

**Innovation in Regional Planning:
The Evolution of Large Institutional Networks**

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Innovation in Regional Planning: The Evolution of Large Institutional Networks

Over the past century metropolitan areas have emerged as the dominant economic units in global society, especially in advanced nations (Sassen, 2001; Scott, 2001). Some investigators have even argued that the metropolitan area will become a key level of governance, supplanting national, regional/provincial/state, and local governments as the locus of economic and development decision-making (Altshuler, et al., 1999; Katz, 2000). That this is possible is becoming increasingly apparent as national and regional governments devolve functions and localities cooperate to solve inter-jurisdictional problems; and as regional identity supplants national identity in those places where historic place-based influences such as language and culture are reasserting themselves in the face of oppressive or restrictive national policy or global homogenization. In this context, metropolitan region government and governance assert increasing importance. Yet many national or regional constitutions do not authorize metropolitan government, which had led to the formation of self-made regional governance coalitions (Innes, et al., 1994). Nations that have established metropolitan region governments have done so recently, at least compared to the age of nations and municipalities. The effectiveness of metropolitan or regional government in those countries is mixed, at best (Putnam, 1993; Albrechts, et al., 2001).

The Current State of Metropolitan Planning and Decision Making Research

The multiple networks of organizations that govern metropolises typically specialize in governing infrastructure. These entities make investment decisions of great consequence, as infrastructure supports most activities that occur in urban regions. Infrastructure is vital to public health (Melosi 2000), the economy (Aschauer, 2000, World Bank, 2003), hazards management (Mileti, 1999; Burby, 1998), environmental protection (UNCHS, 2001), and urban development (Erie, 2000; Hall, 2002). Urban infrastructure service delivery is a basic activity of government, and the quality of its provision shapes, in large part, the nature and extent of metropolitan growth. Therefore, the effective management of infrastructure service provision is critical to a range of activities that are central to the life of urban regions. This is a question of regional governance, and more specifically, of large institutional networks.

These metropolitan institutional networks extend far beyond the geographic bounds of any particular region, and involve what we have come to call multiple scales or levels of government.

An important part of my argument centers precisely on the persistent notion of the distinction among and isolates scales or levels of government from one another. As it is evident that there are different levels, each with its own elected and appointed officials, budgets, and laws; it is easy to fathom why the notion of separation persists in practice and the academy, especially in North America. These constitutionally established separations among levels have prevented effective governance across scales, and these new networks have been the subject of much recent scholarship, which will be reviewed later in this article. Currently, there is more interaction, if not integration (as in Miami-Dade consolidated city-county government), among these scales. Without citing any specific data, I contend that these interactions are increasing, and will do so for the foreseeable future. For these reasons I believe that multi-scalar approaches to metropolitan region governance are vital, and far outweigh the preponderance of research that has focused on a single level, such as the metropolitan region. Large institutional networks are the emerging form of these multi-scalar interactions, and thus the focus of this article, which outlines some important considerations for research into metropolitan regional governance.

Regardless of the specific structures of metropolitan institutions, their ineffective decision-making has contributed to (or failed to resolve) numerous problems with a multiplicity of harmful consequences: traffic congestion, air pollution, flooding, water pollution, public illness, degraded security, lower economic output, and increased vulnerability to terrorism and natural hazards. Researchers and other analysts have located the source of these inadequacies in infrastructure governance institutions (Altshuler and Luberoff, 2003; Dowall and Whittington, 2003; Flyvberg, et al., 2003; Zimmerman and Cusker, 2001; Moss, Marvin, and Guy, 2001; Neuman and Whittington, 2000). Findings of inadequacy include fragmented and uncoordinated processes due to overlapping jurisdictions of governmental agencies and quasi-governmental authorities, districts, and utilities; financing for individual projects instead of entire networks; lack of institutions and plans for comprehensive management; and lack of metrics for measurement of performance. Existing studies of infrastructure planning and decision making practices have yielded important yet limited insights. Our limited understanding is correlated with the quality of research about metropolitan region planning. There is a significant body of such research, and exploring its contributions and limitations should lead to better research, and eventually better knowledge.

