

**PAPER PRESENTED AT THE AMERICAN REAL ESTATE  
SOCIETY 24<sup>th</sup> ANNUAL MEETING (April 16-19, 2008)**

**Butterfly Spotting:  
An Industrial Real Estate Perspective on  
Globalization and Transnational Economies**

by

**Patrick Lecomte (\*)**

**University of Cincinnati  
College of Business  
402 Carl Lindner Hall  
Cincinnati, OH 45221-0195, USA  
Phone: 646-639-1265  
Email: pat.lecomte@gmail.com  
www.patricklecomte.com**

**Bill Whitaker  
University of Cincinnati**

**Will McIntosh  
University of Cincinnati**

**(\*) contact author**

**Important Disclosure**

***Draft. Do not quote or reproduce without the contact author's prior written authorization.***

The NAIOP Research Foundation provides funding for three manuscript prizes, which are awarded independently by the American Real Estate Society (the professional organization for real estate academics). The judges, who comprise ARES leadership, past winners and general membership, review the scholarly research presented at the ARES annual meeting, for the quality of the literature review, methodology and impact of findings. The views represented in these manuscript award winners are those of the authors, and do not necessarily reflect those of the NAIOP Research Foundation.

**Butterfly Spotting:  
An Industrial Real Estate Perspective on  
Globalization and Transnational Economies**

by

**Patrick Lecomte (\*)**

**Bill Whitaker**

**Will McIntosh**

(\*) **Contact Author. Email: pat.lecomte@gmail.com**

**Abstract**

*As national economies are becoming ever more global and interconnected, this paper addresses the need for real estate investors to develop new, efficient ways to assess how variables and phenomena central to economic globalization (e.g. outsourcing) might impact their domestic portfolios and investment decisions. By focusing on a set of globalization-driven processes affecting industrial properties, the paper proposes several innovative concepts that can be used to capture linkages between direct real estate markets and their global economic environment. It first describes the concept of Transnational Property, i.e. a property which, although physically located in the US, is at the core of complex transnational flows. In essence, a transnational property implies a non-spatial definition of location, a notion modeled after economic geography's positionality. The paper encapsulates these concepts by a measure of globalization at the property level called Transnational Coefficient. It also stresses the need for an update of the Economic Base Theory to account for global interconnectedness of national economies and proposes the concept of Global Economic Base Category (GEBC). It concludes by explaining how these new tools could concretely be used by real estate investors faced with the challenges of transnational economies.*

*"If everything occurred at the same time there would be no development. If everything existed in the same place there could be no particularity. Only space makes possible the particular, which then unfolds in time. Only because we are not equally near to everything; only because everything does not rush upon us at once [...] can we endure at all".*

*August Lösch*

*The Economics of Location, 1943*

**INTRODUCTION**

On February 27<sup>th</sup>, 2007, the Shanghai Stock Exchange plunged 8.8 percent sending shock waves to stock markets worldwide. During the following week, the Dow Jones Industrial Average lost 4.6 percent. REITs trading on US markets were not spared by the crisis, with the Dow Jones All REIT index shedding 8.5 percent over the week. While some Wall Street pundits were calling China a new proxy for risk, real estate investors were left wondering what the direct connection might be between buildings located in US cities, i.e. real assets, and the pullback of a highly speculative, government-controlled and embryonic market such as the Shanghai Stock Exchange. Apart from the obvious impacts caused by market contagion and its disturbances on investor confidence and ultimately on corporate profits, what could be under normal circumstances the link, if any, between a

building located in a North American MSA and the economic situation in China? The Chinese incident brought to the fore the need for real estate investors to develop efficient ways to assess how variables and processes central to economic globalization (e.g. outsourcing) might impact their domestic portfolios and investment decisions. Concretely, what tools do real estate investors have at their disposal to capture linkages between direct real estate assets and their international economic environment in an increasingly complex and interconnected world economy?

Assessing the transmission mechanisms between US-based real estate assets and global macro-economic variables is all the more pressing as due to their dual nature (i.e. physical assets and financial assets), buildings are in a totally unique position. Although they are inherently rooted in their local environments, real estate assets are at the crossroad of multiple influences, from the region to the world. This highly exposed position finds no equivalent with other asset classes. In essence, an analysis of globalization and direct real estate should be done one building at a time. An alternative and more practical methodology is to focus on a particular property type or sub-type and get as specific as possible with respect to this type's characteristics in a framework of analysis that puts globalization at the center. This is the approach selected here. This paper explores the question of linkage between direct real estate and globalization through the lens of industrial properties. Of the three major property types (office, residential, industrial), industrial is the one most explicitly exposed to global influences. Caught up in the ever growing realms of global production and distribution, industrial buildings, and in particular warehouses, are at the forefront of economic globalization. Our objective is not to extend previous studies concerned with the determinants of real estate returns (e.g. Ling and Naranjo, 1997) by including factors stemming from international economics into classic real estate finance models, but rather to provide an analytical case study of the various linkages between buildings and their global environment. To do so, we focus qualitatively on a specific set of processes which are globalization-driven. The paper first reviews the literature to identify existing models of industrial real estate and how they deal with globalization. In the second section, it analyzes the global manufacturing context and related processes such as global supply chains and logistics, and how they impact US-based industrial buildings. In the third section, it proposes several new concepts and tools that could be applied to better characterize real estate assets in a global environment. The paper concludes by explaining how the proposed innovations introduced in the previous sections could practically be used by real estate investors faced with the complex challenges of transnational economies.

## **1- LITERATURE REVIEW**

Ever since the early 1990s, globalization has been a common buzz word in economics and business. Countless articles and books have been published claiming to shed some light on what is by definition a very complex, pervasive though elusive, phenomenon. The elusiveness of globalization at the local level is deceiving inasmuch as the accrued interconnectedness of national economies has had some very direct consequences on the ways people live and work, not only in developing countries like China and India but also

in the West. Real estate has not been immune from this buzz. In fact, for many years, the international dimension of real estate investing has generated a very prolific branch of academic literature (e.g. Hamelink, Hoesli, 1994).

Bardhan, Edelstein and Tsang (2007) point out that there is a “conceptual dissonance between real estate and international economics”. That dissonance stems from the unique status of real estate assets which are both rooted in their local surroundings and part of processes with much wider geographic reach and determinants than the local level only. This is especially the case for direct (i.e. non- securitized) real estate. Many researchers have overcome the difficulty by focusing on indirect, securitized real estate instead (e.g. Wilson, Zurbruegg, 2003) and issues such as the diversification benefits of international real estate securities. Given the global spread of REIT-like structures in recent years, the focus on international real estate securities has been very relevant. However, when it comes to deciphering linkages between actual properties and globalization-driven phenomena, such an approach is of little help.

The following literature review comprises two sections. It first reviews research connecting globalization (identified either by a set of flows or by variables stemming from the field of international economics) and direct real estate. It then focuses on models of industrial real estate and their mention, if any, of global driving forces. Many topics pertaining to globalization of direct real estate markets, especially in the case of industrial properties, have been covered in the non-academic literature (e.g. industry publications) where some of the references mentioned thereafter are originally from.

### **1-1- Globalization and direct real estate**

Among the many fields that could be roughly characterized as constituting Land Economy, there has been a keen interest in globalization and its impact on the built environment. Urban economists who have been at the forefront of globalization research customarily study the internationalization of urban landscapes (e.g. Kresl and Frey, 2005). Likewise, urban sociologists are interested in buildings as far as they can give information about the changing living and working conditions of people in ‘world cities’ (e.g. Sassen, 1994).

Amid these attempts to untangle the global-local nexus, real estate researchers seem to be somewhat lagging. There is indeed little academic research associating international economics and direct real estate markets. The existing literature is interested in three related issues:

- the nature of the flows that define globalization of real estate markets,
- the relative importance of domestic and international factors in real estate returns,
- the identification of global drivers in real estate cycles.

In 1988, James Graaskamp gave a speech in Boston on the topic of ‘Globalization of Real Estate’ (Graaskamp, 1988). In that speech, he provides an interesting assessment of the globalization of US real estate markets in the late 1980s. He identifies two mechanisms favoring globalization of real estate: trade and foreign investments, either in individual properties (direct) or in real estate securities such as REIT stocks (indirect). Graaskamp’s remarks still stand out today due to the explicit linkages that he makes between international macro-variables and US real estate markets. A large part of his speech is devoted to the impact of US and international interest rates on domestic real estate,

especially with respect to Japanese investors and their landmark transactions which were grabbing front-page headlines at the time<sup>i</sup>. By the same token, Graaskamp points out the impact of globalization driven phenomena such as outsourcing of manufacturing jobs (through labor cost) and ballooning imports of consumer goods (through chronic foreign deficit) on respectively US industrial real estate and US retail real estate. In both cases, he sounds pretty negative.

Renaud (1998) inventories the international and domestic factors that triggered the 1985 to 1994 global real estate cycles. He emphasizes the role of capital flows from Japanese foreign investments, and the closer links between capital markets and the real estate industry as catalysts to the global 1990 crash.

Winger (1998) provides a practitioner's perspective on the issue of domestic versus international factors. He asserts that even markets as local as real estate are not insulated from "developments in faraway places". Globalizing markets affect real estate demands through the macroeconomic component of local demand. His approach focuses on global trade and its impact on the final demand of local firms. He recommends that real estate investors monitor the "foreign factor" embodied by imports and exports of the local economy.

Clark and Lund (2000) analyze the globalization of the Copenhagen real estate market. They define globalization of a property market as "increasing shares of agents at increasing distances from the market area, involved in the production, ownership, maintenance, use and reproduction of the built environment.". Their analysis is exclusively centered on foreign investments, thereby disregarding any potential effect of trade on domestic real estate markets<sup>ii</sup>.

