

Infrastructure, the shipping container, and the globalization of American space

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ABSTRACT:

The shipping container is one of the primary agents of globalization. An object that gains importance through its role in infrastructure, the container's success is due to its ability to work in preexisting national transportation systems, within the identity and space of the nation-state. But in the process those systems are globalized, as the infrastructure that once functioned at the national scale, serving the priorities of the nation-state, is now reoriented to serve international routes of trade and global agendas. The impact of the container on the American trucking and railroad systems is an example. Yet globalization is not merely a top-down phenomenon, and nations and local places have the power to affect global space and to reshape this new worldwide container infrastructure. The study of infrastructure, and more particularly the container, is especially valuable for what it reveals about these ongoing processes. This in turn helps shed light on the dynamics of our global era, and reveals the strengths and weaknesses of some contemporary theories of globalization. The global, national and local are interrelated in a nuanced engagement, in which no one factor is dominant.

CONFERENCE THEME: Identifying or assessing emerging trends and fields in architectural research

KEYWORDS: shipping container, globalization, infrastructure, standardization, United States

I. INTRODUCTION

One of the more subtle yet powerful agents of globalization over the past 50 years has been the humble generic steel box known as the shipping container. In this paper I describe how the shipping container has worked its way into the ground-based freight transportation system of the United States—that is to say, the trucking and railroad infrastructures—and in the process has globalized a system that until recently was primarily oriented towards domestic movement. This is the subject of my ongoing dissertation research in architecture doctoral studies at the University of Michigan. The changes brought about by globalization, and represented in particular by the container, are causing deep changes to national space, as the infrastructures that once served to unify national territories are now increasingly oriented outward, integrating the space of the nation-state into the burgeoning global network of international commerce with its far-flung supply chains and intricate logistics. Isolated faraway places are brought into closer and more direct connections with each other, as a complex dynamic unfolds between global forces and local actions. This paper discusses how containerization is relevant to some of the leading theories of globalization, especially those theories with a spatial component.

I believe the study of infrastructure illuminates aspects of our physical world that cannot be understood through the traditional viewpoints of urban design and architecture. As an architecture doctoral student who has chosen to augment my background in urban design by specializing in infrastructure, I think the infrastructural paradigm is a promising avenue for furthering our comprehension of the built world, and I believe the discipline of architecture needs to pay it greater attention. Indeed, a new awareness of infrastructure's importance has recently emerged, among both scholars and the general public. This has begun to spread to architecture as well, but most of the important and perceptive scholarship on the topic comes from other fields. Architects tend to be interested in objects that are in the foreground, that draw attention—and infrastructure by its very nature generally lies in the background. Yet infrastructure exerts such a powerful influence over how our buildings and cities are constructed that some thinkers in the field of architecture (notably Keller

Easterling, Carol Willis and Alan Berger, among others) are starting to come to grips with it. I hope this paper will demonstrate how my own research, on the impact of the shipping container upon the American transport system, reveals an ongoing series of changes that are perceived most clearly through the framework of infrastructure.

The backdrop to the shipping container's success is the phenomenon of globalization. Examining the container's growing presence in American infrastructure is a way to better understand how globalization has penetrated into and reshaped the territorial space and built environment of the U.S. Globalization is of course having a great impact on the traditional conception of the nation-state, whose powers and boundaries are being eroded, though in what fashion and to what degree is hotly contested. The globalization debate is often long on theorizing and short on specifics, but the container is a tangible presence, one that can be studied and put in the context of various theories. A wide range of ideas and attitudes about globalization have proliferated: that we live in an increasingly interconnected world, that borders are more and more porous, that the nation-state is losing relevance, that the local and global are tied ever more closely together, that place and distance no longer matter, that scale has grown more flexible, that neoliberalism has triumphed over government power, that preexisting systems have been totally reshaped or leapfrogged, that we have made a fundamental break with the past, etc. Understanding the process of containerization can give more nuance to these theories, supporting some and undercutting others.

