Europe has had positive effects on welfare owing to decreases in prices and increases in frequencies. These positive welfare effects appear to dominate the negative effect of the environmental consequences, but the negative effect on sustainability is nevertheless serious. The importance of the long run aspects of environmental problems is therefore evident, and it is not clear how the interests of coming generations can be safeguarded without a stronger central government role.

Differences in Governance

The way governments operate has changed considerably during the recent past. Planning infrastructure, imposing taxes and giving subsidies to public transport firms have become activities where increasingly more actors try to determine the outcome. This has led to a decrease in the power of governments and change in governance style. Participation of multiple actors sanctioned or required by law in the policy preparation process has become standard in many countries. The range of stakeholders involved has widened. Public-private partnerships have become usual and regulation has been partly replaced by contract-type agreements between the government and sector organizations that have standing by law. These patterns seem to apply equally to North America and Europe.

As mentioned above, the more modest position of governments in transport and physical planning has been a reaction to a period of strong public sector involvement after the large economic crisis of the 1930s. At that time and thereafter, until recently, governments were assigned or assumed a large role in the development of national economies. The large failures of extreme government involvement in the Communist countries were not yet generally known or understood. However, the notion of the welfare state with strong and powerful central government collapsed after the economic crisis of the 1970s and has been replaced by an institutional setting where governments have a reduced role with mixed and not yet fully understood consequences for sustainability.

Kaufmann *et al.* (2002) provide some objective evidence that suggests modest differences at best between the two groups of countries tied to the Atlantic. Kaufmann *et al.* constructed governance indicators for about 175 countries based on a large data set measuring underlying variables (Table 2). They define governance as the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored

Table 2. Governance styles (scale about -2 to +2) for a selection of countries

	USA	UK	Germany	France
1. Voice and accountability	1.24	1.46	1.42	1.11
2. Political stability	1.18	1.10	1.21	1.04
3. Government effectiveness	1.58	1.77	1.67	1.24
4. Regulator quality	1.19	1.32	1.06	0.60
5. Rule of law	1.58	1.61	1.57	1.21
6. Control of corruption	1.45	1.86	1.38	1.15

Source: Kaufmann *et al.* (2002).

and replaced (Table 2, rows 1 and 2), the capacity of the government effectively to formulate and implement sound policies (rows 3 and 4) and the respect of citizens and the state for the institutions that govern economic and social interactions (rows 5 and 6). Kaufmann *et al.* emphasize that the governance measurement indices are subject to considerable error so that cross-country comparisons should be made with caution. The indices assume values between about -2 and +2. For the selection of countries presented here (USA, UK, Germany, France), high values are found. For most countries in other parts of the world, much lower scores are obtained. For the governance indicators measured here, there is not a major gap between the USA and Europe. Differences within Europe are more substantial. A tendency can be observed that France is rather different from the other countries, despite a similarly high score: it has the lowest score for each of the six indicators. Thus, in terms of the governance indicators used here, the differences between the USA and the larger European Union countries are modest. The conclusion is that it is not so easy to explain differences in transport policies between the USA and Europe based on general governance indicators like those used by Kaufmann *et al.* (2002). An explanation may be that the indicators used here generally concern democratic values according to which Europe and the USA are clearly similar. Issues related to views on the responsibilities of state and citizens, the right of the public sector to interfere with individuals, and the potential of the private sector to solve social problems are not addressed by these indicators. Research into this topic is sorely needed to provide greater insight into comparative differences in governance.