Case, Goetzmann and Rouwenhorst (2000) explore factors influencing co-movement among international real estate markets. They look at total returns for prime industrial, office, retail real estate in 22 cities in 21 countries. They examine the relationship between GNP changes and property returns of actual properties in order to separate global from local economic effects on the co-variance of real estate returns. They find that world real estate markets are largely correlated through common GDP effects. Investment in a global real estate portfolio is essentially a bet on broad trends in global production. They also assess that "while real estate is fundamentally local, demand for space apparently responds to contemporaneous changes in the global economy".

Ehrenberg and Mallen (2003) ask how a global economy relates to local real estate investors and their respective returns. They wonder to what extent the future growth of real estate in the West will actually be articulated in the real estate markets of the East. They conclude that real estate is "essentially a parochial construct that can only be fully understood, transacted and managed at the local level".

Bardhan and Kroll (2007) provide a general overview of globalization and real estate. They adopt a macro approach to assess the global-ness of US real estate. They identify that for any given industry, there are three kinds of activity related to globalization: international trade in goods and services, cross-border investment in facilities for production, sales, distribution of output or some element of the supply chain, and cross border portfolio investments in financial securities<sup>iii</sup>. However, their analysis which remains at the aggregate level eschews a detailed empirical study of specific property types. It is more focused on the globalization of the real estate industry (with a particular

emphasis on its supply chain) than that of real estate markets per se, let alone individual properties.

Bardhan, Edelstein and Tsang (2007) research the impact of global financial integration upon the pricing of and investment in local assets. They propose a transmission mechanism from globalization to the real estate sector: Increased openness which results in accrued international trade and economic integration leads to higher productivity and output, and in turn to the relative rise of real estate prices. Hence, globalization has a positive impact on real estate markets. Notwithstanding its use of variables from the realm of international economics, the analysis falls short due to its empirical focus on real estate security returns rather than private real estate. The identified transmission mechanism appears more relevant for industrializing countries such as China and India than for developed economies, unless massive characterization is made by property types/sub-types.

### **1-2 Models of industrial real estate and globalization**

While applied research, especially that emanating from industry researchers, has been acknowledging the influence of globalization, in particular global trade, not only on the demand for but also on the supply of domestic industrial space (e.g. RREEF, 2006; Heitman, 2007; TWR-CBRE, 2008), academic research has been blatantly silent. This might be due to the fact that industrial real estate is the least researched property type in the academic literature (Rabianski and Black, 1997). Nonetheless, the gap between academia and the industry is striking.

Industrial real estate has triggered many models in the academic literature. The scope of the research has gone from a purely local perspective to a national view. However, few researchers have ever considered the potential influence of global forces in their analysis. In a seminal paper, Hoag (1980) proposes a model of non-owner occupied properties which covers physical characteristics as well as financial characteristics. Financial characteristics encapsulate the micro- and macro-markets within which a property trades. The macro-market encompasses regional and national factors including nominal interest rates. However, there is no mention of international factors.

Grissom, Hartzell and Liu (1987) find no evidence that general economic factors might indirectly influence industrial real estate returns. They posit that one possible explanation for this phenomenon is that each city within a given region has a unique economic base. Wheaton and Torto (1990) study the production of industrial space. They develop a model that suggests that industrial completions are explained by change in output (or employment) in manufacturing and by movements in the after-tax cost of corporate capital. Their model is strictly domestic.

Ambrose (1991) analyses the warehouse market in the Atlanta area. The model focuses on property-specific characteristics which explain the bulk of warehouses' asking prices. There is no mention of any economic variables, let alone international factors.

Kling and McCue (1991) investigate the relationship between industrial property construction and the macro-economy. They find that employment shocks either directly or through output and nominal rate shocks account for the majority of the variation in industrial property construction. Their analysis does not include any international macro-variables.

Fehribach, Rutheford and Eakin (1993) expand Ambrose (1991)'s model by including physical, locational, financial and economic variables to determine the factors that influence the sale prices of industrial properties in the Dallas / Fort Worth area. They find that sale prices are best explained by a series of property-specific characteristics while market conditions can be captured by two economic variables: industrial cap rate and prime rate. The search for optimal models does not cover any international factors.

Lockwood and Rutherford (1996) look at the value of industrial buildings in the Dallas / Fort Worth area. They find that local market effects, physical characteristics and location are primary sources of value for industrial properties. Their results contradict Hoag's hypothesis that national concomitants of value and interest rate should be included in industrial real estate models.

DiPasquale and Wheaton (1996) explain that industrial construction is closely related to US macroeconomic movements. However, they don't mention any potential international forces.

Buttimer, Rutherford and Witten (1997) examine the determinants of industrial warehouse rents in the Dallas / Fort Worth area. They incorporate time-varying market conditions, locational and physical characteristics of the property. Their findings indicate that industrial real rents are positively related to changes in net employment. They do not hint at any international dimensions of industrial real estate.

Wheaton (1999) looks at fundamentals of real estate cycles. He explains that although several authors have demonstrated the close link between the industrial market and the US economy, "little is known about behavioral parameters in the industrial market".

Thompson and Tsolacos (2000) develop a multi-equation simultaneous model to make projections in the industrial property market. They find that changes in the availability of industrial floorspace are strongly related to variations in gross domestic product. No mention is made of globalization.

Torto Wheaton Research-TWR (2002) proposes a framework for forecasting industrial market. The growth in manufacturing production or distribution inventories is expected to drive the demand for industrial space. The state of the economy, industrial employment, the price of space and its availability are dominant factors. The sophisticated model makes no direct reference to variables related to international economics.

In contrast to the above-mentioned papers, several researchers propose more inclusive models of industrial properties. Mueller and Laposa (1994) associate industrial warehouse demand with a process, i.e. the movement of goods sold from the place of production to the place of consumption. Population growth is deemed a better indicator of warehouse space demand than manufacturing employment. The framework acknowledges the impact of global trade through concepts such as shipping tonnage, ocean movements and airport freight, although it does not explicitly elaborate on globalization and international economics.

Hughes (1995) puts global trade at the center of his framework of analysis for industrial real estate. Exchange capability identified by currency values and trade barriers are one of the five factors of demand in the industrial market. The model assumes that most tenants of industrial properties are involved in export activities. Given that current exchange conditions dictate an industrial producer's ability to export, "the determinants of industrial demand in a particular location are the same as those that cause an expansion in the economic base". Interestingly, even though it misses an empirical validation, this

research directly connects variables from the field of international economics with a specific property type.

Thrall (2002) adopts a business geography perspective and explains that “unlike office market, which can have a significant component of demand that arises from the local economy, demand for industrial is instead the result of larger national and global economic forces.”

McGowan (2004) assesses the impact of global trade on regional demand for US warehouse space. The factual analysis highlights the growing importance of logistical processes on the US warehouse market.

Pearce-Snyder (2008), in a report for the National Association of Industrial and Office Properties (NAIOP), sets out a futurist’s view of US commercial real estate markets. The forecasts fully acknowledge the central role of globalization on the demand, supply, location and design of US industrial properties.

## **2- INDUSTRIAL BUILDINGS AND TRANSNATIONAL ECONOMIES: A CASE STUDY**

In *The World is flat*, Friedman (2005) asserts that “the global economy is descending on the local at a rapid pace”. Although the sentence is catchy, singling out the local ‘touchdown’ of globalization is an uneasy task.

Fortunately, real estate is in a unique position. Buildings are quintessentially local assets immersed in a global environment. Buildings are the concrete recipients of globalization-induced influences at the local level. Studying buildings in a global framework is essentially equivalent to identifying globalness at the local level<sup>iv</sup>. Some researchers posit that real estate’s localness is always greater than its globalness (e.g. Bardhan and Kroll, 2007). But, is that so? Is it enough just to assert it without any empirical evidence? This paper aims to answer these questions by conducting a case study of US-based industrial buildings.

As pointed out by Hesse (2002), investigating industrial real estate markets enables to connect the system of transnational flows embodied in global trade and foreign investment with material space. Because of this special connection, industrial real estate is an “ideal indicator of structural change”.

Our search for linkages between globalization and industrial real estate stresses the overriding importance of processes in deciphering globalness at the property level. The paper emphasizes the role of globalization-driven phenomena on companies’ use of factors involved in the production and distribution of goods and services (e.g. labor, capital, assets including buildings). As identified by Sachs and Shatz (1994), “transnational corporations are the conduit for increased internationalization of the US economy”<sup>v</sup>.

The next section explores the context surrounding US-based industrial buildings in transnational economies.

### **2-1 Transnational economies: a tale of two revolutions**

At the beginning of the 1990s, Robert Reich argued in *The Work of Nations* that there were no longer national economies in the traditional sense, but rather ‘global webs’ into which the economies of all nations have merged. One of the factors responsible for these



intertwined economies and ultimately what Reich calls a “super symbolic economy” is the shift of western countries’ top corporations from a labor intensive model of production to thought intensive high value-added outputs.

Ever since the industrial revolution spread from England to the western world in the mid-19<sup>th</sup> century, production systems have evolved toward accrued efficiency. The most spectacular shift was undoubtedly the invention of mass production encapsulated in what is known as fordism. Fordism which appeared in the 1910s accompanied the rise of mass consumption in the 20<sup>th</sup> century.

Over the last twenty years, western companies have moved from fordism to post-fordist methods characterized by just-in-time (JIT) system and modular production. The related system known as ‘lean’ is now dominating most sectors of the US economy (Womack et al., 1990). Lean production and distribution have played an instrumental role in the emergence of transnational economies. Out of the ten flatteners identified by Friedman (2005), four are directly related to the lean-JIT production system: outsourcing, offshoring, efficient supply chain and insourcing.