A brief explanation of the shipping container itself could be useful at this point. The container is a metal box 8' wide, 8'-6" high, and 20' or 40' long (there are variations, but these are the most common dimensions) designed to carry freight cargo, with swinging doors at one end and attachment fittings known as corner castings at each corner. Its size and specifications are standardized at the global level by the ISO. The container's value lies not in any remarkable intrinsic qualities, but in its ability to be carried by multiple modes of transport—ship, truck and train—over the ocean and in virtually every country around the world. Thus the container itself can be transferred between those modes, rather than needing to have its cargo unloaded and reloaded; this represents a tremendous savings of labor, time and money. The container does not improve any single mode of transport, but by linking them all together it makes the overall freight transport network dramatically more efficient, especially at the global level. In the process the domestic transport systems of particular nation-states become more closely intertwined, and the significance of national borders is reduced. A container can be packed at a factory in the heart of China, carried by various means through China, across the ocean, and into the U.S., and unpacked at a warehouse in Kansas City, all without being opened once. Traveling upon the national networks of road and rail, and by shipping over the ocean, the container is an object that spans the entire journey of a global cargo, and creates a global infrastructure out of these disparate systems.

2. INFRASTRUCTURE AND THE SPACE OF THE NATION-STATE

Until recently most infrastructure has been created and instituted at the national scale, for it is the nation-state that has been the most fundamental spatial unit of governance, commerce and society. Defining itself as a discrete territory, a space of control, the nation-state imposes a one-to-one correspondence between the national space, the government, and the social and cultural identity of its people, and so it is the national scale that truly matters for most purposes. This has come to be assumed, to be seen as natural, but is in fact the contingent result of various factors, and in the long span of history is a relatively recent phenomenon (Sassen 2006, 25-140). The great era of modern infrastructural development coincides fairly well with the establishment of the full-fledged nation-state, and infrastructure—transportation infrastructure especially—has often been built at the national scale, with the intent or effect of supporting (or even creating) the nation-state. A classic example is the railroad: the first infrastructure of modernity, it played a key role for many nations in giving coherence and unity to their territories. In the expanding U.S. this was especially true, as the trains covered a vast expanse of land, unifying it both physically and psychologically.

For Americans perhaps the definitive infrastructure of national identity is the Interstate highway system, sometimes referred to as the largest public works project in history. Where the railroad helped produce national unity, the Interstates cemented and deepened it. An infrastructure of staggering

scale, efficiency and standardization, it imposed a cohesive system upon a national territory of great size and variety, making local variations negligible, generating development in less economically advanced regions, and ultimately weaving the nation together more tightly. The degree of uniformity and standardization that undergirds the Interstate system is remarkable, and while the railroads had gradually developed a similar level of standardized rationalization over time, in the case of the Interstates it was imposed by the federal government at the outset. Engineering details like lane width, slope and gradient, minimum turning radius, etc., were made consistent; the emphasis on standardization even extended to the signage.

The infrastructure of the nation-state, developed during a historical period that could be roughly categorized as that of modernity, tended to be characterized by a universalist “one size fits all” approach, with new networks often created from scratch. At its best this approach gave unity and coherence to nations, providing a benefit to all citizens even if it reinforced central power as well, while at its worst it generated some of the bureaucratic nightmares described so well by James Scott in *Seeing Like a State* (Scott 1998). The container infrastructure by contrast is a more flexible one that does not impose itself as an entirely new system, but instead fits into preexisting systems. This seems especially suited to our era of globalization, in which nation-states still control their own territories and wield vast power, for the container works within national infrastructures rather than seeking to overturn or replace them. The crucial point to realize is that this remarkably successful system of globalization, the container infrastructure, does not emerge as a full-blown independent system, nor does it transcend what came before. Instead it depends upon the preexisting networks and routes embedded in the space of the nation-state. These are cobbled together, in effect, to craft a global infrastructure.

