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Tokaido Megalopolis: lessons from a shrinking mega-conurbation

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ABSTRACT

This paper examines the challenges posed by giant polycentric city-regions from the perspective of an analysis of the Tokaido Megalopolis, the first case of this urban scale in Asia. Many of the issues faced by today's mega-conurbations were identified in Tokaido 60 years ago, but at a very different moment in world history, and with different interpretations of major challenges and possible policy responses. The paper makes four main points: first is that timing is important in urban development, particularly in relation to prevailing ideas and norms about planning. Second, even if complexity means that to an important extent mega-conurbations are self-organizing systems, they are still shaped by planning institutions both at the large scale with major infrastructure, and at smaller scales through regulation. Third, the institutions and rules structuring land development are profoundly important politically, economically, and in structuring long-run spatial and social equity outcomes, including distribution of the costs and benefits of urbanization. Finally, the emergence of any particular mega-conurbation is likely to be a once-only affair, and contingent patterns and processes of development will have long-term consequences for the urbanism achieved, and for the urban societies produced. These have important planning implications.

KEYWORDS

Mega-conurbation; planning institutions; developmental state; urban property system; shrinking population; megaregion

Debates about large-scale urbanization have seen a recent resurgence, with divergent interpretations of their significance and implications. This paper contributes to these debates from the perspective of the case of Japan, which is surprisingly absent from recent discussions which have focused primarily on the U.S., Europe, and China. The 'Tokaido Megalopolis' region was identified and celebrated in the 1960s, shortly after Jean Gottmann framed the northeast seaboard of the U.S. as a new form and scale of the urban and called it 'megalopolis', and Gottmann was a major player in debates about Tokaido. Today Tokaido has in aggregate ceased to grow and is shrinking in most places, so the compete process of megalopolitan growth can be studied. The case of Tokaido supports the identification of mega-conurbations as a significant challenge for urban theory and policy, while also making clear that this is not a new challenge, as the peak growth of Tokaido was a half-century ago. Many of the key urban issues faced by today's mega-conurbations were also identified in Tokaido fifty years ago, but at a very different moment in world history, and analysis of the Japanese experience is revealing.

There is a contested, and ever-growing list of terms used to describe large polycentric urban regions formed by the growing together of two or more city-regions: conurbation, megalopolis, polycentric mega-city region, extended metropolitan regions, megaregion, and many others. Harrison and Hoyler (2015) argue that the increasingly political use of the term 'megaregion' means that it is increasingly likely to become a chaotic concept: misleading, misinterpreted, and misused. Attempting to avoid such problems, I use two terms in this paper: 'Tokaido Megalopolis'¹ was the term universally used in Japan beginning in the 1960s to describe the polycentric urban region

from Tokyo to Osaka. And all the papers in this special section refer to the phenomenon of very large, polycentric urban regions as ‘mega-conurbation’ to indicate an orders-of-magnitude increase in scale of the phenomenon Geddes (1915) originally identified in England as ‘conurbation,’ the growing together of formerly distinct city-regions.

Debates about the meaning of large scale urbanization have a long history, but became particularly prominent at the beginning of the twentieth century as a result of rapid and chaotic urban growth during the nineteenth century. Geddes (1915) initiated modern usage of the term megalopolis, using it to indicate an undesirable scale and stage of urban growth. Mumford (1940) adopted and extended Geddes’ idea of stages of human development and urbanization, arguing that megalopolis represented a scale of urban growth which marked the beginning of a decline leading to alienation, dysfunction, and ultimately to ‘necropolis’ or the decay and death of the city and civilization itself. This provocative and influential analysis was central to Mumford’s effort to convince planners and policy makers to develop regional planning approaches designed to plan and limit the growth of large city-regions (Meller 1993). As discussed in detail below, the French regional geographer Jean Gottmann (1957, 1961) presented a much more positive analysis of the reality and future prospects of the urbanized northeastern seaboard of the US which he called megalopolis (Baigent 2004), directly contradicting Mumford’s interpretation, and it was Gottmann’s approach that found fertile ground in Japan (Hanes 1993; Hebbert 1994).

Recent decades have seen a renewed focus on issues of large-scale, polycentric metropolitan regions, their economic and social significance, and how to plan them (Hall 1997; McGee and Robinson 1995; Scott 2001; Sorensen and Okata 2011). An important contribution was inspired by advocacy to create transnational spatial planning capacities for the European Union (Faludi 2018; Faludi and Waterhout 2002; Jensen and Richardson 2001), that in turn inspired research projects designed to analyse the extent and nature of functional integration in, and planning potential of emerging polycentric urban regions in Europe (Halbert, Convery, and Thierstein 2006; Hall and Pain 2006; Hoyler, Kloosterman, and Sokol 2008).²

In the U.S. the identification of an emerging ‘megaregion’ scale is linked with advocacy for planning efforts to enhance economic competitiveness and sustainability in a globalizing world, in which the US is seen as falling behind, and envious comparisons with Europe are explicit (Florida, Gulden, and Miellander 2008; Lang and Dhavale 2005; Lang and Nelson 2007; Regional Plan Association 2006; Ross 2009). Documents such as the Regional Plan Association ‘2050 Plan’ (2006) which identifies 11 US megaregions, are primarily arguments for increased strategic planning capacity and investment particularly in high-speed rail, and can be read as a kind of strategic regional boosterism (Wachsmuth 2015). Others are skeptical that promoting megaregion growth and integration is likely to contribute to more sustainable futures in the U.S., because of likely increases in private vehicle travel (Wheeler 2009). China has also been prominent in recent debates because of the unprecedented scale of mega-conurbation currently emerging, and the very different approaches to planning evident there (Wu 2015; Xu and Yeh 2011).

Healey argued that identifying and mapping regions can be understood as attempts at ‘summoning up’ or creating consciousness of a place as deserving of attention (Healey 2007). Planners have often attempted to create consciousness of functional regions, to highlight regional scale issues such as infrastructure investment, sustainable water and airshed management, and protecting green infrastructure, for example. But as Harrison and Hoyler argue, there are many different regionalization projects, and global interest in megaregions is highly uneven. As they put it,

“we urgently need more systematic examination of who is determining how megaregionalism is constructed politically, why – and specifically, in whose interests – megaregionalism is being mobilized, and how actors seek to defend and enhance their essential interests through megaregionalism” (2015, 19).