The lean-JIT production system combined with intertwined international economies has modeled the new post-fordist, global economies of the West. The resulting system is a “techno-capitalism” (Suarez-Villa, 2003) whose key characteristics are choice, cost efficiency and speed:

- **Choice:** Mass customization aimed at western countries’ middle class has become the prevalent mode of production and distribution. This translates into product proliferation in terms of Stock Keeping Units (SKU), and retailers’ demand for private label brands, custom labeling and store-ready displays (Nuzum and Jonhson, 2006). Companies choosing to fragment their product lines adopt a mode of production known as flexible specialization or flexibilization (Dicken, 2007). Flexibilization is “a highly differentiated, strongly market- and customer-driven mode of creating added-value.” (Hesse and Rodrigue, 2004). Product proliferation puts intense tensions on supply chains which in turn require additional warehouse/distribution space.
- **Cost efficiency:** The liberalization of trade in the 1990s has opened the door to an unrelenting quest for the lowest possible costs. This has turned large corporations into “global scanners constantly evaluating potential production locations in all parts of the world” (Dicken, 2007). Cost-based competition embodied by massive imports of low-cost products, and processes such as outsourcing and offshoring has affected all sectors of the US economy<sup>vi</sup>. Even the real estate industry which had been deemed uniquely local for long is now exposed to global sourcing of both commodities and skills (Graaskamp, 1988; Bardhan and Kroll, 2007). As noted by Bellofiore and Vertova (2006), “higher quality at lower cost is required everywhere”. In addition to the well-documented surge in freight flows associated with imports from low-cost countries to developed economies, cost-based competition has triggered the emergence of long, linear and complex global supply chains (or global production networks)<sup>vii</sup>. “Techno-capitalism” relies on a large-scale, network-oriented mode of production (Hesse and Rodrigue, 2007).
- **Speed:** Time-based competition which was theorized by management consultants in the 1980s (e.g. Stalk and Hout, 1990) has become the rule in global markets. At all levels of the business cycle, competitiveness stems from the ability to “manage,

optimize and compress time” (Freedman and Twist, 2000). Firms have to produce on demand, just-in-time and deliver instantaneously. Time-based competition puts a special strain on distribution systems whose flawless efficiency becomes central to success. The quest for speed to market has propelled logistics at the cornerstone of firms’ search for competitive advantages.

None of the above-mentioned changes would have been possible without two other fundamental breakthroughs: the transport revolution and the IT revolution. A century ago, Marshall (1890) underlined the incredible effect that a combination of efficient transportation with modern communication (i.e. respectively railway and telegraph) had on an American farmer’s ability to use his machinery without worrying about a broken part, even in the most remote locations of the North West. This point has taken an all-new dimension with the advent of containerization and the Internet:

- **The transport revolution:** Improvements in transport technology and massive investments in infrastructures, in particular at terminals, have fostered globalization, by allowing “a space/time collapse of global proportions” (Rodrigue, 1999). The use of containerized shipping has led to large reductions in shipping costs as well as an explosive growth of freight flows across the world (Levinson, 2006). Containers have been instrumental in spurring what transport geographers call ‘intermodality’ or the seamless transfer of goods from one transportation mode to another (e.g. from a ship to a train, from a train to a truck). Physical distribution made possible by efficient transport modes has become the material foundation of flow-oriented transnational economies (Hesse, 2002).

- **The IT revolution:** New technologies have yielded spectacular productivity gains (TWR-CBRE, 2006). Production and distribution systems involve high-tech sophisticated processes that companies strive to constantly improve. Accelerated information transfers allowed by the Internet are applied to keep track of global supply chains and production networks, from the foreign producers’ plant to US store shelves.

In their search for competitive advantages, large companies have been responsible for tectonic changes at the local, regional and national levels. Knox (1997) notes that “the burst of transnational corporate activity formed the basis of the recent globalization of the world economy. In effect, the playing field for large-scale businesses of all kinds had been marked out anew. Companies have had to rationalize their operations in a variety of ways, restructuring their activities and reorganizing and redeploying their resources between different countries, regions, and places. Local patterns of economic development have been recast and then recast again as these processes of restructuring, reorganization, and redeployment have been played out.”

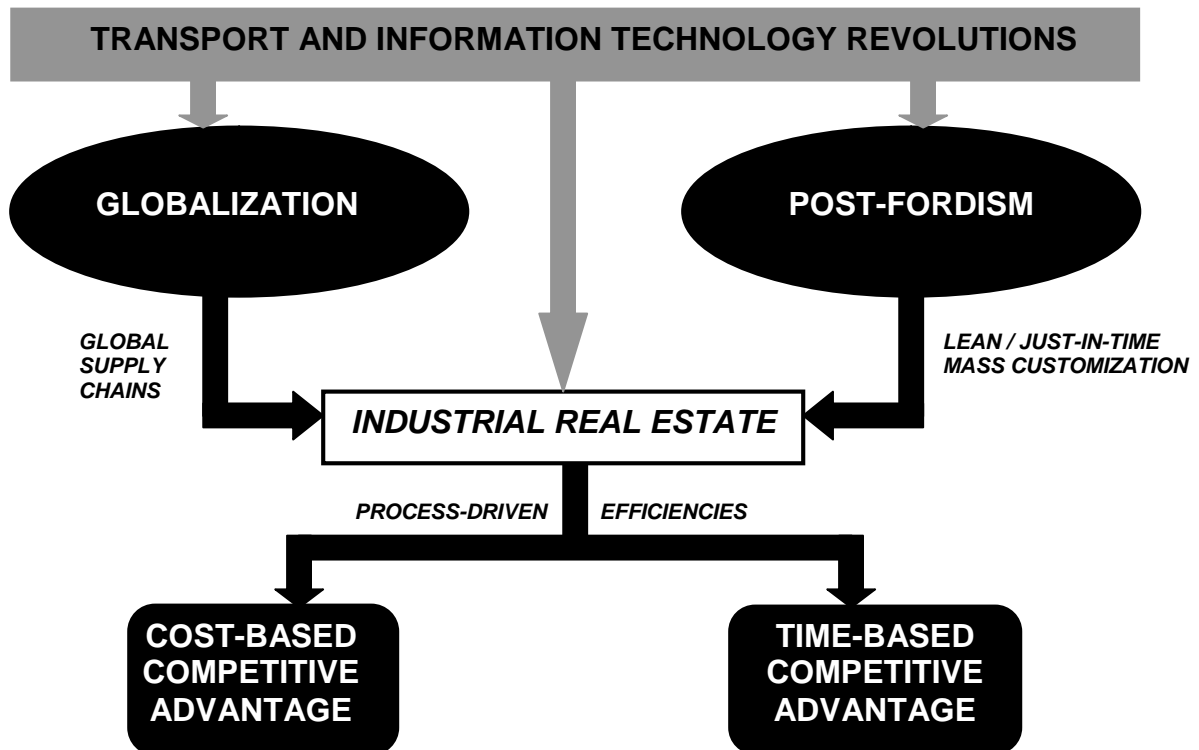
Hesse and Rodrigue (2004) add: “the growing flows of freight have been a fundamental component of contemporary changes in economic systems at the global, regional and local scales. These changes are not merely quantitative, but structural and operational. Structural changes mainly involve manufacturing systems with their geography of production, while operational changes mainly concern freight transportation with its geography of distribution”.

Whilst the local and regional consequences of transnational economies have been extensively researched by geographers and urban economists, the actual impact on real

estate is not well known. Indeed, how do industrial buildings fare in a global post-fordist ‘symbolic economy’? Real estate which is notorious for its inability to adapt to its time-space varying surrounding (e.g. Weimer, 1966; Graaskamp, 1970) has been suddenly immersed into an array of powerful forces which are projecting it into a global, time obsessed and frenetically fast-paced environment. Untangling the dual effects of globalization and lean-JIT production system is difficult insofar as both phenomena tend to feed one another. The popular media keep mentioning manufacturing job losses and other dismal consequences of the above-mentioned processes at the local level. The truth of the matter is that buildings are far more exposed to drastic industrial changes and innovation shocks than people, inasmuch as they cannot be relocated and are difficult to re-train (i.e. refurbish) for new technical requirements.

Globalization and post-fordism have radically altered the context in which industrial space is being used. Extreme adaptability and responsiveness of the supply chain to changes, even those occurring in faraway places, have become the norm of intense global competition. Figure 1 reproduced below illustrates industrial real estate’s position enmeshed between complex supply chains resulting in an exponential growth of freight flows on the one hand, and transnational corporations’ relentless search for cost-based and time-based competitive advantages on the other hand.

**Figure 1: Industrial Real Estate as a Catalyst for Efficiencies between Transnational Flows and Time**



## **2-2 Boxes and buildings**

In an economic environment dominated by transnational flows, warehousing occupies a pivotal role in companies' competitive strategies. Hence, of the three industrial subtypes in the NCREIF database (i.e. manufacturing, warehouses, R&D/Flex), warehouses are probably the most directly exposed to the full range of globalization-driven processes described before. Breakthroughs in logistics and the need for distribution systems to constantly adapt to a rapidly changing global environment have placed warehouses at the forefront of transnational economies. Besides, warehouses are institutional investors' preferred investment subtype in industrial real estate. As of Q4 2007, warehouses made up about 3/4 of the NCREIF industrial database. In this paper, we have therefore chosen to analyze the impact of globalization at property level through the lens of warehouses.

### **• *The emergence of logistics real estate***

In a fordist system, warehousing spaces were necessary to hold and administer large stocks. Conversely, in the lean system, inventories are a dead-weight which has to be eliminated. Lean production and distribution rely on tense continuous fluxes to keep supply chains functioning smoothly while inventories have been reduced from several days' worth of manufacturing activities to only several hours and in some extreme cases only 15 minutes (Hesse and Rodrigue, 2004). Friedman (2005) tellingly illustrates that point by reporting that "when our grandfathers owned shops, inventory was what was in the back room. Now it is a box two hours away on a package car, or it might be hundreds more crossing the ocean". Skjøtt-Larsen et al. (2007) sum up the situation by explaining that "the major contribution of logistics to global supply chain is the idea of product flow".