To date, nearly all institutional analyses of metropolitan regions have been individual or comparative case studies, starting with Selznick's classic study of the Tennessee Valley

Authority (Selznick, 1949). Individual case studies typically have limited applicability to the variety and complexity of metropolitan governance arrangements extant around the globe because they are exceptionally difficult to generalize. Comparative studies have been conducted using a single disciplinary lens, or focused on a single issue, such as transportation or air pollution. Many comparative studies have lacked a theoretical frame and/or prospective research design, limiting the transferability of their findings. Of the few prospective comparative regional government analyses, one concerned civil society, not institutional design (Putnam, 1993). Another considered the effect of institutional design on performance, but stopped short of a multidisciplinary analysis (Ostrom 1990). Savitch and Kantor (2002) analyzed urban growth by comparing metro regions in Europe and North America from a political economy vantage. As a consequence, there is a gap in our current knowledge about which factors are critical in designing and managing governance institutions for metropolitan regions. Thus we have identified the first two key factors for fruitful research, a prospective research design that is comparative, one that focuses on regional growth management institutions.

In addition, investigators have not previously measured the performance of metropolitan governance institutions regarding infrastructure using a multivariate and multidisciplinary approach. Most importantly, the potential relationship *between* the two domains, that is, the reciprocal link between institutional design and institutional performance, again, for metropolitan infrastructure governance, has not been critically evaluated. There is, therefore, a critical need to identify the underlying institutional factors that dictate effective decision-making and obtain desired performance in the metropolitan public policy arena.

An important long-term goal for research on regional planning should be to understand the effects of innovations in institutional design on institutional performance. Understanding these effects contributes to knowledge in two areas. One area is institutional theory, particularly institutional development and evolution as it pertains to institutional design. The other area is practical - how institutions develop strategies to improve metropolitan development, especially through the delivery of urban infrastructure. A distinctive characteristic of metropolitan infrastructure governance institutions, and regional planning institutions more generally, is the primary importance of place. The spatial dimension is critical because infrastructure is deployed in geographic space. In this sense, analyzing metropolitan infrastructure institutions differs from the analysis of Congress or state legislatures, for example, or health care or education, by the

addition of geographic variables (Harvey, 2001). Some political scientists and economic geographers (Hamilton, 2002; Agnew, 1987; Berry, 1991) and urban researchers (Carruthers and Gudmundur, 2002; Sassen, 2001; Healey, 1997; Bollens, 1997; Castells, 1989) have analyzed the spatial dimensions of institutional processes, yet few institutionalists have made place-based analyses central to their work in a systematic manner. Nor does their work extend to institutional design itself (save the work of Patsy Healey and her collaborators). This reveals a gulf for regional planning research to fill.

Innovation, Experience, and Regions - Balanced Measures for Research

As this special issue is titled Innovative Experiences in Regional Planning, let's take a careful look at the key qualifying term - innovative. What is innovation, and how do we recognize it? More importantly, why is innovation, or at least innovative experiences, an important research subject? Are we researchers limiting our horizon by focusing on innovation? Is proven experience and tradition not worth our intellectual energy? After all, institutions are permeated with history and traditions that endure across generations. To ignore this essential nature of institutions is to turn one's back to a main source of their power. Instead, we should ask what is the relation of innovation to institutions.

According to the Oxford English Dictionary, innovation comes from the Latin: *innovare*, to renew, alter, transform. This Latin word stems from *novare*, to make new. To innovate is not the same as to create, whose Latin root is *creāre*, to produce, make, and bring into being, "especially to produce where nothing was before". Innovate refers to making something new from an existing thing. Transformation is fundamental to innovation. In English, an early usage of innovate was to change a thing into something new. Current meanings include to introduce a novelty, and to make changes in something that is established. Innovators thus stand on the shoulders of giants, or at least predecessors. Change is an important part of the contemporary meaning of innovate. From the perspective of institutional research, to study innovation is to study change, or what many institutional researchers have called *reform*. While this should resonate with most institutional researchers, as change and flexibility are often cited as fundamental conditions for effective institutional performance, let us examine the proposition that innovation, in and of itself, is central to understanding regional planning and its institutions more closely.