The Japanese case supports the idea that contests over the political construction of megaregions are important, but with the advantage that these battles are long past, and we can examine the outcomes.

This case points powerfully to several major issues that are less salient in the current cases of Europe, the U.S., and China. First, timing is important in the development and planning of mega-conurbations, particularly in relation to prevailing ideas and norms of planning practice. In the 1960s belief in planning was still strong, the Japanese developmental state was booming, massive social housing projects and new towns were still breaking ground, and neoliberalism was yet unknown. Political battles were not about whether to plan, but about where to invest, and who would benefit. Global capital flows, building technologies, and infrastructure finance and governance institutions are very different today than they were in the 1960s, providing very different conditions for growth.

Second, even though Friedmann (this issue) is clearly correct in arguing that scale and complexity mean that to an important extent mega-conurbations are self-organizing systems, that does not mean that they cannot be or are not planned both at the large scale with major infrastructure, and at smaller scales through regulations, taxes, and norms. While major infrastructure investments are almost always the subject of visible political battles, the usually less visible but equally important struggles are those over the deeper rules of engagement of urbanization: development control regulations, building standards, municipal boundaries, organization and finance, water supply, housing policy and infrastructure investments. While in the U.S. and Western Europe these are often taken for granted, the longer perspective of the Japanese case makes clear that these institutions are often 'in play' in the political economy of urbanization, and in practice are highly variable, playing a major role in differentiating outcomes between places. Processes of urbanization themselves can propel transformative change of urban institutions, as occurred in Japan, and one focus of research should be on how this plays out in different jurisdictions.

Third, is that it seems likely that in many mega-conurbations capitalist land development can be powerfully self-reinforcing, in the sense that those gaining profits from land development during periods of growth gain resources for further development and increased political influence (see papers by Labbé, Harms, and Shatkin in this issue). Property development and public and private capital investment in mega-conurbations is a major component of GDP, fuels economic growth, and conversion from rural to urban land drives asset accumulation, and creates huge numbers of jobs. The Tokaido case helps us to pose questions about the distribution of the capital gains, assets and costs produced by urbanization, which appears to vary greatly between cases.

Finally, in 1960s Japan it was expected that rapid growth would continue indefinitely, but not only has Japanese economic growth virtually halted since the early 1990s, population has also started to decline. In the recent 2015 census it was reported that from 2010 to 2015 the total Japanese population had declined from 128.06 million to 127.09 million. The population of Tokaido area, which grew in population from 40,195,675 (48% of the national total) in 1950 to 79,990,733 in 2010 (62%), had dropped to 77,788,086 (61%) in 2015.³ The Tokyo metropolitan area continued to grow slightly by about 330,000, particularly in central Tokyo, but this was offset by significant losses in the outer reaches of the Tokyo centred region, and the Nagoya and Osaka areas. It is projected that Japanese population will have declined by 30 million by 2050 to about 98 million so soon everywhere in Tokaido will be seeing significant population loss. The case of Tokaido makes clear that the emergence of megalopolis does not necessarily lead to the sort of civilizational decline that Mumford predicted, as Tokaido thrived during much of the last 60 years. Nor has the end of population growth translated into economic decline for Tokaido or Japan, even though growth slowed dramatically after the burst of the bubble economy in 1990, as discussed below. It is too soon to say how population loss will affect the economy, and the relationship is not simple. It is clear, however, that the end of population growth does mark a major turning point, as population loss has led to mass housing vacancy, land abandonment, and de-urbanization, and has contributed to much slower economic growth of recent decades.

Similar projections of imminent demographic decline are made for Korea and Taiwan, as well as China, whose total population is projected to peak soon after 2025. Birth rates around the world are dropping fast, and global urbanization is projected to largely completed before the end of the century

(UNDESA 2014). The ^{twenty-first} century will therefore represent the endgame of urbanization, and the current period of rapid urbanization should be understood as a distinct and time-limited phase of human evolution. Tokaido suggests that emergence of any particular mega-conurbation is likely to be a contingent and once-only affair, with enormous long-term consequences, which suggests the importance of the choices that are made, and of planning to the extent possible.

The paper is divided into three sections, first is an analysis of research on Tokaido by observers during the period of rapid growth, that corresponds roughly to recent debates about megaurbanization elsewhere. The second section takes a retrospective look at the challenges of growth, planning, and governance of Tokaido with the benefit of the last 40 years of research. The conclusions develop the main insights suggested by this analysis of an early developing mega-conurbation.

1. Contemporary perspectives on Tokaido

The Tokaido Megalopolis is the core region of Japan, along the Pacific coast of the main island of Honshu, stretching from Tokyo in the east to Osaka in the west. Tokaido was the name of the feudal era highway running east along the Pacific coast linking the old imperial capital of Kyoto with the Shogun's capital Edo (now Tokyo), which was the actual seat of power after 1600. This area has therefore long been the main political and economic centre of Japan, but industrialization and modernization in the twentieth century saw a dramatic concentration of population and industry here. New modes of transportation and communications, especially railways, telegraph and telephone, were first developed here, and state-led heavy industrial development was also focused in this area before WW2. But it is during the post-war 'rapid growth' period that the Tokaido region achieved its current dominant position in the Japanese space economy. A combination of huge investment in industrial plant and infrastructure, and a massive rural to urban migration to Tokaido from all other parts of Japan dramatically reinforced the scale and centrality of this region.

Gottmann's (1957, 1961) seminal work *Megalopolis: The Urbanized Northeastern Seaboard of the United States* was a major turning point in conceptions of large-scale urbanization. Published first as a short paper in *Economic Geography* (1957), and four years later as a massive tome of 810 pages, *Megalopolis* (1961) was ground-breaking in its conceptualization of the region between Boston and Washington as a single, integrated, and polynuclear urban region, even though there remained extensive non-urban areas throughout. Until this point the dominant image of giant cities was of metropolitan regions composed of a central city surrounded by suburbs and hinterlands.