To coordinate a system characterized by time pressures and global freight, sophisticated processes have been massively applied to distribution systems. First, technological advances such as electronic data interchange (EDI), bar code systems and radio frequency identification (RFID) allow for complete visibility at all stages of the distribution network. Warehouse Management Systems (WMS) have turned warehouses into smart buildings. Secondly, highly efficient logistical processes such as cross-docking<sup>viii</sup> have cut time and cost involved in moving products and holding inventories to record lows (Dicken, 2007). Moreover, firms searching to optimize their supply chains tend to integrate the functions of production and distribution under the umbrella of logistics. Warehouses provide added-value services (e.g. postponement<sup>ix</sup>) which are becoming some of the most important aspects of warehousing operations (Nuzum and Johnson, 2005b; Speh, 2006). As a result, the difference between production and distribution is frequently blurred. For imported goods, added-value services performed in warehouses are common<sup>x</sup>. Of particular interest to real estate investors is the fact that optimization strategies used by logistics (such as 'merge-in-transit') often lead to 'building-less' industries as shown on Exhibit 1.

In short, under the fordist paradigm, warehousing used to be a relatively basic operation (at least compared with manufacturing). Buildings were designed accordingly with limited distinctive characteristics. In a transnational economy, warehouses belong to a new industrial sub-type known as logistics real estate. They are no longer a place to store goods but have become the critical link between inbound and outbound complex flows. Consequently, industrial buildings play a bigger role in firms' search for competitive

advantages. The rise of logistics in distribution systems exemplifies the radical changes that globalization-driven processes can impose on real estate assets. Speed focused companies look for physical features that can contribute to create value in their supply chains (e.g. cross-dock capabilities, high door ratios, high speed communication capabilities, automated materials handling, round-the-clock operations). As mentioned by Hesse and Rodrigue (2004), "whereas transport was traditionally regarded as a tool for overcoming space, logistics is critical in terms of time". Levinson (2006) adds: "the economies of containerization have shaped global supply chains in peculiar ways. Distance matters but not hugely so." The overriding importance of time in transnational economies has been responsible for the shift of warehousing from a space-time realm to a time-dominated realm where efficiency measured in terms of speed, reliability and frequency is more important than proximity and distance.

**Table 1: From Proximity to Process: The Emergence of Logistics Real Estate**

<i>Time Line</i>	<i>Industrial Revolution 1910s</i>	<i>Mass Production 1990s</i>	<i>Globalization/ Lean</i>
<b>Realm</b>	SPACE	SPACE-TIME	TIME
<b>Production System</b>	PRE-FORDISM	FORDISM	POST-FORDISM
<b>Main Driver for Manufacturing</b>	INDUSTRIALIZATION	MASS CONSUMPTION	MASS CUSTOMIZATION
<b>Site Selection for Industrial Buildings (*)</b>	LOCATION AS A SOURCE OF SYNERGIES: cluster, agglomeration (e.g. Marshall, 1890).	LOCATION AS A SOURCE OF EFFICIENCY: Time is linked to space.	LOCATION SECONDARY TO TIME: speed, reliability, frequency.
<b>Implications for Warehousing</b>	PROXIMITY-DRIVEN	ACCESS-DRIVEN	PROCESS-DRIVEN
<b>Main Transportation Modes</b>	RIVERS, RAILROADS	TRUCKS	INTERMODAL

(\*) For an explanation of the link between transportation and communication costs, and agglomeration economies, see Swann (2006)'s analysis of the four ages of place: medieval, industrial, global clusters and new global village (endnote xiii).

• ***Searching for the buildings in a typical global supply chain***

In order to reduce shipping costs and increase productivity, lean distribution aims at minimizing the number of times goods are handled while in transit. Thanks to containerization and intermodality, imports typically join tense distribution networks as soon as container ships coming from abroad reach US shores.

In their 1994 paper, Mueller and Laposa introduced the concept of ‘path of goods movement’. Their framework emphasized the entry of US-based industrial real estate into a global mercantile economy. In a transnational economy, however, the path of goods movement is only one dimension of broader distribution systems. It has to be qualified to take account of each supply chain’s idiosyncrasies. Identifying where the goods will actually stop and get into a building is the key question (NAIOP, 2007; Mueller and Mueller, 2007). A path of goods movement not involving any buildings is of little interest to real estate investors. Exhibit 2 presents the journey of a container in a typical global supply chain. In essence, whenever there is a break in the fast-throughput process (i.e. a change in transportation mode), specialized infrastructure is required. There are three main types of buildings involved in the movement of imported goods, from the US port where they are unloaded to their end-users (e.g. stores, factories):

- Import-Driven Warehouses,
- Intermodal Facilities,
- Distribution Centers.

→ ***Import-Driven Warehouses*** are devoted exclusively to handling imports. Maltz and Speth (2007) explain that the concept of “import warehouse is embedded within the import process and that import warehouse operations cannot be understood except in the context of the overall import process”. Chief among these warehouses’ tasks are transloading operations whereby ocean containers are unloaded into larger domestic containers that can be swiftly shipped by rail or truck to the next step of the distribution network. In the process, ocean containers can be mixed and matched or combined into store-specific assortments (customer fulfillment operations). Import-driven warehouses are also used to consolidate imports from various origins in an effort to avoid less than truckload shipping. Their ability to handle imports depends on specific physical characteristics that set them apart from domestic warehouses. They are long and narrow, have numerous doors, large trailer parking lots, and drop yards for storing containers. The majority of import-driven warehouses are located near coastal ports although many such warehouses may be found inland at intermodal facilities (e.g. Chicago, Atlanta and Dallas).

→ ***Intermodal Facilities*** are logistics hubs located in proximity to or having on-site access to several transportation modes. Access to rail is particularly important as trains have captured a large share of domestic container traffic at the expense of trucks. Intermodal facilities aggregate flows to minimize handling and inventories. Because of congested ocean port areas and expensive land costs in coastal regions, logistics operations are being pushed inland, as faraway as possible from ports. Containers often go directly from ships onto trains to be processed in an inland facility with “intermodal ramps”. Intermodal ramps enable the transfer of containers between train and truck. Inland ports such as Alliance Texas are a growing form of intermodal facility where “all the activities relating to transport, logistics and good distribution are carried out by various operators”

(CSX Real Property, 2006). Such facilities are also called Integrated Logistics Centers (Heitman, 2007). Typically, intermodal facilities are made up of several buildings hosting distribution, processing and manufacturing, as well as a multimodal terminal. They are located in areas with large population, deep local labor base liable to perform logistics operations, and excellent connections to Interstate Highways.

→ **Distribution Centers** (DC) have traditionally been key components in supply chains (Hesse, 2002). Under the influence of globalization and surging imports, DCs have become highly efficient, big facilities incorporating the latest innovations in warehouse design, layout and management (Nuzum and Johnson, 2005a). Some mega-sized DCs exceed one million square feet. Hesse and Rodrigue (2004) explain that “network building leads to a shift towards larger distribution centers, often serving significant transnational catchments”. Finding the right location for a DC is crucial for an efficient logistics operation. In order to achieve the greatest productivity, a DC should have easy access to major transportation modes. Another criteria for location is the proximity to large population centers as well as freight and labor costs (TWR-CBRE, 2006). Like other buildings which are handling transnational flows, DCs are carefully designed for maximum efficiency, i.e. speed of delivery (Hesse and Rodrigue, 2004). The building should optimize space utilization and minimize horizontal distances in order to accelerate product flows. DCs are usually rectangular in shape with dock doors located lengthwise on both sides.

### **2-3 Challenges of transnational economies for real estate investors**

The case of warehouses illustrates the radical changes triggered by globalization and transnational economies on US-based industrial properties. The emergence of logistics real estate embodies these changes in two spectacular manners:

- US-based industrial properties are part of global networks (i.e. global supply chains) which transcend the traditional local dimension of real estate assets;
- US-based industrial properties are directly impacted by globalization-driven phenomena and related processes.

Such changes carry many new challenges for real estate investors.

#### **• *Global supply chains as transmission mechanisms between buildings and the world***

Global supply chains are the dominant transmission mechanism between US-based industrial properties and their global environment. In their quest for economies of scale, transnational corporations operate their production and distribution systems on the basis of national and international networks. Buildings are caught up in global supply chains which are constantly overhauled and optimized. In such a fast-pace environment, flexibility is a desirable characteristic. Flexibility entails that location of buildings involved in production and distribution processes might only be relevant for a limited period of time<sup>xi</sup>. Hesse (2002) explains that “firms are increasingly inclined to make location decisions dependent on specified operations. [...] The company is no longer committed to life-long location but may be able to follow the ever changing pattern of flows”. A consequence of global supply chains has been to move buildings ‘out of the map’. What matters is specified use with respect to a process, not location per se although proximity to labor pools and customers still matters. As a result, companies with much

shorter planning horizons than in the past have little incentive to own industrial real estate which would needlessly lock them in. Some real estate investments trusts like Prologis have thrived on this trend by focusing on generic, versatile buildings with short construction cycle<sup>xii</sup>. Likewise, Third Party Logistics providers like UPS and Fedex have benefited from similar fundamentals by enabling companies to leverage somebody else's logistics assets (what Friedman (2005) calls 'insourcing').

Changes, big or small, at any stage of the chain can have a radical impact on US properties. For instance, while West Coast seaports are notoriously congested, transnational companies and their logistics partners are looking for alternative routes to ship imports from Asia to the US. Several innovative solutions are currently being implemented with the expansion of the Panama Canal and the economic renaissance of the Suez Canal (McGowan, 2004). This will spur the development of East Coast seaports and ultimately push the distribution geography of the US territory eastward with negative consequences for those properties suddenly becoming sub-optimal.