Does innovation make something good? There is no need to elaborate on the statement that what may have seemed a good idea at one time, before it was tested, turned out to have disastrous consequences, like nuclear fission and DDT. This "Frankenstein effect" of technology run amok has a long tradition in the arts, the sciences, and society at large. The relentless pursuit of the new, perhaps solely because it is new, can produce a shock to the system and thus garner attention for the perpetrator. We could question whether this value that our societies confer on novelty and innovation for its own sake is overrated. In any event, human nature and social mechanisms have conspired to produce a dialectic between innovation and tradition, twin poles to the enantidroma of human history.

As tradition is weighed against innovation in the course of daily affairs, decisions turn on appropriateness to context, and to the problem to be solved. The twin criteria of appropriateness and problem solving can be applied to institutional design for regional planning. Institutional designers are precisely those who solve problems in a given context, whose resulting design has a purpose. Theirs are not abstract problems of logic, mathematics, or pure science. As innovation in the institutional context concerns transformation of existing patterns into something new, where does the inspiration for the new come from? Often it is imported from elsewhere. The transfer of institutional "technologies" is an area that has received scant attention by researchers, although it has been a field of interest among historians and economists for some time. A useful parallel for institutional technology transfer is in the work of historians of technology, particularly Thomas P. Hughes. His social construction of large technological systems model accounts for the social, economic, and institutional factors in the transfer of ideas from one context to another, and the transformation of scientific knowledge and inventions into technological networks that become imbedded in everyday life (Hughes, 2004, 1983; see also North, 1990 for an economic institution example).

Yet most accounts of institutional transformation analyze the internal conditions of the institution or the external forces that act on it. Examples of inside conditions necessary for reform include interactive double-loop learning, iteration and feedback, trust and cooperation, the creation and use of intellectual, social and political capital, and collaboration among a wide range of stakeholders (Argyris and Schön, 1978; Innes, et al., 1994; Healey, 1997; Fischer, 1999). Outside stimuli of change are too numerous to mention, yet generally fall into two

categories: responding to threats to identity, autonomy or function; or to opportunities for gain and improvement.

As a consequence of research that concentrates either in internal or external factors of institutional change, but rarely on both simultaneously, these and other accounts elide or are somewhat naïve about the sources of ideas that are drawn upon for the substance of change. What are these sources, and where do they come from? Research on institutional reform would benefit from an exploration of these and related questions. For example, has an imported idea been an asset or liability in its implementation in the new context over time? My own research into metropolitan and regional planning reveals that ideas imported from abroad and inserted into a new milieu in ways that are not culturally or institutionally responsive have had the reverse effect of retarding or hindering – rather than stimulating – the development of planning tools, processes, and organizations. They also have the concomitant effect of inhibiting the effective performance of local institutions (Neuman, 1996, 1998). These questions need careful consideration in order to evaluate the efficacy of the transfer of technology, broadly understood. Martin Heidegger's famous essay "The Question Concerning Technology" provides perhaps the best single treatment of the philosophical and theoretical ramifications of this issue, and Henri Lefebvre's book *The Production of Space* is the most salient in the realm of city building and planning (Heidegger, 1977; Lefebvre, 1991).