Gottmann identified significant urban problems associated with this new scale of urbanization, including traffic congestion, emerging slums, water supply, and fragmented local governance that was inadequate to manage the larger scale problems then emerging. But he argued against Mumford's alarmist interpretation, suggesting that

"What is happening in Megalopolis today has been described as a pathological phenomenon, a sickness, a cancer (...) Urban growth in general has been discussed and condemned on moral grounds for a long time. Such debate is expectable and desirable, but on the whole history has shown the condemnation to be unjust" (Gottmann 1961, 13).

He argued that while there were problems in Megalopolis, 'the population is on the average healthier, the consumption of goods higher, and the opportunity for advancement greater than in any other region of comparable extent' (Gottmann 1961, 16). In Gottmann's view Megalopolis was a prototype of the future of urban civilization, 'Megalopolis stands indeed at the threshold of a new way of life, and upon solution of its problems will rest civilization's ability to survive' (Gottmann 1961, 16). Megalopolis was thus a vast laboratory in which new patterns of mega-urbanisation were being tested.

This positive evaluation was appealing to Japanese observers of the Tokaido megalopolis, and Gottmann was invited repeatedly to Japan to contribute to debates there (Hanes 1993; Hebbert 1994). Gottmann's ideas excited intense interest in Japan, perhaps more, even, than in the US,

and a significant literature on the Tokaido megalopolis quickly emerged, (Doi 1968; Gottmann 1980; Isomura 1969; Nagashima 1967, 1968, 1981). The Tokaido megalopolis was similar to its US cousin, but was bigger, denser, and growing faster. By 1965 the core area of Tokaido from Tokyo to Osaka (without hypothesized extensions) and was home to 50 millions, half the population of Japan (Nagashima 1967, 12). And while the population density of the US Megalopolis was 2.7 per hectare, the average density in Tokaido was 14 per hectare (1,400/square km) in 1965 (Doi 1968, 97).

A significant focus of early research was on descriptions of processes and patterns of growth (Nagashima 1967; 1968; Doi 1968), on attempts to define, measure and map the extent of megalopolis consistently (Doi 1968; Tonuma 1970), and on the connectivity offered by emerging transportation and communications networks and technologies: bullet trains, telephones, expressways, etc. (Gottmann et al. 1968; Nagashima 1967; Tonuma 1970). The bullet train, in particular, dramatically reduced travel time from Tokyo to Osaka from eight hours by express train to three hours when it opened for regular service in 1964 as the world's first high-speed train (Hanes 1993; Yamamoto, 1993). A key feature identified in Tokaido was the polycentric linking together of specialized urban centres, with government and finance in Tokyo, heavy industry and manufacturing in Nagoya, trading and manufacturing in Osaka, high end cultural production and high-tech ceramics in Kyoto

Figure 1. Analysis of negative externalities was prominent, not just because of rapid and chaotic urbanization, but also because Japan was experiencing a steadily worsening environmental crisis, equivalent to that occurring in China today. As Nagashima put it, echoing Gottmann's 'main street' metaphor for the role of megalopolis in national life:

"The 'main street' of the nation, the focus of wealth, authority, and education, is also the focus of contemporary problems of large cities everywhere: of congestion; of air pollution, commuters, and traffic jams." ... "not only is the air of megalopolis polluted with automobile exhaust and factory fumes, but the rivers are filled with industrial waste products. The environment of megalopolis is noisy and ugly. Its settlements are expanding haphazardly, spoiling the landscape and obliterating man's contacts with nature" (Nagashima 1967, 13).

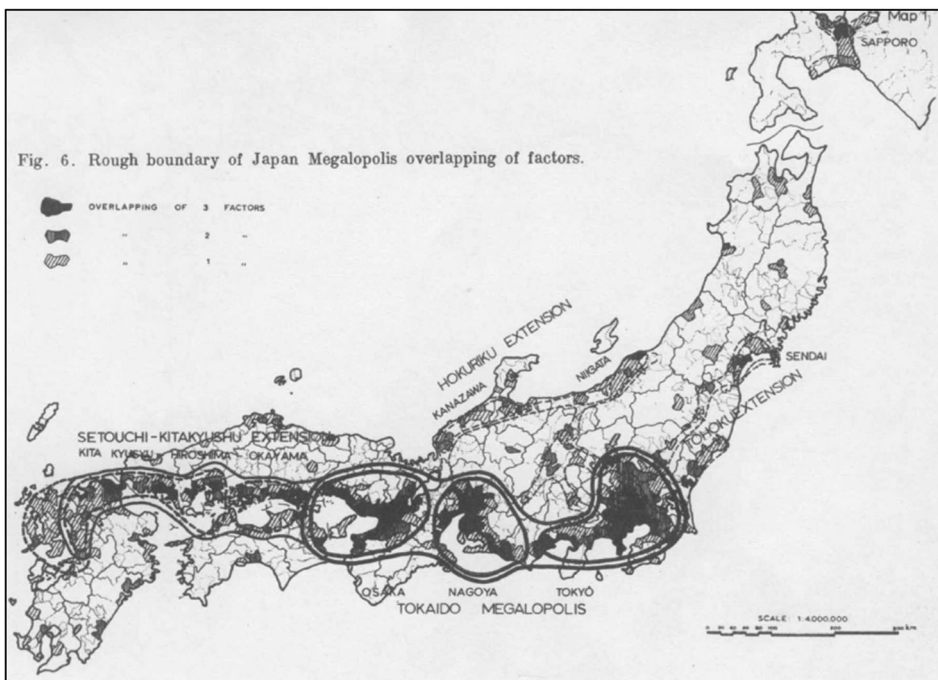


Figure 1. Mapping Tokaido Megalopolis, 1968. Source: Doi (1968).