3. GLOBALIZATION AND THE SHIPPING CONTAINER

The shipping container moves on routes, within national spaces, that were created long before, for very different purposes and with other agendas. Containerization is not a new dynamic divorced from the past, something cut whole from fresh cloth, but instead is stitched together from elements already in place. The role of history, particularly that of the nation-state, becomes crucial. The American rail network, for instance, has long been focused on Chicago, thanks in large part to that city’s quickness to embrace rail technology in the mid- and late 1800s, in addition to several other historical circumstances. Given that longstanding tradition, it is not surprising that in recent decades the city has become a massive nodal junction for container movement by rail, and container transfers between trains and trucks. Chicago is now a key point on global container trade routes, for reasons that have little to do with globalization or the container, but everything to do with American history and Chicago’s role in it. The realization that containers move along preexisting routes also makes geography and topography relevant. The Mohawk Valley in upstate New York, for example, is a reasonably level path through the Appalachians; it was therefore the perfect route for the Erie Canal, later for a major railroad line (the New York Central’s “water level route”), and still later for an Interstate highway (I-90, the New York State Thruway). The succession of cities that sprang up along the canal—Utica, Syracuse, Rochester, Buffalo—reinforced the route, as it was logical for subsequent infrastructures to serve them. Today the rail and highway routes of the Mohawk Valley are major corridors for container traffic, thanks not to some new global dynamic but rather to their position in the American landscape.

All this stands in marked contrast to much of the contemporary dialogue about globalization, which is often seen as a radical new phenomenon sweeping away the old relics in its path. Enthusiasts of globalization see it as a utopia while critics view it as a dystopia, but either way the past gets overlooked. Thomas Friedman’s superficial *The World is Flat*, one of the most popular accounts of globalization, is typical of this tendency; Friedman breathlessly celebrates a bright new future, a world in which old rules have changed and previous limitations can be transcended, or so he believes (Friedman 2005). He demonstrates little interest in the underlying factors, so rooted in history and geography, upon which our global era is built, and that set the conditions for how globalization is carried out. Aside for the naïve notion that globalization will inevitably be a force for good, Friedman’s viewpoint suffers particularly from the assumption, implicit in his title, that all corners of the world are now on equal footing, with no real obstacles to growth and no barriers between them.

Friedman's central idea of a "flat" world does however possess some validity if one thinks purely in terms of the globe becoming more tightly interconnected, and of course the container is one of the innovations that has made this so. A more helpful and less simplistic metaphor, though, is that of "scale bending," introduced by Neil Smith to describe how local actors are now able to jump across scales and link directly with the global, or to deal with each other across a global expanse (Smith 2004). The concept suits containerization well, capturing how the container allows faraway places to come into an unprecedented sort of close contact with each other—though it is a limited form of contact, that of business and trade. The connections between localities no longer need to be carried out through the agency of the national, nor to make a laborious transition across national borders, but can work more directly from place to place. When scale bends in this way, the local does not merely participate in the global but can take an active agency in it. With regard to the container's presence in American infrastructure, for instance, some localities have been able to make themselves key hubs on global trade routes, while others have languished. The Los Angeles region has been among the most successful: it built up two giant ports (Los Angeles and Long Beach) despite having no natural deepwater harbor, and also constructed a plethora of rail and road connections for container movement, including the crucial Alameda Corridor (Erie 2004, 115-171). Far more humble actors can also leverage the global container network for their own purposes, such as when illegal migrants hide in containers. The global is not simply imposed on the local, therefore, but the two are engaged in a back-and-forth interplay. It is not merely that the contours of globalization have local nuance, but that the global is actively shaped by an accumulation of local factors.

Many contemporary theorists of globalization and space miss this point, so fixated are they on a presumed opposition between the global and local. Two of the most celebrated are David Harvey and Manuel Castells, very different thinkers in most respects. Tethered to a neo-Marxist view, Harvey relentlessly emphasizes global capital's control over space, and hence its immense power over local actors and communities that are tied to particular places (Harvey 2001). Fascinated by the impacts of technology, Castells contrasts the "space of flows" with the "space of places," essentially setting up a confrontation between global flows and local places (Castells 1996). Thus both Harvey and Castells, though insightful and valuable scholars in many ways, create a false dichotomy between the global and the local.