**• *Globalization-driven phenomena and accrued obsolescence risk at the property level***

The rise of Third Party Logistics providers in the market for industrial real estate exemplifies the overriding influence of processes on space. Lean implies a specific mix of functional and locational characteristics which depends on each sub-type's idiosyncratic positioning in the global supply chain. As globalization-driven phenomena and related processes have come to dominate US-based industrial buildings, the paradoxical effect at property level has been the growing importance of facilities' physical characteristics. Maturation of Just-In-Time and lean as a result of accelerating globalization has led to 'process-driven' buildings.

In *Powershift*, Toffler (1990) presciently noted that "new knowledge speeds things up, drives us toward a real-time, instantaneous economy, and substitutes for time expenditure. Space is conquered by knowledge. [...] Warehouse companies are next in line for trouble as extra-intelligence spreads through the economy". Rapidly evolving processes increase real estate's sensitivity to innovation shocks and obsolescence, so much so that the constant optimization of supply chains can threaten the very relevance of apparently well-established sub-types. Exhibit 1 presents several cases of outsourcing and offshoring leading to US-based properties being circumvented altogether. Even logistics real estate is concerned. New strategies known as DC Bypass enable importers to offshore added-value logistics operations in China, thus suppressing the need for large US-based distribution centers. In transnational economies, no building is insulated from firms' global search for competitive advantages.

**• *The need for an enhanced typology of US-based industrial properties***

As a result of the two above-mentioned changes, the traditional typology of industrial real estate has become insufficient to describe the diversity of US-based industrial buildings found in a global distribution network. NCREIF does not recognize logistics real estate as a separate industrial type. The generic all inclusive sub-type 'warehouses' used in the database actually refers to the old fordist model and appears largely inadequate in the age of flexibilization and lean distribution. In 2005, NAIOP spearheaded an endeavor to standardize the terminology of industrial properties (NAIOP, 2005). Several property types were defined: warehouse (used for storage and distribution of materials),



distribution warehouse (designed to accommodate efficient movement of flows), and truck terminal. This terminology does not fully acknowledge the emergence of highly specific logistics sub-types. In particular, it focuses on use and overlooks other concepts such as intermodality of transportation modes, which are central in transnational economies. Pearce-Snyder (2008) explains "the logistics analysts who have taken charge of managing corporate shipping are abandoning the 'one (huge) size fits all' strategy, and using increasingly powerful computer algorithms to finetune their distribution systems to reflect changes in fuel costs, labor supplies and on-time performance. The future market for warehousing and distribution space is likely to become more diversified as the science of logistics becomes more diversified."

As a result, we believe that an enhanced typology of industrial buildings should be developed based on the combination of use (gauged in terms of throughput) and intermodality. Such terminology would help position a property in the distribution network, by encapsulating its exposure to global flows. The following section elaborates on the need to position US-based properties in their global environment and proposes several innovative concepts that could help real estate investors tackle the challenges raised by transnational economies.

### **3- A GLOBALIST APPROACH TO COMMERCIAL REAL ESTATE ASSETS**

#### **3-1 Transnational property: defining a new category of properties**

The paper has identified in the previous section that US-based buildings can be radically influenced by globalization-driven phenomena. In the case of industrial real estate, such phenomena (e.g. massive growth in imports) have translated into the widespread implementation of productivity-enhancing processes. More generally, through the example of industrial buildings, we identify the rise of a new category of properties which are physically located in their domestic surroundings but whose functional, locational and financial components are dominated by transnational activities (e.g. global supply chains). We call such property a *transnational property*. Transnational properties are at the core of globalization. A transnational property such as an import-driven warehouse or an inland port with foreign trade status is influenced by domestic demand but also by manufacturing conditions in countries where imports are produced. Transnational properties are therefore very sensitive to any changes in the global economic situation underpinning competitive advantage and investment flows.

A process-driven industrial building is the simplest example of transnational property. However, not all transnational properties are process-driven. To enlarge the scope of our analysis, a residential property in Manhattan catering to high-flying international finance executives can also be considered a transnational property insofar as the conditions leading to the income generating abilities of the building derive in large part from sociological and economic changes triggered by globalization. Likewise, the headquarters of a transnational corporation are essentially a transnational property. It is obvious that in these two cases, the degree of the properties' transnationality will be more difficult to assess than for an industrial building. In all probabilities, it will be lower than in the case of an import-driven warehouse. Nonetheless, it would be simplistic to overlook it.

### **3-2 Positionality: placing buildings in transnational economies**

Bardhan and Kroll (2007) note that as a result of globalization, real estate's geographic reach has been extended, weakening the nexus between 'local' and 'location'. Understanding the new nexus between local and location, and more generally between local and global, is crucial in order to position buildings in their global environment. In order to do so, we rely on concepts developed in the field of geography. Thanks to its focus on the spatiality of the contemporary world, geography has an important contribution to make on issues pertaining to globalization and real estate. Economic geographers have been actively researching the impact of globalization on location and place.

Globalization profoundly alters geographic scales. Transnational phenomena (e.g. outsourcing and offshoring) are responsible for scalar switchability (i.e. the switch from one scale to another, for example from the local to the global in case of outsourcing), resulting in scale overlapping and complex geographies of linkage (Yeung, 2002). In such an environment, how can we best define the location of a building? And is location still a relevant characteristic of physically rooted assets like real estate? Two schools of thoughts are proposing totally divergent answers to these questions (Amin, 2001):

- On the one hand, neo-liberal theories assert that the homogenization of firms, sectors and geographical territories tend to cancel the role of place. This view considers that transnational economies trigger a space-time compression of such magnitude that geography does not matter anymore (e.g. Cairncross, 1997). The world has become a "space of flows" (Castells, 1996);
- On the other hand, a majority of geographers consider that due to the geographical embeddedness of the economy, "globalization may have eliminated space, but it has by no means undermined the significance of location, of place" (Martin, 1999). Dicken (2007) states that the world is both a "space of places" and a "place of flows".

The aspatiality of competitive advantage flows currently dominating production and distribution systems in the West seems to support the neo-liberal view of a homogenized world where geography is irrelevant. However, as noted before, in many activities pertaining to economic globalization, place still matters, especially in relation to geographic scale interconnectedness (e.g. access to multi-modal transportation in supply chains)<sup>xiii</sup>. As noted by Yeung (2002), a global sense of place supposes that localities as sites of agglomerated activity have "far less to do with the properties of a territorial system (e.g. localized linkage) than with the effects of spatial and temporal exposure and connectivity". Sheppard (2006) proposes the concept of *positionality* to characterize relative location within the new global capitalist space economy. Positionality can be used to describe "how different economic agents are positioned with respect to one another in space-time. [...] Positionality is a relational construct: the conditions of possibility for an agent depend on its position with respect to others as in network theory".

We propose that a new concept of property location modeled after positionality be developed. One way to position buildings in transnational economies is to focus on exposure to globalization-driven flows. Globalization entails flows of goods, people, capital, and information which have the potential to impact all four commercial real

estate property types. As exemplified by logistics real estate, exposure to global flows is a differentiating feature among properties. Import-driven warehouses are more directly exposed to globalization than DCs inasmuch as DCs may also handle domestic-driven flows. The distinctive degree of exposure stemming from a property's positioning in the global network of transnational flows (e.g. its role and location in a global production network) impacts the property's reaction to international macro-economic events, and ultimately its risk profile for real estate investors.

In sum, the concept of transnational property implies a non-spatial definition of location inasmuch as the main factors defining a property in a transnational economy are not its physical characteristics with respect to a local, or even regional, geographic scale but its functional and locational components which are part of fast-changing transnational phenomena underlying globalization-driven flows.

### **3-3 Transnational Coefficient: a property-level measure of globalization**

To quantify a property's exposure to transnational flows, we develop a quantitative measure of globalization at the property level. This quantitative measure is called *Transnational Coefficient*. The Transnational Coefficient (TC) emulates transnationality indices used to assess the degree of firm internationalization (Ietto-Gillies, 1998).

Our objective is to design a simple, easy to compute measure that is conceptually and practically relevant while avoiding subjective measurements.

This paper presents an index made up of two indicators:

- the first indicator called *Property Globalization Score* (PGS) relates to the property itself;
- the second indicator known as *Tenant Transnationality Score* (TTS) relates to the property's tenants and the assessed internationalization of their activities.

The Transnational Coefficient is a composite index based on both the property's exposure to globalization flows and tenants' assessed degree of internationalization. It is computed as follows:

$$TC = PGS \times TTS$$

The Transnational Coefficient should be reported with the combined index and the two indicators, i.e. TC (PGS, TTS), in order to enable comparisons across properties and tenants.

#### **• Property Globalization Score (PGS)**

We select three ratios indicative of a building's exposure to global flows:

- Use of the building associated with imports/ exports (in percentage of square footage),
- FDI ownership of the building (measured as percentage in total USD ownership e.g. joint venture),
- Foreign tenants in the building (measured as percentage in USD rental income).

The Property Globalization Score is defined as the weighted average of these three ratios. The PGS is computed by weighting the indicators as follows: 60% for building use, 20% for FDI ownership, and 20% for foreign tenants. These proposed weights mark a trade

bias consistent with the current dominance of competitive advantage flows. They are adjustable depending on analysts' appreciation of the global economic environment.

$$PGS = W_1 \times \% \text{ Building Use} + W_2 \times \% \text{ FDI Ownership} + W_3 \times \% \text{ Foreign Tenants}$$

with  $W_1 = 0.6$ ,  $W_2 = 0.2$ , and  $W_3 = 0.2$

• **Tenant Transnationality Score (TTS)**

To determine the Tenant Transnationality Score, we define a set of indicators capturing the potential for outsourcing / offshoring of the activities carried out in the building given the industry in which tenants operate. The TTS focuses on imports of goods (trade flows, outsourcing) and services (offshoring). This is a three-step process:

- We first score the current level of internationalization of tenants' supply chain. We compute the following ratio: *Imported Inputs/ Cost of Goods Sold* in tenant's income statement. For the sake of convenience, this ratio may also be calculated at the aggregate level (industrial sectors).