We can rely, in part, on the principle of appropriate technology to guide institutional innovation. Appropriate technology arose when "advanced" technologies of industrial nations were exported to so-called less developed nations and their impacts were not absorbed by the economy or society of the receiving nation, resulting in many negative or spillover consequences (Schumacher, 1973; McRobie, 1981). Yet to assume the contrapositive case, that institutions perform more effectively when they innovate based on local knowledge and practices, and not imported ones, has also led to the propagation of ill-suited planning methods such as zoning. Zoning is based on the idea of segregating land uses from one another, an anathema to the very idea of a city, which is to bring people and uses together. In the U. S., for example, most municipal planners contact their neighboring municipalities' planners for how to handle a new problem. They may go to other towns within their county, and less frequently to a well-known case within the same metro area. Rare is to search further afield. These different scenarios illustrate that there is not one rule that applies in all circumstances in deciding on the

appropriateness of the transfer of knowledge or technologies in the quest for institutional innovation. In the shadow of these limitations, let us turn to theory to supplement empirical evidence in the search for guidance for institutional innovation in regional planning.

Theoretical Propositions Framing Institutional Networks

Institutional theorists have tended to examine pieces of the puzzle rather than the entirety. Some theorists contend that structure (forms of organizational and interorganizational arrangements, rules) and agency (impacts of individuals' actions) are the most salient institutional characteristics (Gordon, 2003; Voigt and Engerer, 2002; Young, 1998; Goodin, 1996; Williamson, 1996; Giddens, 1984). Others find that history, culture, and norms play significant roles in institutions (Brenner, 2003; Lieberman, 2002; Sen, 1997; North, 1990). Doctrine, the systematic embodiment of norms and traditions in operational behaviors, is less studied (Kingdon, 1995; Faludi and van der Valk, 1994). Structure, agency, and doctrine are categories that can be adapted to organize the independent variables. Among institutional researchers using these variables, some have found that collaboration across networks elicits benefits such as increased legitimacy through democratic participation, increased equity, and increased cooperation (Agranoff, 2003; Agranoff and McGuire, 2003; Goodin, 2003; Innes and Booher, 2003; Hambleton, 2003; Vigar, Healey, et al. 2000).

Networks of collaboration also have their costs, including time, increased transaction costs, decreased stability, diffusion of authority, and erosion of accountability (Milward, 2000; Provan and Milward, 2001). Some have gone so far as to call the weak network forms of governance "the hollow state" (Milward, 1996). Common institutional reform strategies (restructuring, privatization, decentralization, coordination) have had limited effectiveness, primarily because they have addressed only one isolated element of the institutional field (structure, agency, or doctrine) (Verstegen and King, 1998; Burtless, 1996). For example, privatization may improve efficiency, but brings new inequities and externalities (Sclar, 2000). Measuring institutional performance has received growing attention (Jennings, et al., 2002; Boyne, et al., 2001; Agranoff and McGuire, 2001; Heinrich and Lynn 2000a, 2000b; Innes and Booher, 1999). Most have tested results of institutional innovation for single agencies or single levels of government (Lowry, 2003; Ruhil and Teske, 2003; Chisholm, 2002; Heinrich, 2002; Wang, 2002), or limited

function networks that provide a single service (Kelly and Swindell, 2002; Provan and Milward, 2001; Heinrich and Lynn, 2000a).

In an effort to operationalize these theoretical parameters in a more concrete historical basis, we will consider models of government, which can be broadly classified as autocratic and centralized or pluralist and networked. In autocratic governments, humans devise government in order to marshal power to serve collective interests such as welfare and security, which they otherwise cannot secure for themselves when acting alone. In pluralist models, humans organize collectively through various social contracts in order to guarantee collective goods and safeguard rights such as liberty and equality. For centuries these models have been studied primarily as they relate to nation-states and municipalities. Less attention has been paid to urban regions - a recent intermediary.