Yet in many quarters there was also supreme confidence that the challenges of megalopolitan growth could be managed, and that growth could be shaped to new, more rational patterns. The 1960s were the heyday of Japanese ‘developmental state’ planning, with massive state investments in infrastructure, industrial land development, industrial water supply, electricity generation, and public housing (Glickman 1979; Johnson 1982; Mosk 2001; Sorensen 2002). Infrastructure investment was key, but also important was the concentration of power in an activist central state that took planning seriously. Even though in theory the prefectures and municipal governments had been granted more autonomy by the postwar occupation reforms, central government still had decisive leverage over both levels of local government through close control over finances, secondment of key personnel, direct central authority over ‘delegated functions’ including city planning, and through regional branch offices of key ministries such as the Ministry of Construction (for details, see Hein and Pelletier 2006; Sorensen 2006).

The national government had significant planning tools including the Comprehensive National Development Plan Act (CNDP)(1950) used to produce a series of comprehensive plans for the overall development of the national territory. These were indicative guides to large-scale development patterns, rather than detailed plans, but quickly became contentious, as politicians from peripheral regions blamed the concentration of investment in Tokaido for the massive migration towards the core and population decline in the regions. This initiated a long-running and fractious debate over regional policy, with sharply divergent visions of national and regional development (Steffensen 1996). In response the first CNDP of 1962 proposed a set of fifteen ‘New Industrial Cities’ throughout the country, but in practice, key aspects of the CNDP were simply disregarded, and most public and private investment continued to be in the Tokaido area. It was only after the third CNDP of 1977 that political pressure from peripheral areas was successful in shifting a significant share of public investment out of the core metropolitan areas (Calder 1988; Glickman 1979). But this was short lived, as in the 1980s the rise of neoliberal ideas, a politically resurgent conservative Liberal Democratic Party (LDP), and growing concern for the international competitiveness of Japan’s global city, Tokyo, led to a renewed focus in the fourth CNDP of 1987 on investment in the core metropolitan regions, especially Tokyo (Sorensen 2003; Waley 2007). Urban region planning was led by the Ministry of Construction in annual updates to infrastructure plans for each metropolitan area, with a focus on transportation systems, water supply, and river engineering. The fact that planning was led by central government ministries with large and rapidly growing budgets meant that local government fragmentation was less of an obstacle to integrated planning for city-regions [Figure 2](#).

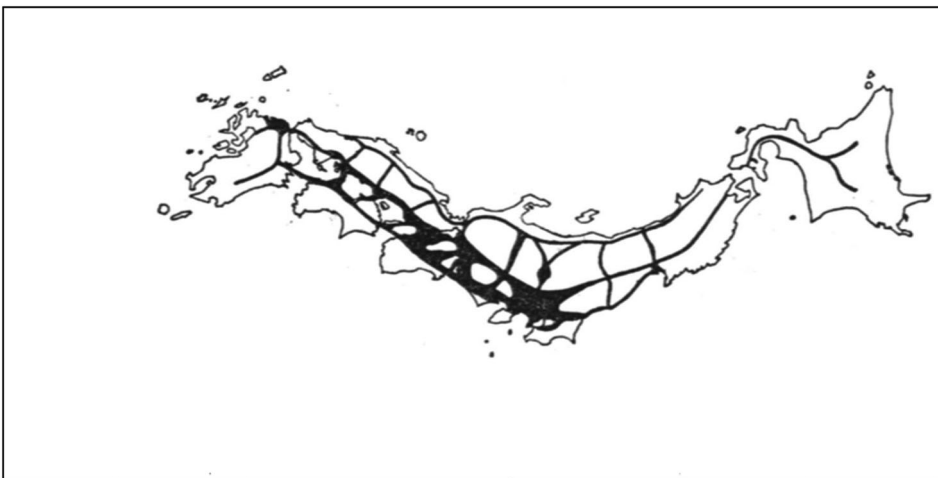


Figure 2. Tange’s Megalopolis concept. Source: Tange, in (Gottmann et al. 1968).

But the boldest planning ideas were not those of the government. A prominent example was the work of the ‘Metabolist’ group of architects and Kenzo Tange. Following the release of the Metabolist Manifesto in 1960, and of Tange’s radical 1961 Plan for Tokyo that proposed to reorganize Tokyo into a linear city that projected across Tokyo Bay (Tange 1961), Tange went on to extend this concept to a growth plan for the whole of Japan, that proposed a giant axis of development centred on Tokaido (see Figure 2) (Lin 2007; Pernice 2007). This is more a diagram than a plan, as it was neither backed up by data, nor took serious account of geography, but it is typical of much of the work of the Metabolists, who deliberately ignored inconvenient details such as land ownership and financial viability in designing megastructure urban futures. And it was based on then widely accepted projections that rapid economic growth would continue indefinitely, a prospect later dismissed as both logically and ecologically impossible (Glickman 1979).

More influential was a contribution by the prominent politician, Kakuei Tanaka, whose (ghost-written) *Building a New Japan; A Plan for Remodeling the Japanese Archipelago* (Tanaka 1972) was published in 1972 in both Japanese and English just before Tanaka assumed the role of Prime Minister. Tanaka’s proposal echoed Tange’s with plans to develop a bullet train network throughout the archipelago, and to link all the main islands with multiple bridges, in an attempt to spread investment away from the Tokaido area. Tanaka was, not incidentally, a regional politician with a base in a mountainous district north of Tokyo that subsequently received its own bullet train line. Tanaka’s plan and its impacts are discussed further below. The point here is that there was no shortage of bold thinking and planning for the Tokaido Megalopolis, which was widely seen as a heroic product of miracle economic growth and the effective forward-looking developmental state planning apparatus that had rebuilt Japan, phoenix-like, from the ashes of WW2. During the whole of the rapid economic growth period, a highly centralized system of planning continued.