Some other scholars have been more nuanced in exploring the global-local dynamic, granting more agency to the local, but still persist in viewing the global as an all-encompassing force that sets the conditions within which the local can act. Neil Brenner discusses how the urban policies and planning of several European cities are increasingly oriented towards global competitiveness rather than national or local priorities, often with the result that a neoliberal outlook takes precedence over social welfare (Brenner 2004). Stephen Graham and Simon Marvin, in their well-known *Splintering Urbanism*, examine how infrastructure is being "splintered" into different levels of service and transformed to serve the priorities of the global elite. They are especially concerned with how the modernist tradition, which sought to create universal infrastructure available to all, has been superseded by a neoliberal attitude that parcels out infrastructure at varying levels depending on one's ability to pay, sometimes neglecting the poor entirely (Graham and Marvin, 2001). While Brenner, and Graham and Marvin, recognize the important role of local actors in making and carrying out decisions, they still tend to view globalization as a top-down phenomenon, to which the local can only react. They fail to recognize the agency the local may possess, the creativity it might exhibit, or even the raw power it sometimes can exert.

It should also be noted that often a global condition is created in the first place by local or national forces. The shipping container is in fact one such case: it comes from the U.S., where it was introduced by various entrepreneurs in the 1950s and subsequently standardized by the federal government in the early 1960s. The ISO made it a global standard later in the 1960s, but its dimensions were identical to the version the U.S. government had established. So every container in the world today traces its heritage back to the U.S. of the late 1950s and early 1960s, and to the particular conditions of that place and time. As in many other ways, the postwar era of American dominance set a template for globalization (the internet being another example). Yet an object from one locale can be used by other actors for their own purposes, and in recent decades the export-oriented economies of East Asia, China in particular, have exploited containerization with tremendous success. This has resulted

in a vast flow of containers into the U.S., as the wave of globalization now sweeps back over America from abroad, and the nation is impacted in unexpected ways by the very forces it originally set in motion.

4. THE SHIPPING CONTAINER'S IMPACT ON AMERICAN INFRASTRUCTURE

The consequence of the growth in container traffic to the U.S. has been a reconfiguration of the American transport infrastructure, to suit the container and the global flows of trade it represents. Actually, this process has been ongoing to some limited degree ever since the introduction of containerization, but it has certainly accelerated. In the trucking industry, more and more container chassis (this is what allows a typical truck “tractor” to carry a container—it is similar to a flatbed trailer, but customized for the container) have been made available, and a greater number of trucking companies have become involved in container haulage. In addition there have been improvements to certain roads and highways, mainly those serving ports or intermodal terminals. This reflects to some extent a shift in road-building priorities, influenced by the ISTEA legislation that prioritized connections between transport modes. In Southern California especially, the meteoric growth in container traffic from the ports of Los Angeles and Long Beach has been a motivation for expanding road capacity, though making significant upgrades to highways has proved difficult (Erie 2004, 166-168).

The container has caused more dramatic changes to the American rail system. The rising use of trains to carry containers in the 1980s and 1990s brought new and profitable traffic to the U.S. railroad corporations. Having been decimated by trucking since the 1950s, the railroads welcomed the new traffic, though it forced them to change some of their practices and build new railcars customized for containers. The railroads also had to shift their resources to certain routes, particularly the corridors from the West Coast to the eastern half of the country, which now became important segments along the pathways of worldwide container movement (i.e., from East Asia to the population centers of the central and eastern U.S.). Having long carried domestic traffic primarily, these corridors have changed in function and now carry containers on long hauls—their orientation has been altered from a domestic focus to a global agenda. As noted earlier, another result has been a massive gain in container traffic for the Chicago area.