Studies that have addressed metropolitan governance from an institutional perspective have done so by testing one or two parameters at a time. Research on *restructuring* (the redesign of structures, processes, missions, products, and/or services), for example, often has tested its effect on decision-making rather than performance (Albrechts, Healey, and Kunzmann, 2003; Gualini, 2001; Keating, 1998; LeGalès and Lequesne, 1998). Research on *coordination* (among organizations through networks of collaboration, and multi-sector partnerships) has also tested its effects on decision-making and local democratic participation rather than performance (Drabek, 2003; Hambleton, et al., 2002; Dijst, et al., 2002; Fubini, 2003; Katz, 2000). *Privatization* (shifting responsibility from the public to the private sector) research has tested its effects on performance, and found mixed results: some efficiency gains, some efficiency losses, and increased cleavages among sectors and levels of government (Keating, 2002; World Bank, 2002). *Decentralization* (from higher to lower levels of government) studies have also found mixed results: some efficiency gains, some efficiency losses, increased equity (Newman and Herrschel, 2002; UNCHS, 2001; Besley and Coate, 1999; Humplick and Estache, 1995). *Agency* has been a source of innovation, but has not been systematically and comparatively measured in terms of outcomes (Altshuler and Luberoff 2003; Simmie, 2002; Albrechts, 1999). *Doctrine*, such as coordination of spatial policy and institutions via planning, has been analyzed for decision-making, and not performance (Gualini, 2004; Healey, et al., 2003; Healey, 2002; Faludi and van der Valk, 1994; see also North, 1997). Some collected volumes of original research has, taken together, analyzed several parameters of institutional design (Salet, et al., 2003; Graham

and Marvin, 2001; Salet and Faludi, 2000; Faludi, 2002). Willem Salet has conducted cross-disciplinary theoretical research on strategic spatial planning, finding that cross-sectoral spatial linkages established through comprehensive infrastructure planning were institutional innovations that enhanced political legitimacy and functional effectiveness (Salet and Faludi, 2000). In another series of comparative studies on metropolitan and regional planning in Europe, Salet found that four different institutional models governed infrastructure planning, each with different impacts on multilevel governance relationships (Salet, Thornley and Kreukels, 2003). Yet no researchers, to our knowledge, have performed a prospective study comparing the performance effectiveness of the six *italicized* parameters listed above for institutions of metropolitan infrastructure governance.

Furthermore, infrastructure governance performance has not been "assessed on the basis of multiple measures chosen to reflect community objectives" (NRC, 1995, 3). To the National Research Council's call for assessing "three broad categories of measures: effectiveness, reliability and cost" we add two more measures: social equity and security (NRC, 1995, 3). Also, to our knowledge, existing research on infrastructure institutions has been conducted on individual systems such as transportation (Neumann and Markow, 2004) and not on multiple networks comprehensively, studying their interconnected effects and impacts on the metropolis, as a land use planner would. This characteristic concern "with programs and projects within a single mode [of infrastructure] has led critics to cite this [institutional] structure as an obstacle to improved performance of the nation's infrastructure ... because it deters effective thinking about the interactions and tradeoffs among the various modes" (NRC, 1995, 2; see also NSF, 2002; OTA, 1995). Some investigators have theorized or analyzed multiple performance measures that provide useful models for empirical research (Carmona, 2003; Wong, 2003; Hendrick, 2003; Adyer, et al., 2003; Young, 2002; Bovens, et al., 2001). An emerging literature on measuring governance performance uses advanced multivariate statistical techniques could be extraordinarily useful in guiding research methods (Gissendanner, 2003; Heinrich, forthcoming, 2002, Sellars, 2002; Lynn, Heinrich and Hill, 2001). These promising lines of inquiry still have not addressed metro infrastructure institutions, a situation noted over 15 years ago (National Council on Public Works (1988).