- We then assess the potential for increased globalization of tenants' supply chain. We focus on labor cost differences, by computing the following ratio:

$$\frac{\text{Average Annual Domestic Salary for tenant's industrial sector in USD}}{\text{Average Annual Salary in pool of potential foreign suppliers in USD}}$$

The average US salary is from the Bureau of Labor Statistics. Average foreign salaries are aggregate macro data. The higher the labor cost difference ratio, the higher the risk of outsourcing/ offshoring for the activities performed in the building. If the tenant is a retailer, the industrial sector selected in the ratio is that of goods sold (e.g. manufacturing).

- The Tenant Transnationality Score (TTS) is given by the product of the two above mentioned ratios.

$$TTS = \frac{\text{Imported Inputs}}{\text{Cost of Goods Sold}} \times \frac{\text{Average Domestic Annual Salary in USD}}{\text{Average Foreign Annual Salary in USD}}$$

• **Examples**

*Example 1: Industrial building used by a domestic manufacturer relying on imported components in its supply chain.*

Property Globalization Score

Percentage square footage used for import/export= 20%

Percentage FDI in the building= 0%

Percentage Foreign Tenants in the building= 0%

Hence, PGS= .6x.2 + .2 x 0 + .2x 0=0.12

Tenant Transnationality Score

Imported Inputs/ Cost of Goods Sold= 16%

Average US Salary in USD= 30,000

Average Foreign Salary in USD= 3,000

Hence, Labor Cost Difference ratio= 10

Tenant Transnationality Score=  $.16 \times 10 = 1.6$

And Transnational Coefficient=  $0.12 \times 1.6 = 0.192$  reported as TC= 0.192 (0.12, 1.6)

*Example 2: Import-driven warehouse used by a large domestic retailer.*

Property Globalization Score

Percentage square footage used for import/export= 100%

Percentage FDI in the building= 0%

Percentage Foreign Tenants in the building= 0%

Hence, PGS=  $.6 \times 1 + 0.2 \times 0 + 0.2 \times 0 = .60$

Tenant Transnationality Score

Imported Inputs/ Cost of Goods Sold= 70%

Average US Salary in USD= 45,000

Average Foreign salary in USD= 3,000

Hence, Labor Cost Difference ratio= 15

Tenant Transnationality Score=  $.7 \times 15 = 10.5$

And Transnational Coefficient=  $0.60 \times 10.5 = 6.3$  reported as TC= 6.3 (.60,10.5)

*Example 3: Residential building in Manhattan rented to expatriate executives and owned by a joint venture between a domestic real estate fund and a European investment bank.*

In case of residential properties, we set TTS equal to 1 and report it as not applicable (N/A). Hence, TC= PGS

Property Globalization Score

Percentage square footage used for import/export= 0%

Percentage FDI in the building= 30%

Percentage foreign tenants in the building= 50%

Hence, PGS=  $.6 \times 0 + 0.2 \times 0.3 + 0.2 \times 0.5 = .16$

And Transnational Coefficient= 0.16 reported as TC= 0.16 (.16, N/A)

Shin (2002) explains that “though there is general agreement about what economic globalization encompasses as a concept, finding comparable analysis and indicators on the subject can be difficult.” The Transnational Coefficient’s multidimensional approach aims to address this concern by proposing a comprehensive and consistent measure of globalization at the property type.

The Transnational Coefficient is designed to be transnational properties’ bar codes in a global economy. It is a quantitative measurement of positionality applicable to all commercial property types.

**3-4 Toward Global Economic Base Categories (GEBC)**

Finally, we broaden the scope of our analysis and propose an updated version of the Economic Base Theory to account for the global economic environment. The corresponding concept presented thereafter is called *Global Economic Base Category or GEBC*. The next section introduces this innovative concept and explains how it could

help real estate investors tackle the challenges of transnational economies. Due to the format of this paper, we can only present an overview of our analysis.

Economic Base Categories (EBC) are often described as an alternative to geographic regions in real estate portfolio diversification. For instance, papers by Mueller and Ziering (1992), and Mueller (1993) explain that local economic drivers of individual metropolitan areas are “the key determinants for more efficient diversification”. A strategy shedding geography altogether and diversifying along purely economic lines provides real estate portfolio managers with superior risk-adjusted returns. The methodology used in these papers to determine economic categories is consistent with that developed by Hoyt (Hoyt, 1954). It is based on employment and MSA-dominated economic regions. The economic base theory which was devised in the 1930s as a planning tool and refined in the 1950s when extensive research on the topic was conducted by land economists (e.g. Andrews’ series of articles) relies on a fordist, export-oriented (basic) mode of production. The economic base theory was actually well adapted to capture the regional impact of US multinational corporations’ explosive growth in the post WWII era. However, one may wonder whether it is still applicable to post-fordist, import-driven economic activities in the ‘super symbolic economy’ defined by Reich (1991). In other words, is the economic base theory obsolete in the age of globalization? Fujita, Krugman, and Venables (1999) state that the economic base theory is best applied to a region in isolation but basically inapplicable to the national economy, let alone to the world. How can traditional economic base categories be relevant then in an economy where the global scale pervades most economic activities even at the most local level? In fact, several elements mentioned in this paper thus far cast doubt on the validity of Economic Base Categories in transnational economies, and therefore their applicability as diversification tools for real estate portfolio managers. First, as implied by the concept of positionality, globalization challenges the very notion of region. Scale overlapping and scalar switchability engulf buildings into complex networks which transcend any established definition of economic regions. Secondly, due to the dual effect of globalization and lean on production and distribution systems, productivity has surged while employment (e.g. in manufacturing among other economic groups) has been steadily declining. Hence, value creation and the built environment are increasingly disconnected from employment. Thirdly, globalization puts into question the classification of economic groups traditionally used in EBC analysis (as exemplified by the blurring line between manufacturing and warehousing). Hence, globalization-driven phenomena challenge base identification, base measurement and base types as customarily used in the economic base theory.

• ***Base identification: Setting the boundaries of transnational regions***

Hoyt (1954) mentions that “the normal unit for analyzing the economic base is the metropolitan area, or the area in which people can work in any one part of the region and live in any other part of it”. Identifying the base area has always been a challenge. Many papers have been written on the topic (e.g. Andrews, 1954b; Mattila and Thompson, 1955). However, this issue has taken an all-new dimension with the rise of transnational economies.

The new geography of production and distribution as well as the emergence of global supply chains and related global production networks seriously threatens the simple vision of base proposed by early theorists. Focusing on MSA is no longer the answer. As explained by Sassen (2002), global cities are now involved into “a strategic cross-border geography constituted through multiple ‘locals’”. The spatiality thus produced can be thought of as a cross-border network of specific sites embedded partly in the national but constituted through spatial and temporal practices that distinguish these from others, notably those of the national, as historically constructed”.

It is a well known feature of large cities to have ‘discontinuous hinterlands’. Van Cleef (1937) acknowledges that a major difficulty of the economic base theory derives from the fact that contrary to small villages which have ‘continuous hinterlands’, cities have commercial and cultural relations with other cities and regions in many parts of the world. Mayer (1954) describes the case of Chicago as the quintessential American city with a discontinuous hinterland. He writes: “The Chicago region is nationwide and even world-wide in extent. A large part of the civilized world [...] receives more of its agricultural machinery from Chicago, than from any other place. The Chicago Board of Trade is the mart in which grain prices are set for the world. [...] Therefore, Chicago’s discontinuous hinterland [...] is virtually worldwide”.

The literature contains various alternatives to the classic metropolitan area. We will briefly review the most relevant for our analysis and explain how they might help construct economic bases in a global context.

Transportation has been mentioned as a way to delineate economic base areas. Gras quoted by Andrews (1954d), and Mayer (1954) look at transportation routes and traffic flows to establish the boundaries of ‘ideal’ regions. Such an approach is interesting, though insufficient. In particular, it is very difficult to implement in the context of transnational economies because of their extreme spatial nodality fostered by multi-modal transportation and the emergence of continuous flows (of information, goods).

Andrews (1954d) proposes several area delimitation techniques including the legal city, the labor market area and the industrial area. Of these three techniques, only the industrial area seems somewhat relevant to transnational economies, by placing the emphasis on the integration and interdependence of productive activities. Andrews (1954c) mentions the concept of ‘linked activities’ which could theoretically be applied to global production networks. Linked activities encompass enterprises and industries with varying degrees of interdependence in the urban community as well as “chains of production where there is a formal and direct supply and demand relationship”. Linked activities however suppose relatively short chains. Andrews confesses that “we are still very much in the dark concerning such link associations but have some satisfaction in knowing that these chains cannot usually be very long due to the small chance of locational advantages in one metropolitan area.” To deal with the long and complex chains found in transnational economies, other concepts might be necessary. Tiebout (1956) refers to Lösch’s production-oriented spatial system as the closest approximation to an ‘ideal’ region. Lösch (1943)’s analysis brings an interesting perspective on the issue of linkages and interconnectedness in transnational economies. He defines three types of economic regions: market areas, regional networks and regional systems (also called economic landscapes). An economic landscape is self-sufficient. Lösch writes: “the economic landscape is a system of different markets; an organism, not merely an organ”.

Interestingly, this is very close to what Skjøtt-Larsen et al. (2007) explain about supply chains. A global supply chain creates “an organizational system with its own attribute. It becomes an organization in its own right, a supra-organization, linking the operations of members”. In essence, global supply chains are transnational economic landscapes.