The biggest change for the railroad industry was the development of double-stack railcars, so named because they carry containers one atop the other. Trains consisting of these railcars are known as “stacktrains,” and they have proved highly profitable since a stacktrain can hold about 75% more containers than a normal train of the same length (and length is usually the limiting factor for these trains, not weight). Stacktrains originally ran only on western routes, where most clearances were sufficiently high, but their profitability has motivated the railroads to raise clearances on some major routes in the East as well, despite the great expense involved. One major project, recently completed by Norfolk Southern, is the “Heartland Corridor,” extending from the port of Norfolk across Virginia, West Virginia and into Ohio, which required enlarging numerous tunnels in the mountains (Cauchon 2006). Its vaguely patriotic name notwithstanding, the Heartland Corridor is of course mainly carrying containers with international cargo. A similar project is the “National Gateway,” launched recently by CSX and currently underway; this will connect southeastern ports with Ohio, and like the Heartland Corridor it involves expensive work enlarging tunnels (Boyd 2010).

In addition to the alterations to the road and rail systems, the container has caused another change to the national transport network: the creation of intermodal terminals at particular locations, generally along a major rail line and near at least one highway. Sometimes called “inland ports,” these terminals are primarily used to transfer containers between train and truck, but are also used for train-to-train transfers. Some of the early intermodal terminals were simply modified rail yards, but nowadays the new terminals are usually built from scratch, and being very large facilities are usually located on the exurban periphery of major cities, where land is available and a major market is nearby. Many of the biggest and most important are near metropolises in the central span of the nation, like Chicago, Kansas City, Memphis, Dallas, Columbus, etc. As with the changes to the trucking and rail systems, the development of these terminals represents a reconfiguration of the domestic infrastructure to serve global cargo.

Perhaps the most interesting impact of the shipping container on American infrastructure has been the development of domestic containers. Used in the U.S. and Canada only, these domestic containers are generally 53' long, 8'-6" wide, and 9'-6" high, and hence too large for use in other countries. They first appeared in the 1980s, and their popularity has increased dramatically in recent years. Despite being larger than standard containers, the domestic containers have fittings designed so they can be utilized by much of the same equipment that carries normal containers. In particular, they have castings not only at their corners, but also at the same points as a standard 40' container; thus a crane or any such device used for normal containers can also hold a domestic container. The domestic containers are transferred at the same terminals as normal containers, and often can be carried in the same railcars. Different trailer chassis are used for them, but this is a minor factor. Because domestic containers work within the system already laid down by the globally standardized container, they in turn further strengthen that system. The chain of causation in a sense has come full circle, as the container, originally developed to fit into national infrastructures, now becomes the template around which new elements of the national infrastructure are designed. This confirms the importance of the container and the power of globalization, yet also demonstrates that local and national variations will still flourish.

The many and assorted changes to the U.S. infrastructure caused by containerization have mostly been implemented by actors at the national or local level, such as American corporations, the federal government, state and local governments, and various national or local institutions. Global players, despite their apparent power in our globalized era, have seldom been the ones to make these alterations. This fits well with an argument put forth by Saskia Sassen, one of the most prominent scholars of globalization; she explains that it is usually not global bodies like the U.N., World Bank or I.M.F., or even multinational corporations, that carry out the changes of globalization within the national sphere. Rather, the actions that further globalization are often actually imposed from within, at the national or local level. The nation-state therefore retains much of its importance in this global era, somewhat paradoxically, because it is one of the prime implementers of globalization (Sassen 2006, 222-322).

5. CONCLUSION

Infrastructure is not a glamorous subject, and the shipping container in its own right is a decidedly banal object. But the study of infrastructure can do much to reveal the workings of human existence, and containerization is at present a particularly fruitful infrastructural system to examine, for it helps one better comprehend the nature and dynamics of globalization. In light of what the container reveals, various theories of globalization are strengthened or weakened, and certain new insights can be attained. In particular, the nation-state can be understood as having an integral place in globalization and global space; the global era does not make the national obsolete, but rather depends upon it, at least for the moment. The infrastructural systems of the nation are not superseded or bypassed by globalization, but rather are constitutive in creating the new global systems. Yet these new global systems in turn have a major effect on those very same national infrastructures, and on national and local spaces. The container is a key object in a constant and ever-shifting interplay between the global, national and local.

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