How tradition-bound institutions have incorporated new ideas and technologies, such as homeland security, disaster preparedness, sustainability, life cycle planning, performance

management, and the spatial dimension of policy - all pertinent to infrastructure - is an indicator of flexibility and adaptability (Altshuler and Luberoff 2003; Albrechts, et al., 2001). A collaborative and interdisciplinary research design could make cross-continental comparisons in areas where one continent has an advantage due to more experience. In Europe, for example, responses to terrorism and spatial policy have been operative for decades, while in the U.S. disaster planning has a longer history. My own research along with a decade of practice experience has found that infrastructure decision-making occurs in complex networks that are patched together over time. Institutional networks for planning in a single metropolitan area involve dozens, and up to hundreds of organizations and interest groups. In addition, the availability of financing delimits what infrastructure is “needed”, rather than social demands specifying need. This fragmentary approach, common in the U.S., has been a direct outcome of the bias of infrastructure decision-making toward individual *projects* rather than entire *networks* (Neuman and Whittington, 2000). In European cities such as Madrid, a coordinated regional approach has resulted in effective strategies and outcomes (Neuman, 1996).

Intense political competition for infrastructure investment capital among agencies is the inevitable product of project-based planning and financing. In the absence of a plan, policy makers get involved in negotiations over individual infrastructure projects instead of far-sighted leadership and oversight. Some regard this as the *realpolitik* of infrastructure management. However we believe this is a *détente* that has led to inefficient and inequitable decision-making, and is the result of a stasis in the design of US infrastructure institutions. In a few cases, however, institutionally embedded collaborative processes have resulted in horizontal and vertical policy integration using a comprehensive plan (Neuman, 1999). In this type of institutional setting, an image embodying norms and doctrine was found to be an important integrating device (Neuman, 1998, 1995).

A Model Research Design for Regional Planning Institutions

The overall *objective for a model research project* is to test the relative extent to which autocratic and centralized or pluralist and networked variants of common institutional reform strategies (restructuring, coordination, privatization, and decentralization) have been more effective means for metropolitan governance institutions to plan and deliver infrastructure services. Autocratic and pluralist conceptions of institutions differ in that autocratic models

value the accumulation and projection of power by a single entity; pluralist models value the distribution of power through cooperation and consensus. Each model (autocratic / pluralist) has its characteristic structures (hierarchy / networks), agency processes (sequential / directive and iterative / interactive), and doctrine (control / consent).

This hypothetical research would study metropolitan infrastructure planning and financing in a number of comparable city regions in different nations and continents to assess their performance in delivering transportation, water, sewerage, and drainage services through metropolitan governance networks. Infrastructure is chosen because it is the most common and arguably the most influential growth and development shaper at the metro scale, and due to the involvement of most if not all levels of government in its planning and financing. We indicate water *and* transportation because of their pervasiveness, importance, and the critical interactions between them (e.g. roads and drainage affect flooding, aquifer recharge, wetland viability, and pollution due to combined sewer overflows). These well-known problems persist because metropolitan governance is often fragmented into issue specific (functional) organizations rather than into comprehensive ones. Performance, as used herein, refers to measurable changes to institutional structures, processes, and doctrine; as well as external outcomes of institutional actions. Following a *general hypothesis* - that institutional design significantly affects overall institutional performance – the *central hypothesis* would be that a metropolitan governance institution of mixed design, an autocratic structure with pluralist agency and doctrine, will more efficiently, effectively, and equitably deliver public infrastructure.

The *rationale* for such research is both practical and theoretical. First, regarding infrastructure decision dynamics, once we gain a better understanding of the effects of institutional design on performance, then lawmakers and other institutional designers/reformers will be better able to develop strategies to improve urban infrastructure provision. Improved infrastructure delivery has been shown to save billions of dollars in capital and operating costs in a large metropolis, improve the environment and the economy, provide more equitable access to infrastructure services (Burchell, 2002, 1992). Second, we expect it will contribute to theory by answering the question of whether an autocratic (single power), pluralist (distributed power), or mixed model is a more effective institutional design for obtaining better performance in terms of delivery of public infrastructure. We also seek to answer corollary questions of institutional evolution, design, and public policy: As societies continue to transform toward liberal

democracies, is a partial institutional design or reform such as decentralization or privatization alone sufficient to accomplish public policy reform (Bellah, et al. 1991)? Is an established civic culture alone sufficient to achieve progressive change and effective governance performance (Putnam 1993, 2000)? To what extent can an idea (strong democracy, sustainability, life-cycle infrastructure planning) motivate decision-making (Barber, 1984; United Nations, 1987; New Jersey State Planning Commission, 1992; Ostrom, et. al., 1993)? Can institutional evolution be guided to support emergent learning networks that successfully adapt to technical and social change, or resist their pathologies (Ostrom, 1990; Neuman 1999; Elster, 1998)?