2. Tokaido megalopolis in retrospect

From the perspective of 2018, the rapid growth period and the emerging Tokaido Megalopolis look very different. Even until the 1990s the heroic story of ‘miracle economic growth’ led by an activist Developmental State was a credible and coherent (although not unchallenged even at the time) tale of strong planning, centralized government, industrial policy, and a sophisticated elite bureaucracy/conservative party/big business alliance (Johnson 1982; Vogel 1979). But that story has unsurprisingly been revealed by much subsequent research to be just one aspect of a far more complex picture. The next section briefly reviews four key aspects of Tokaido megalopolitan development that gain importance in retrospect: a better understanding and more critical analysis of the developmental state; the impacts of the environmental crisis, the intersection of land policy and economic growth; and long-run patterns of demographic decline.

2.1. The developmental state

We now know much more about what is now commonly referred to as the ‘developmental state’ set of governance institutions than did observers during the 1960s, as a result of a significant amount of social science research on Japanese and East Asian economic growth in the post-war period. The seminal work on the developmental state was Chalmers Johnson’s ‘MITI and the Japanese Miracle: the Growth of Industrial Policy, 1925–1975’ (Johnson 1982). Johnson attributed Japan’s distinctive economic development institutions to the emergence during the 1930s of a nationalist and authoritarian governance system which was oriented primarily to the mobilization of national resources behind the war effort. He showed that the system of industrial policy that emerged in this period continued and actually grew stronger during the postwar rapid growth period of the 1950s and 60s. He argued both that the bureaucracy was instrumental in facilitating rapid economic growth, and that a number of features of the Japanese political system had served to ‘insulate’ the bureaucracy

from democratic and particularist pressures that might have undermined the technocratic approach to fostering economic growth.

Johnson's argument was controversial both for the idea that a state bureaucracy could successfully intervene in markets, and for the suggestion that Japan's political system allowed the state bureaucracy to take its own direction relatively independent of democratic processes. On the first point many economists argued that the explanation for Japanese economic growth lay not in state-led industrial policy but in other macroeconomic factors (including the cold war, large underemployed rural labour reserves, technological catch-up, high savings rates, etc.), and that state intervention may even have been a drag on the economy (Adams and Ichimura 1983; Komiya 1990; Patrick and Rosovsky 1976). Others countered that the state clearly played a central and positive role in fostering growth (Gao 1997; Pempel 1982; Vogel 1979; Zysman 1983). There is no value in taking sides here on this rather polarized debate about the impacts of the state in economic development in East Asia. All agree that the state did intervene massively through infrastructure investment, industrial water and electricity supply, and coastal landfill and inland land assembly for industrial complexes (Glickman 1979; Mosk 2001; Murata and Ota 1980).

With regard to the second point, with a little more historical distance it is possible to go beyond the simple dichotomy of developmental state versus democratic society that characterized much of the debate. On the one side are those who emphasize the 'developmental state' interpretation of Japanese governance characterized by: a highly centralized government structure and weak local governments; a weak influence of electoral politics on government policy formation, planning, drafting of legislation and administration, which is instead entrusted to a relatively autonomous bureaucracy that is insulated from political and particularist pressures; the prioritization of economic growth to the detriment of other goals; and a reliance on economic success as the primary basis of state legitimacy (Cumings 1987; Gao 1997; Johnson 1982; Woo-Cumings 1999). 'Insulation' from politics allowed a focus on efficiency rather than political influence on policies.

In this interpretation, bureaucratic leverage over the financial system is a key element of state power (Johnson 1982; Woo-Cumings 1999). For example Woo-Cumings shows that this was accomplished primarily by MITI's controls over foreign currency, and by encouraging 'overlending' to finance industrial growth. Banks could lend far higher amounts than their capital base could justify, and beyond the normal collateral limits of their clients.

Contesting this interpretation of Japanese governance are a number of scholars who sought to challenge Johnson's 'insulated' developmental state model. Instead of a technocratic central government bureaucracy, they argue, Japanese governance has been highly politicized, with decision-making mediated by processes of bargaining and distribution structured by the long-ruling Liberal Democratic Party (LDP) (Calder 1988; Muramatsu 1993; Muramatsu and Krauss 1987; Ramseyer and Rosenbluth 1993; Richardson 1997). In an influential analysis, Calder (1988) outlined a model in which the LDP maintained power by tending to the needs and demands of its core clientele of supporters, particularly during recurring periods of electoral crisis in which its majority in the Diet was threatened. Aided by the ever-increasing resources available to the state as a result of the booming economy, the LDP was able to expand its base by incorporating new groups into its 'circles of compensation.' Calder argues that it was primarily in ministries such as MITI that bureaucrats enjoyed relative autonomy in policymaking, as there was only a small budget and few opportunities for pork-barrel spending. In the big spending ministries such as Construction, Health and Welfare, and Agriculture, politicians ensured a vast flow of government funds to key LDP support groups such as farmers through huge subsidies for rice growers, and to peripheral regions in the form of infrastructure. A significant percentage of funds distributed in this way routinely flowed into LDP coffers (Calder 1988; McCormack 1996; Woodall 1992).

Yet both interpretations may be correct. As Allinson suggests, while the bureaucracy-dominant position is most useful in explaining the rapid growth period, the pluralist position is more applicable to the post-1970 period, and neither are adequate to explain the changes that occurred during the whole postwar period (Allinson 1993, 124). The position taken here is that during the rapid

economic growth period of the late 1950s and 1960s, when the LDP enjoyed overwhelming electoral dominance at the national and local government levels, the developmental state model captures adequately major features of Japanese governance. From the late 1960s, with the growing electoral threat of opposition parties, spreading environmental crisis, and the increasing size of the urban middle class, the LDP needed to work harder to maintain its majority, and a greater degree of pluralism and democratic input into policy priorities is seen, as well as a huge growth in government spending targeted to shoring up the LDP political base. A major outcome was the politicization of infrastructure spending and land regulations, and a long-run shift of investment from an overwhelming focus on the Tokaido region during the rapid growth period towards increased spending in peripheral areas from the 1970s (Glickman 1979). This flow of infrastructure funds to the periphery became a central feature of the political economy of the 'construction state' from the 1980s (Woodall 1996).