Liberalization and Regulation: Supra-national Organizations

Generally, it has been easier to deregulate (or, for that matter, to regulate) nationally versus internationally. Much of this stems from the fact that international organizations do not have the authority to sanction or enforce cross-national regulation. Cross-national organizations such as the World Trade Organization (WTO), the European Union, the North American Free Trade Association (NAFTA) or even the International Civil Aviation Organization (ICAO) require consensus decision-making, which, as is well known, takes a long time. Yet, as globalization unfolds, the transaction costs associated with extended decision and response times become increasingly strong barriers to achieving national and global competitiveness. One value of Sustainable Transport in Europe and Links and Liaisons with America (STELLA)/Sustainable Transport Analysis and Research (STAR)-type cross-national organizations is that they help people and agents in the

policy process to find out what is happening and thus enable better access to information and knowledge, and probably produce more efficient and better regulatory and deregulatory initiatives. It is clear that for achieving sustainability, international agreements are an essential element. However, the experiences with the Kyoto protocol make clear that these international agreements are hard to achieve.

At the same time that decisions of a regulatory nature are moving to higher levels, such as cross-national contexts, they are also devolving to sub-national levels as illustrated by the devolution experiments occurring in many European countries, e.g. autonomic regions. This trend, while much less important in the USA where the separation of powers has always provided a stage upon which regulatory issues could be decentralized, is nonetheless an emergent issue. For local environmental quality, devolution may be an important step, because the more visible aspects of environmental quality are relevant at the local level and this may make it easier to mobilize political support for measures such as traffic calming, restricted parking policies, pedestrian areas, robust land-use regulations, metropolitan public transport, etc.

Summary and Conclusions

Several generalizations and conclusions are offered. First, there has been a stronger market orientation in the USA. Second, it adopted liberalization policies later, but when it did so in the late 1970s, it occurred more broadly and rapidly. Third, places with a stronger Continental tradition have generally had greater problems deregulating and privatizing and have taken longer to move toward market-oriented outcomes, e.g. most of Europe, Canada and New Zealand. Fourth, authority for making regulatory decisions that traditionally belonged to the nation state is shifting upward to both a supra-national context and a sub-national regional level. For sustainability issues, this is probably a positive development.

Conclusions and Suggestions for Further Research

Institutions have important impacts on sustainable transport. Their role, however, is poorly understood because they are often implicit and invisible. International comparative research is an important way to improve one's understanding of the role of institutions. Several topics for future research have been identified in the paper.

- Role of institutions in technological change: due to institutional differences, technology adoption processes may be quite different across countries.
- Role of institutions in the formation and existence of multinational firms and their transportation impacts.
- Institutional barriers to well-functioning international transportation networks such as freight transport by rail.
- Impact of institutions on social equity that has large impacts on a variety of other issues such as public transport subsidies cost of infrastructure construction and acceptability of transport pricing policies.

Also for regulations, there are several research agenda issues and topics that derive from our discussion. First, given the dynamics of regulatory regimes

discussed above and the fact that much of the recent liberalization trend attempts to address the unintended consequences of regulations. There is also a need to investigate the question of from where regulations are derived. An improved understanding of the source of regulations both in terms of the perceived societal need and the process by which they are produced could contribute to a more efficient approach to managing the development and maintenance of regulatory regimes.

Second, this paper has defined institutions as social rule systems of which one formal type is regulations. As indicated in the second section, organizations are the entities that carry out what is implied by institutions. The interplay between organizations and institutions (regulations) should be examined systematically to gain better insight into how regulations are formed, maintained and transformed, and how this varies between North America and Europe.

Third, comparative analyses of regulatory regimes within specific transport modes and/or transport intensive industries could provide deeper insight into differences between Europe and North American countries. For example, a comparative study of the motor vehicle industry would yield interesting insight.

Fourth, regulations regarding taxation in support of transportation are quite different across countries and in particular across the Atlantic. An analysis of these differences could provide new insight into different regulatory regimes while at the same time examining specific social equity issues. For example, like children, the elderly are often viewed as dependents and receive advantages accordingly. This is an important general societal policy issue in all countries on both sides of the Atlantic because the portion of elderly is large and growing. Because of their dependency status, it has been taboo to question whether the elderly are paying enough of the transport bill. This is particularly important in the USA. because the income data suggest they could afford to pay more.

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