The central hypothesis could be tested by the following specific objectives and hypotheses:

Objective #1 Identify and evaluate variations in the structures, agency, and doctrines of the institutions responsible for transportation, water, sewerage, and drainage infrastructure planning, budgeting, financing, operations, and maintenance in 1970 and 2000.

Hypothesis #1a If institutional structures and processes (forms and rules) are easier to change than their doctrines (based on norms and traditions), then institutional leaders choose structural reform because they can manage it and show (at least administrative) results. That is, they make the easier choice to show that they acted decisively, independent of the performance outcomes of those decisions.

Hypothesis #1b If changing the institutional doctrines such as privatization and decentralization is shown or perceived to be equally or more effective in performing its mission as changing structures or processes, then leaders will choose to reform doctrine as well as structures.

Hypothesis #1c Pluralist governance is correlated with more looped and iterative (less linear) path dependence and greater organizational and social learning, whereas autocratic governance is correlated with linear path dependence and less organizational and social learning.

Objective #2 Identify and evaluate variations in the performance of transportation, water, sewerage, and drainage infrastructure in terms of effectiveness and efficiency, using accepted professional standards for levels of service as measures of effectiveness, and operating costs per unit of service delivery as measures of efficiency.

Hypothesis #2 Pluralist metropolitan governance structures are correlated with greater transaction costs, higher levels of service, larger variations in service, and decreased conflict; whereas autocratic metropolitan governance structures are correlated with lower transaction costs, lower levels of service, smaller variations in service, and increased conflict.

Objective #3 Identify and evaluate variations in the equitable delivery of and access to transportation, water, sewerage, and drainage infrastructure.

Hypothesis #3 Pluralist metropolitan governance structures are correlated with greater social equity responsiveness; whereas autocratic metropolitan governance structures are correlated with less social equity.

This research would be innovative if it engaged a collaborative and interdisciplinary research team, if its prospective research design would evaluate a substantial number of metropolitan governance institutions in different countries and continents, if it would correlate multiple dimensions of institutional design with multiple dimensions of institutional performance, and if it would establish benchmarks to measure social equity as an institutional outcome. The expected result would be to *establish evidence-based causal links between institutional design and institutional performance for metropolitan infrastructure institutions.*

Thus, based on the anticipated research findings, researchers might be able to identify and assess common and unique factors of both failure and success in order to construct a Decision Effectiveness Matrix applicable to metropolitan governance institutions in a range of institutions and sociopolitical settings. Its *significance* is that the expected results support the identification of strategies to improve practices of metropolitan planning, governing, and infrastructure decision-making.

The prospective research design would measure changes in the case study metro areas over a thirty-year period, which will enable us to test for longitudinal variation within each case, in addition to comparing variations across the cases. 1970 is chosen because it marks an approximate before/after division of collaborative planning and management practices of metropolitan infrastructure institutions, and corresponding changes to the world economy and its spatial implications, especially for metropolises. Three institutional design dimensions -

structure, agency, and doctrine – would constitute the independent variables. Institutional performance - the effectiveness, efficiency, and equity of an institution in realizing its prescribed mission – would be the dependent variable. Selected cultural, political, economic, and social factors would be selected as intervening variables.

Independent Variables – Institutional Design

The three principal categories of independent variables (structure, agency, doctrine) can be either autocratic and centralized or pluralist and networked, in general terms.