The essential feature of the Japanese developmental state apparatus was that central government ministries developed a set of policy tools that allowed a much higher level of engagement with private sector actors and coordination of private investment than is typical of the Anglo-American model of capitalism. This was not a command and control system such as in the Soviet Union, and in many regards the direct influence of government was rather limited and declined over time, but the degree of information sharing, establishment of government sanctioned cartels to manage market share, 'administrative guidance' of industrial investment decisions, low tax rates for businesses, public infrastructure investments to encourage land development, and low interest rates for capital financing of industry created a distinctive variety of capitalism (Hall and Soskice 2001; Tsuru 1993) that had important long-term impacts, discussed next.

2.2. Environmental crisis

In retrospect, one of the single most important shifts in governance of the megalopolis was that caused by the environmental crisis, and the emergence of vigorous environmental movements that demanded change. As is well known, rapid expansion of population and industry in highly concentrated areas, with little pollution regulation and less enforcement produced a devastating environmental crisis during the 1960s, in which hundreds died, and thousands were crippled (Broadbent 1998; Huddle, Reich, and Stiskin 1975; Ui 1992). Environmental movements grew throughout the 1960s, and by the early 1970s their allies in socialist/communist alliances were in control of the prefectural governorships and most mayoralties in all the core metropolitan areas (Krauss and Simcock 1980; McKean 1981). Success in the 'big four' pollution cases at the Supreme Court in 1970 tipped mainstream public opinion heavily in favour of the environmental activists, and a real fear of losing their majority in the national parliament forced the conservative LDP to pass a set of strict pollution control laws in 1972, as well as to endorse a significant decentralization of planning authority to prefectural and municipal governments (Sorensen 2002).

It is important that the environmental crisis contributed directly to a political crisis for the ruling party, as it is hard to imagine this decisive shift of policy without a democratic political system that allowed environmental movements and their progressive allies to pose a real threat to the continued dominance of the LDP at the national level. The political/bureaucratic/business coalition of the rapid growth period was permanently weakened even though the LDP was able to regain a stable majority in the election of 1980. This allowed a sharp turn to the right and a partial reversal of many of the urban policies of the 1970s, but the new environmental regulations continued, and were effective in dramatically reducing urban environmental pollution (Fujita and Hill 2007; Okata and Murayama 2010).

It is also clear in retrospect that although local government planning powers were still considerably weaker than in most other developed countries, the revised City Planning Law of 1968, and its transfer of significant planning responsibility to municipal governments was a major critical juncture in the development of a stronger, more effective planning system (Sorensen 2011). The revision of 1968 was the first major revision of the 1919 planning law, and it introduced a number of new

features, such as urban growth boundaries and development permits. A related reform produced the District Plan system passed in 1980, that contributed important tools for detailed planning of small areas which helped the emerging local environmental and community development (*machizukuri*) movements (Okata 1994; Sorensen and Funck 2007).

2.3. Land policy and the bubble economy

The corruption of the developmental state from the 1970s is nowhere more clear than in approaches to land policy, infrastructure, and urban planning. Tanaka's 'Building a New Japan' plan – written while he was the Minister responsible for MITI, but published just before he became Prime Minister in 1972 – proposed to remodel and decentralize Japan through nationwide infrastructure building (Tanaka 1972). This plan, which included a network of expressways and a nation-wide bullet train system was important, as it sparked a real estate boom, with land price inflation particularly intense in places he proposed to build new high-speed rail lines and new industrial developments. Then the oil price shock of 1973 plunged Japan into a sharp recession in 1973-74. This crisis of land price inflation and disastrous property value crash and national recession inspired the government to become much more active in land policy, creating the National Land Agency and a complex set of new land laws regulating land prices to deter speculation (Kirwan 1987; Sorensen 2002). Central was the creation of a system of land price monitoring throughout the country, with powers to cancel land transactions that exceeded reasonable levels of inflation to prevent speculation. Even during the extraordinary inflation of the 1980s bubble economy, however, there were no cases where this power was actually exercised. After the crash of the bubble, the land price monitoring system was used to engineer a very gradual decrease of official land values (on which collateral evaluations were based) to prevent bank failures and development industry bankruptcies during the 1990s, but also preventing a quick resolution of bad debts and reset of the banking system (Wood 1992; Woodall 1992).

During the 1970s the developmental state apparatus was increasingly turned towards land and urban development, not primarily to ensure quality urbanization, but to protect and enhance land asset values, and create opportunities for land development profits (Samuels 1983). The 'circles of compensation' described by Calder were formed around increasingly vast amounts of public investment in infrastructure that created property investment opportunities. The ruling LDP was linked with massive corruption in state construction projects, and kickbacks in land development schemes. There is no doubt that failures of land policy, both of commission and of omission, were a major contributor to the disaster of the Bubble economy of the late 1980s, and its crash in the early 1990s (Anchordoguy 1992; Haley and Yamamura 1992; Woodall 1996; Yamamura 1992).

In retrospect it is clear that with the end of rapid growth in the 1970s the developmental state institutions of collaboration and information sharing were subtly transformed and adapted to create a collusive and ultimately destructive linkage between state infrastructure development projects, land development, land values, financial institutions, and politicians, in what effectively became a giant ponzi scheme in the bubble of the late 1980s. The enormous increases in land value associated with economic growth and the development of the Tokaido megalopolis contributed to a transformation of the developmental state into a 'construction state' in which land and property development represented an increasingly large share of all economic activity, and a major focus of investment and asset accumulation. The collapse of the bubble after 1990 proved this to be a misallocation of investment, and the destruction of trillions of yen in assets crippled Japanese financial industries and was a primary factor in the last quarter-century of recession in Japan.