Therefore, we suggest that the ‘ideal’ transnational region be defined by the simultaneous satisfaction of the following two tests:

- Whether the metropolitan district is on the path of transnational flows, from their point of origination to their destination (e.g. For imports, from the port of entry to the end-users. For exports, from the producer to the place of departure for foreign buyers). For example, an inland hub concentrates all kinds of transnational flows and as such it is part of many transnational regions,
- Whether the metropolitan district is part of a global supply chain (global production network).

By definition, geographic areas which do not belong to a transnational region are excluded from the ‘benefits’ of globalization. The name of the game for any metropolitan districts is to meet both tests in order to appear on the new global economic map. However, it is a daunting task due to the constant re-definition of optimal global supply chains in the face of intense global competition (see endnote xi).

A major characteristic of transnational regions is that they transcend any concept of national borders. Transnational regions reach beyond domestic boundaries. They are essentially connected to other foreign transnational regions with which they interact. To go back to our case study, container ports and import-driven warehouses concretely link domestic transnational regions and exporting countries’ transnational regions under the umbrella of global supply chains/ global production networks. Although domestic and foreign transnational regions might be influenced by very different local factors, there are symbolically no borders between the two.

• ***Base measurement: transnational value as ‘captured value’***

Base and non-base are generally measured in units of employment. This is the methodology applied in the real estate finance diversification literature. Andrews (1954a) underlines the limitation of such an approach in case of increasing productivity. He proposes several alternatives including payroll, physical production, and value-added. In this paper, we choose to focus on value added.

Value added is often mentioned as a viable alternative to employment (e.g. Sirkin, 1956) even though it is not exempt from shortcomings. Because of the practical complexity of implementing value-added as a unit of measure, this approach has been somewhat overlooked over the years. We think that globalization should put the focus back on value added as unit of base measurement.

The traditional economic base theory assumes that value creation is anchored in a local environment, which justifies its choice of MSA-dominated economic bases and employment. Transnational economies have turned this conception on its head. Transnational economic bases suppose a new definition of base measurement modeled after the complex value creation process of transnational economies. As exemplified by the study of logistics real estate, transnational value creation is less dependent on and less attached to a geographical context than value creation in the old fordist system. Value



added should therefore be qualified in terms of creation loci and ability of the producing region to capture it.

Cole, Hess, Yeung, Dicken, and Henderson (2004) stress the growing disconnect between global production networks and regional development. They write: “the fact that a region is ‘plugged’ into global production networks [...] does not automatically guarantee its positive developmental outcome because local actors in this region may be creating value that does not maximize the region’s economic potential. [...] Local actors in a region also may not be able to capture much of the value created. From the regional development perspective, the creation and retention of value within the region is imperative”.

Hence, we suggest that base be measured in terms of ‘captured value added’. The short-cut method to estimate captured value added is to look at regional firms’ tax returns.

• ***Base type: classifying transnational activities***

Classifying the base activity types is the last but not least dimension of the economic base theory. The choice of types has to reflect underlying economic activities.

Weimer and Hoyt (1939) present a list of seven economic base activity types: manufacturing, trade, extractive industries, governmental activity, educational institutions, resorts and amusement centers, retirement. Mueller (1993)’s diversification strategies are based on nine economic groups: farm, finance and real estate, government, manufacturing, military, mining, service, transportation and diversified. The differences between both lists indicate the structural changes of the US economy from the late 1930s to the 1990s, i.e. the rise of financial services especially.

Andrews (1953) proposes a classification based on a radically different methodology. He classifies types according to genres of export: export of goods, export of services, and export of capital. What could be the relevant criteria in a transnational economy? Should the exposure to transnational flows (i.e. positionality) or the ability to create transnational value be the differentiating factor? Further research beyond the scope of this paper is needed to answer these questions. Nonetheless, it makes no doubt that the selection of global supply chains/global production networks as units for base identification supposes a more precise classification of economic types.

Globalization and process-driven transnationality entail an increased specialization at all levels of the economy while many activities are no longer geographically determined (see table 1). This is to a large extent incompatible with the cluster bias of traditional base types. We suggest therefore that as a first approach, the nine category classification be overhauled. In particular, the large number of MSAs falling into the diversified base group in Mueller’s study is totally unsatisfactory. This point is actually crucial. As transnational corporations are increasingly opting for a modular mode of organization which fosters lean and flexibilization, many core activities are turned into outsourced services (e.g. distribution outsourced to Third Party Logistics providers). The classification of transnational activities will have to reflect bases’ economic structure in a way which is not only large enough to encompass most generic cases but also, and more importantly, discriminating enough to avoid the pitfall of vast undetermined so-called ‘diversified services’ economic bases which would add no value to real estate investors.

• ***Summary: did Homer Hoyt know something about globalization that we are too afraid to ask?***

Despite its shortcomings, the economic base theory is more relevant than ever for real estate investors. In a world where property location is essentially non-spatial, an updated version of the economic base theory can become an essential part of a new global economic geography. Global economic base categories have the potential to be compasses allowing investors to perform international comparisons across continents, to identify connections among transnational regions and to quantify the impact of those connections on domestic regional and local economies.

By linking export and regional growth, Homer Hoyt had a vision of globalization in which value creation is rooted in material space. Due to the various processes described in the second section of this paper, this is no longer the case.

Value is mobile like the flows that carry it. It moves along global supply chains as rapidly as transnational corporations can re-organize their production and distribution systems. The issue for real estate investors is to position themselves where value is created (e.g. for industrial and office properties) and captured (e.g. for residential properties). In the case of distribution, for instance, we identified three types of buildings involved in transnational value creation. To make things even more complicated, transnational value creation involves processes which are not necessarily spatially defined (e.g. ‘merge-in-transit’ as shown on exhibit 1). Global economic base categories would enable real estate investors to come to grasp with these changes.

## **CONCLUSION**

In this paper, we analyze the impact of globalization and transnational economies on domestic direct real estate assets. Our case study of US-based industrial properties, and more particularly logistics real estate, illustrates the challenges posed by transnational economies to real estate investors. Drawing from the fields of economic geography and transport geography, we describe several innovative concepts and tools that characterize properties in a global economy and help capture the linkage between domestic properties and their global economic environment.

Globalization-driven phenomena underpinning transnational flows have triggered the emergence of a new category of property called ‘transnational property’, i.e. a property which, although physically located in the US, is exposed to complex transnational flows. A transnational property implies a non-spatial definition of location modeled after economic geography’s positionality. The Transnational Coefficient introduced in this paper provides an objective measurement of a property’s exposure to transnational flows. It is a multidimensional index of globalization at the property level, akin to a bar code, that investors can use to analyze their portfolios across buildings and tenants.

We also propose an updated version of the Economic Base Theory to take account of the new global interconnectedness of national economies. We use global supply chains as the unit of base identification and define the concept of Global Economic Base Category (GEBC). Location quotients of these new economic bases known as ‘transnational economic landscapes’ are measured by comparing ‘captured value-added’ at the regional scale.

Globalization with its tectonic consequences on the world economy impacts each country not only at the macro level but also at the micro level by the changes it entails in terms of where (and how) people live and work. Buildings reflect these changes. Real estate assets which are literally at the heart of globalization are an excellent vector to present an analysis of transnational economies. Hence, it would not be surprising if concepts designed in real estate analysis for capturing the influence of globalization-driven phenomena on direct real estate assets would eventually find their way in the larger economic analysis.

We believe that the next frontier in real estate finance is not the link between securitized real estate and globalization but the new interconnectedness of direct real estate assets worldwide. Indeed, what is the connection between a specific property type in a large US city and its equivalent in a first-tier Asian city? This is an open question that will need further research. Dealing with this question and many others related to transnational economies will require an opening of real estate finance to other fields. Geography in particular can provide an original and useful standpoint on globalization, by anchoring the analysis in the various scales surrounding buildings. Paradoxically, going back to the roots of real estate assets as quintessentially physical entities will be instrumental in deciphering the consequences of economic globalization and transnational value creation for real estate investors.

---

<sup>i</sup> Even though China has carved out a position as the world's leading low-cost manufacturer, its foreign direct investments in real assets remain very limited. As of 2008, China has officially no stake in US direct real estate. The situation is more complex in practice as a result of the Chinese government's massive investments in financial securities and investment vehicles (e.g. private equity funds). One might assume that there are numerous non-financial factors explaining this situation, including politics and fears of backlash from western public opinion as experienced by the Japanese in the 1980s.

<sup>ii</sup> Clark and Lund (2000) follow an historical framework of analysis which identifies three successive stages in property investment, from a predominantly local and relatively closed model to a highly open and globally oriented model. Their analysis emphasizes the role of securitization as a crucial vector of globalization.

<sup>iii</sup> Based on Graaskamp (1988) and Bardhan and Kroll (2007), we can identify a broad typology of transnational flows potentially affecting US real estate markets: first, flows linked to firms' global search for competitive advantages or 'competitive advantage flows' (e.g. imports of low cost components, outsourcing); secondly, flows linked to investments in real estate, called 'investment flows', either directly in buildings or indirectly through securitized real estate (e.g. REITs). Investment flows encompass foreign direct investments and direct investments abroad.

<sup>iv</sup> Kresl and Fry (2005) explain that the term globalization may be traced to the Japanese expression 'dochakuka' which literally means global localization.

<sup>v</sup> Dicken (2007) defines a transnational corporation (TNC) as "a firm that has the power to coordinate and control operations in more than one country, even if it does not own them". A TNC has also "the ability to take advantage of geographical differences in the distribution of factors of production and the ability to switch and to reswitch its resources and operations between locations at an international or even global scale". The last point is essential insofar as it is in sharp contrast to the stable and permanent nature of real estate assets.

<sup>vi</sup> Heitman (2007) writes that "over the last 10 years, imports from abroad, particularly China, have grown at a compound annual rate of about 17 percent, three to four times greater than the US GDP growth over

---

the period”. Likewise, the US economy has experienced a sharp decline in manufacturing activities since the 1950s, with manufacturing employment shrinking from 35% of the US private sector workforce to only 11% in 2006.