- Institutional structures: continuum from hierarchy to network(s)
- Institutional structures: centralized or decentralized
- Institutional structures: private sector, public sector, or partnership
- Institutional structures: general purpose or special purpose
- Institutional structures: constitutional mandate for metropolitan governance: yes or no, if yes, voluntary or mandatory
- institutional agency: continuum from linear-directive to iterative-interactive
- institutional agency: continuum from collaborative to coercive
- institutional agency: continuum from innovative to traditional
- institutional doctrine: continuum from control to consent
- institutional doctrine: continuum from long range planning to short range project ethos
- institutional doctrine: an image that conveys the mission of the institution? Yes or no

Dependent Variables – Institutional Performance

Three principal dependent variables can be used to measure institutional performance and outcomes: 1) effectiveness, 2) efficiency, and 3) equity, in general terms. These variables can be evaluated using two categories of evidence: the first is documentary evidence (adopted plans, policies, strategies, programs), and the second is observational evidence (observing meetings and practices, stakeholder interviews). Specific items to be measured include:

- 1) Level of infrastructure service delivery: continuum from high to low
- 1) Degree of security in the face of terrorism and disasters: continuum from low to high
- 1) Responsiveness to change: continuum from high to low
- 1) Success in implementing plans: continuum from low to high

- 1 & 2) Degree of interagency conflict: continuum from high to low
- 2) Transaction costs for policy making and coordination: continuum from high to low
- 2) Operating costs per unit of service delivery, variable units in accordance with accepted professional standards
- 2) Planning and decision making practices: continuum from coordinated to fragmented
- 3) Equality of access by socioeconomic class, race, and gender: continuum from low to high
- 3) Externalities considered in planning: yes or no, if yes, what is scope and degree?
- 3) Political legitimacy and transparency of processes: open-democratic or closed-autocratic

Intervening Variables

- culture: patriarchal or egalitarian
- culture: cooperative or competitive
- political economy: welfare state or market
- political system: liberal democracy or social democracy
- historical: urban and metropolitan institutional history and contingencies

The intervening variables are considered as they affect institutional design only. All metropolitan and regional planning institutions make decisions under uncertainty. For them, dynamic economic, fiscal, and political conditions are an ever-present fact of life. As the hypothetical research would analyze a thirty-year period, each metro area will have undergone one or more economic and political cycles over that time. Thus the intervening variables are meant to measure the possible effects of *types* of economic, political, and cultural institutions; and not instantaneous conditions in any metropolis.

Figure 1, Institutional Design and Performance Matrix, arrays two (of three) independent variables along the vertical axis, and two (of three) dependent variables along the horizontal axis. This matrix identifies the main groupings of variables and merely suggests the principal relationships to be investigated. To help test the relation between institutional design and performance, the research would assess the degree to which an institution incorporates innovation in the face of change. Thus, the research would assess innovation in each of the tripartite independent variables of structure, process, and doctrine. It would also test the extent to which changes in structures, agency, and doctrine have an impact on the metropolitan

planning institution's ability to manage metropolitan outcomes. The measures of metropolitan outcomes include the actual decisions made about infrastructure investments and policies. Through this multi-dimensional research design, the project would evaluate the extent to which changes in the structure, agency, or doctrine, or changes made in combination, are more effective institutional design strategies to manage innovation and extract effective performance.

Benefits to society at large

Good infrastructure management ensures the reliable provision of the basic services that an urban population needs to live. Infrastructure breakdowns and failures can bring whole regions to a standstill, a fact that has become more apparent as terrorist attacks on cities typically target infrastructure. Evaluating infrastructure management across continents, nations, and territories provides crucial knowledge for infrastructure providers of all types. Learning how and why management innovations produce effective outcomes such as greater service efficiency and improved social access to excluded groups is expected to be invaluable knowledge as infrastructure providers seek cost-effective and sustainable solutions under fiscal conditions that are increasingly tight. Therefore, this type of research can be anticipated to have broad policy impacts.