Increases in land values associated with the growth of Tokaido also had important distributional impacts. During the postwar occupation a radical land reform had redistributed farmland from landlords to millions of tenants, producing a highly fragmented and widely distributed land ownership pattern in which the average farm size was only half a hectare (Dore 1959). As Hanayama (1986) showed in great detail, even in the rapidly growing metropolitan areas farmers were able to hold

on to their land long after it was ripe for development, aided by preferential property tax rates on farmland, and weak development controls which meant that they could sell parcel by tiny parcel for urban uses without providing infrastructure. As a result, urbanization produced widely distributed property value increases throughout the core areas of Japan, and to a lesser extent and later, also in peripheral regions, and farmers and rural landowners gained a significant share of the asset value increases produced by urbanization. Because land assembly was so difficult and expensive, government support for industrial location focused primarily on organizing and subsidizing shoreline landfill, and Land Readjustment projects were widely used to consolidate and develop suburban sites while leaving most ownership in the hands of the participating farmers (Sorensen 1999, 2000). Land inflation generated huge capital gains for big business, which was tax sheltered and used as bank collateral and in many cases for overseas investments (Woodall 1996).

Notwithstanding the land boom and bust of the 1970s, a land myth developed that urban assets would always increase in value, helping to fuel the land bubble of the 1980s in which buyers borrowed heavily to buy properties, worried that if they didn't they would miss their chance. Whereas until the 1980s middle-class families had been able to participate in rising values by buying their own home, the 1980s boom and 1990 bust of the property market destroyed the land myth, and land values are still far lower than their 1989 peak today with steady and dramatic declines in value for over 15 years after the bust. Apart from the firms that went bankrupt because they had borrowed too heavily, the biggest losers were a broad section of the middle class that had invested their savings in housing that lost much of its value in the bust. Today, steadily declining populations in suburban areas have weakened resale markets for housing, and vacant and abandoned housing has reached crisis proportions in all but the core areas of the megalopolis.

Gains in land values fuelled growth during the rapid growth period combined with widely distributed land assets contributed to a wide participation in asset growth, and losses in value since 1989 have both undercut the economy and financial system and contributed to greater inequality.

3. Conclusions

The major challenge and opportunity of Tokaido as a case-study of Asian mega-conurbation is that the timing is so different than the other cases discussed in this special section, with peak urbanization occurring under different economic, political, and international conditions than prevail globally today. Urbanization is long complete and the region as a whole is now shrinking in population, providing a different perspective on these phenomena.

Planning is supported by a complex bundle of ideas about the public interest, the legitimacy of state intervention in property markets and regulations that limit private property rights, the relative importance of economic and social investment, and ideas of good and bad patterns of growth, and these have all changed greatly over the last 50 years in Japan, as elsewhere. The kind of planning and infrastructure building that seems appropriate, achievable, and can be financed evolves over time, varies by jurisdiction, and can have important impacts on the forms, processes, and social impacts of urbanization.

One distinctive characteristic of Tokaido was the huge confidence with which planners confronted the challenges of growth. This was the peak of faith in rational comprehensive planning, new towns were still being planned and built, and interventionist urban planning had yet to be challenged by evidence of 'great planning disasters' such as urban renewal, inner-city collapse, and suburban sprawl, or by small-government neoliberalism and the populist rejection of expert advice. Nothing seemed beyond the capacities of comprehensive planning and infrastructure building, and the Japanese were leaders in national-level planning with their Comprehensive National Development Plans, metropolitan region plans, and vast infrastructure investments (Alterman 2001; Glickman 1979; Mosk 2001). In the mega-conurbations emerging today planners and governments are much more circumspect about the likelihood of success of major interventions in urbanization processes, and tend to have less power and smaller budgets (China is a major exception). Instead, the

initiative has passed to the private sector, which has different sets of incentives, and arguably less concern for the big picture, longer term outcomes, or social justice implications.

Attempts to direct patterns of growth at the metropolitan scale require a degree of confidence that planning of development would be better than doing nothing at all, and that planning goals are achievable. The great confidence in the ability of governments to plan and intervene successfully in Japan was directly related to the success of post-war reconstruction and rapid economic growth in which the state was widely believed to be a key (and mostly effective) actor. And curiously, it may also be related to much more limited ambitions over the detailed control of land development (at least compared to northern Europe and North America), as in Japan most smaller scale development was relatively unregulated apart from building codes. Little attempt was made, for example, to regulate land-use or limit land development, and suburban land could be developed without sewer connections or developer contributions to local public goods such as streets and parks which were a major achievement of planning in the other developed countries (Sorensen 2001). Instead, Japanese planning interventions focused on investments in major infrastructure such as ports, dams, river engineering, and road and rail transportation infrastructure.

Timing of mega-urbanization is important, as dominant ideas about the role and potential of planning and governance, about appropriate infrastructure investments, management and finance arrangements, and currently dominant technologies (for transportation, communications, waste management, etc.) change greatly over time, and leave long-lasting legacies.

This leads directly to a second suggestion about the role of planning in mega-conurbation growth. The Tokaido case suggests that it is entirely possible to shape the overall structure of the mega-conurbation by planning the essential large-scale transportation systems of ports, airports, roads and rails. And although costs may increase with scale, there is no shortage of examples of heroic scaling up of infrastructures such as water supply to ever-larger catchment areas, as in the case of New York City over the last three hundred years (Gandy 2002). At smaller scales building codes, development charges, and a variety of smaller-scale plans and regulations seem adequate to support the creation of good urban environments, if that is a goal.⁴ So while it may be impossible to plan many aspects of the development and growth of a mega-conurbation, such growth is still shaped by planning institutions and plans. I agree with Friedmann (this issue p. XX) when he suggests:

“every mega-conurbation constitutes a self-organizing spatial system, which means that it comes into being without an overall plan but as the result of the mutual adaptations among a myriad actors without a central organization. It can therefore be viewed as an *emergent property* of the urban. No single actor within such a system has a comprehensive knowledge of the system’s actual state or its ongoing transformative processes.”

But that does not mean that there are no rules. Quite apart from the large-scale infrastructure projects that shape major patterns of development, the institutions that daily structure millions of mutual adaptations are important even without a central organization. Self-organizing urban systems are always organized according to specific sets of historically and politically mediated sets of institutions (property laws, financial system, housing regulations, land-use regulations, infrastructure finance and maintenance systems, local government systems, among others) that co-evolve over time, and are quite different in each jurisdiction. A primary focus of analysis of mega-conurbation planning and growth patterns must therefore be on those institutions, how they change and evolve, how they vary between jurisdictions, and how they shape processes of urban development and change (Sorensen 2015).

A major question for analysts of mega-conurbation governance is, therefore, how do processes of mega-conurbation growth impact trajectories of institutional change, and when do such changes prompt critical junctures of institutional innovation or transformation? In Japan the environmental crisis of the 1960s prompted mass mobilization of concerned and sometimes desperate citizens, and vigorous environmental movements were key actors in changing the priorities of government towards addressing some negative externalities and creating new planning tools that later enabled citizen-led ‘machizukuri’ community development movements to flourish.

The emergence of mega-conurbations seems certain in most cases to create major environmental, social, and governance challenges. Further research is needed on the processes that translate such pressures into institutional change, or not, in different cases, and on the kinds of changes that are produced in different cases. This suggests that it will be valuable to extend Harrison and Hoyler's provocative questions cited above, and ask in each case how processes of megaurbanization contribute to the transformation of governance institutions, which institutional changes proceed, and which don't. Which actors and projects benefit and gain influence from processes associated with megaurbanization, and which are disadvantaged?

The third point is that the vast expansion of urban area that characterizes the emergence of mega-conurbations today in Asia provides an enormous boost to economic growth and capital accumulation during the expansion phase, because of the huge profits associated with the conversion of rural to urban land. Even without direct capital investment there is significant asset inflation experienced in the knitting together of these vast regions, as speculative capital buys land farther and farther from the urban cores. The hope that some form of urban development may materialize fuels inflated property values throughout the region, even if only a small share of those properties will ever actually be developed. The Tokaido case helps us to ask: To what extent do different groups participate in land value increases due to urbanization? What share is captured by land and property developers? What segments of the population are able to own their own housing, and does it represent a stable asset? To what extent are governments able to capture some of this increase in value to create improved urban environments? Is it common for rapid expansion of urban assets to become a powerfully corrupting force that reshapes the political economy, as happened during the 1970s and 80s in Japan?

The process of urban growth creates a series of powerful positive feedback effects that fuel asset accumulation, and in historical experience, have very often resulted in periodic overshoot and crash. This has also often been associated with the creation of much greater amounts of urban property than is actually needed, and the creation of enormous largely fictitious assets that crumble in market value when the larger growth dynamic halts, for whatever reason. This is what happened to Japan with the collapse of the bubble economy from 1990, which crippled the world's second largest economy (at the time of the crash) for the next quarter century. Is there a role for the state in planning to limit such boom-bust dynamics? This seems much more challenging than simply designing and building major infrastructure systems to enable growth.

A fourth and final observation follows from the fact that the Tokaido Megalopolis is now experiencing demographic decline and that this is already impacting the economy and land development processes. It is reasonable to predict that in most mega-conurbations the period of intense growth and emergence will only ever happen once. There will certainly be urban land development and redevelopment in future, but the processes specific to mega-conurbation emergence – growth from a collection of separate city-regions of 1-10 million into an integrated mega-conurbation of 20-100 million or more – will only ever happen once for any given region. This fact is fundamental to any understanding of the significance of this phenomenon, and suggests that the particular timing, governance institutions, and contingent choices of planning and infrastructure building will in each case have profound long-term consequences, because many durable patterns are created during urbanization, and processes of change are likely to slow as rates of growth decrease. Given current projections of a global urbanization rate of about 75% by 2060 (UNDESA 2014), and with most parts of the world expected to be fully urbanized by the end of the century, the emergence of mega-conurbations is also part of the final stage of global urbanization.

This process of mega-urbanization will therefore only ever happen once in human history (even if it may be a while before the process is completed in India and Africa), and it will only happen in a limited number of places. The distinct and contingent processes that happen in any given mega-conurbation will have huge long-term consequences for the urbanism achieved, and for the societies that emerge from these processes of growth. This suggests an urgency to better understanding of these processes and their consequences, and of the potential for planning to contribute to avoiding the

worst outcomes, and fostering positive aspects. The likelihood that peak population will soon be followed by significant population loss also suggests that careful thought be given to urban form and infrastructure capacity, and that the potential of temporary or flexible urban forms and structures that can be easily and usefully eliminated or redeveloped after the peak is past be carefully assessed.

Finally, it seems clear that the Japanese experience, and Tokaido in particular as the first Asian mega-conurbation to mature and also to pass its peak population, has many potential lessons for others that reach this stage.

Notes

1. Japanese planners and academics enthusiastically adopted Gottman's term megalopolis. In Japanese 'Tokaido Megalopolis' (東海道メガロポリス) combined the three Japanese characters to/kai/do (East/Sea/Road), and phonetic katakana script to directly transliterate 'megaropolisu'.
2. A major component of this research was the POLYNET project led by Peter Hall and Kathy Pain (Hall and Pain 2006), with the policy implications published in the special issue of the journal *Built Environment* (Halbert, Convery, and Thierstein 2006), and theoretical and methodological papers published in a special issue of *Regional Studies* (Hoyler, Kloosterman, and Sokol 2008).
3. Tokaido in this count is the area including the 16 prefectures along the Pacific coast from Tokyo to Osaka: Tokyo, Kanagawa, Chiba, Saitama, Ibaraki, Tochigi, Gunma, Shizuoka, Aichi, Gifu, Mie, Shiga, Nara, Kyoto, Osaka, Hyogo. This corresponds closely to the area indicated by Doi (1968) in his mapping of the region. Source: 2015 Population Census of Japan <https://www.e-stat.go.jp>
4. It is possible that one major exception to this rule is the creation of regional scale park systems. While local parks can always be inserted into the urban fabric after urbanization, large-scale parks are likely to be prohibitively expensive at that point, and the best locations will usually be occupied by high value uses. As William Whyte (1968) argued, the best time to create regional park systems is before urban development, and in most places the logical location is river floodplains, which should in any case be protected for long-run water quality and flood protection, and can be the basis of connected park systems and trails throughout urban regions. In Tokaido, mountains and a few large rivers provided the only large-scale breaks in what is otherwise continuous development of all relatively level land.

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