<sup>vii</sup> Skjøtt-Larsen T., P. Schary, J. Mikkola, and H. Kotzag (2007) define “the global supply chain as the process of supply, production, and distribution that makes other [corporate] strategic objectives possible. [...] The underlying concept of the supply chain is a linear sequence of operations organized around the flow of materials from source of supply to their final distribution as finished products to ultimate users”.

<sup>viii</sup> Speh (2006) explains that cross-docking is “the ultimate in speed as it relates to the warehouse. [...] The goal of cross-docking is to avoid placing the product in storage. The product is received from a truck or rail car at one dock location, moved “across the dock” to another truck, and then delivered [to the end user]. It is most effective in buildings that are constructed for that purpose. The ideal cross-docking facility has many dock doors, and the building is relatively long and narrow [...] to facilitate the easy movement of product from the receiving docks on one side of the building to the shipping docks on the other side”.

<sup>ix</sup> Postponement is a term used in logistics to describe a host of operations that add value to the efficiency of the entire supply chain. Speh (2006) mentions that “the warehouse is the best place to perform these services because of low labor cost, efficiency and proximity to the customers. [...] Postponement simply means to wait until the last possible moment to create the final form of a product.” It encompasses services such as branding and labeling, packaging, final assembly, blending, kitting and reverse supply chain.

<sup>x</sup> Interestingly, operators who used to be active in shipment only (e.g. trucking companies) now often manage the full range of logistics operations and in some cases are even involved in logistics real estate (e.g. CSX Real Property which is the real estate subsidiary of CSX, a major North American railway operator).

<sup>xi</sup> The frequent redefinition of optimal location characterizing global supply chains is in sharp contrast to the situation which dominated industrial growth in pre-fordist America. Pred (1966) explains that “existing industrial locations were usually characterized by tremendous inertia and a temporal compounding of advantages”, thereby resulting in initial advantage. In transnational economies, the very concept of initial locational advantage seems somewhat irrelevant given the speed of change.

<sup>xii</sup> During the week following the Chinese incident (from February 26<sup>th</sup>, 2007 to March 5<sup>th</sup>, 2007), Prologis shares lost 10.65 percent on the New York Stock Exchange. Prologis’ activity is directly driven by growth in global trade. The company operates in 20 countries with almost half of its assets under management out of the US. As of December 31, 2007, the company’s Chinese investments are small in value (\$0.6 bln) although they are significant in geographical coverage (located in cities representing 80% of China’s GDP) and square footage (15.5 msf).

<sup>xiii</sup> According to the four-age-of-place framework described by Swann (2006), western economies are currently in the third age characterized by global clusters and extensive international trade. In this age, place is both irrelevant in terms of customer access and very important considering that “agglomeration economies are highly location specific [i.e.] producers in a specific industry may find that there are only a few places worldwide where they can locate and remain competitive”.

## **REFERENCES**

Ambrose B. An Analysis of the Factors Affecting Light Industrial Property Valuation. *The Journal of Real Estate Research*, 5:3, 1991.

Amin A. Globalization: Geographical Aspects. In *International Encyclopedia of the Social and Behavioral Science* (Smelser N. and P. Baltes, eds), Elsevier, 9, 2001.

Andrews R. Mechanics of the Urban Economic Base: A Classification of Base Types. *Land Economics*, 29:4, 1953, 343-350.

Andrews R. Mechanics of the Urban Economic Base: The Problem of Base Measurement. *Land Economics*, 30:1, 1954a, 52-60.

Andrews R. Mechanics of the Urban Economic Base: General Problems of Base Identification. *Land Economics*, 30:2, 1954b, 164-172.

Andrews R. Mechanics of the Urban Economic Base: Special Problems of Base Identification. *Land Economics*, 30:3, 1954c, 260-269.

Andrews R. Mechanics of the Urban Economic Base: The Problem of Base Area Delimitation. *Land Economics*, 30:4, 1954d, 309-319.

Bardhan A., R. Edelstein and D. Tsang. Global Financial Integration and Real Estate Security Return. Working Paper, University of Berkeley. 2007

Bardhan A. and C. Kroll. Globalization and Real Estate: Issues, Implications, Opportunities. *Fisher Center Research Reports- Paper 0407*, 2007.

Bellofiore R. and G. Vertova. Lost in Space? The Geographical and Political Dimension of Uneven Capitalist Development. In *The Changing Economic Geography of Globalization* (G. Vertova, editor). Routledge, 2006.

Buttimer R., R Rutherford, and R. Witten. Industrial Warehouse Rent Determinants in the Dallas / Fort Worth Area. *Journal of Real Estate Research*, 13:1, 1997.

Cairncross F. The Death of Distance: How Communications Revolution Is Changing Our Lives, *Harvard Business School Press*, 1997.

Case B., W. Goetzmann and K. Rouwenhorst. Global Real Estate Markets- Cycles and Fundamentals. *National Bureau of Economic Research*, Working Paper 7566, February 2000.

Castells M. The Information Age: Economy, Society and Culture. 3 vols. *Blackwell*, 1996.

Clark E. and A. Lund. Globalization of a Commercial Property Market: The Case of Copenhagen. *Geoforum*, 31, 2000, 467-475.

Cole N., M. Hess, H. Yeung, P. Dicken and J. Henderson. Globalizing Regional Development: A Global Production Networks Perspective. *Transactions of the Institute of British Geographers*, 29:4, 2004, 468-484.

CSX Real Property. Development of an Integrated Logistics Center in Winter Haven Florida. *HDR/HLB Decision Economics*, January 2006.

Dicken P. Global Shift. Mapping the Changing Contours of the World Economy. *The Guilford Press*, 5<sup>th</sup> edition, 2007.

DiPasquale D. and W. Wheaton. Urban Economics and Real Estate Markets. *Prentice-Hall*, 1996.

Ehrenberg M. and S. Mallen. Real Estate Services and a Globalized Asset Class. *Real Estate Issues*, Fall 2003.

Fehribach F., R. Rutherford, and M. Eakin. An Analysis of the Determinants of Industrial Property Valuation, *The Journal of Real Estate Research*, 8:3, 1993.

Freedman B. and D. Twist. Why Warehousing and Distribution Patterns are Changing. *Development Magazine, NAIOP*, Winter 2000.

Friedman T. The World is Flat: A Brief History of the Twenty-first Century. *Farrar, Straus and Giroux*, New York, 2005.

Fujita M., P. Krugman and A. Venables. The Spatial Economy: Cities, Regions and International Trade, *MIT Press*, 1999.

Graaskamp J. The Role of Investment Real Estate in Portfolio Management (1970). In *Graaskamp on Real Estate*, ULI- Urban Land Institute, 1991.

Graaskamp J. Globalization of Real Estate -Remarks prepared for the Meredith & Grew Ninth Annual Seminar held in Boston on February 4, 1988. In *Graaskamp on Real Estate*. ULI-Urban Land Institute, 1991.

Grissom T., D. Hartzell and C. Liu. An Approach to Industrial Real Estate Market Segmentation and Valuation Using the Arbitrage Pricing Paradigm. *AREUEA Journal*, 15:3, 1987.

Hamelink F. and M. Hoesli. What Factors Determine International Real Estate Security Returns? *Real Estate Economics*, 32:3, 2004.

Heitman. Rail + Real Estate=Integrated Logistics Center. *Heitman Perspective*, Brian Klinksiek, February 2007.

Hesse M. Logistics Real Estate Markets: Indicators of Structural Change, Linking Land Use and Freight Transport, *Paper presented at ERSA Conference "From Industry to Advanced Services"*, May 2002.

Hesse M. and J.P. Rodrigue. The Transport Geography of Logistics and Freight Distribution. *Journal of Transport Geography*, Vol. 12, 2004, 171-184.

Hesse M. and J.P. Rodrigue. Globalized Trade and Logistics: North American Perspectives. In *Globalized Freight Transport* (T. Leinbach and C. Capineri, editors), Edward Elgar, 2007.

Hoag J. Towards Indices of Real Estate Value and Return. *The Journal of Finance*, Vol. 35, N. 2, May 1980.

Hoyt H. Homer Hoyt on Development of Economic Base Concept. *Land Economics*, 30:2, May 1954, 182-186.

Hughes W. Determinants of Demand for Industrial Property. *The Appraisal Journal*, April 1994.

Letto-Gillies, G. Different Conceptual Framework for the Assessment of the Degree of Internationalization. *Transnational Corporations*, UNCTAD, 7:1, 1998.

Kling J. and T. McCue. Stylized Facts about Industrial Property Construction. *The Journal of Real Estate Research*, 6:3, 1991.

Knox P. Globalization and Urban Economic Change. *Annals of the American Academy of Political and Social Science*, Vol. 551, May 1997, 17-27.

Kresl P. and E. Fry. The Urban Response to Internationalization. *Edward Elgar*, 2005.

Levinson M. The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger. *Princeton University Press*, 2006.

Ling D. and A. Naranjo. Economic Risk Factors and Commercial Real Estate Returns. *Journal of Real Estate Finance and Economics*, 1996, 14:3, 283-301.

Lockwood L. and R. Rutherford. Determinants of Industrial Property Value. *Real Estate Economics*, 24:2, 1996.

Lösch A. The Economics of Location. Translated from the Second Revised Edition (1943). *Yale University Press*, 1954.

Maltz A. and T. Speh. Import-Driven Warehousing in North America. *Prologis Supply Chain Review*. Spring 2007.

- Marshall A. Principles of Economics, *Macmillan* 1890, Eighth Edition, 1920.
- Martin R. The New Economic Geography of Money. In *Money and the Space-Economy* (R. Martin, editor), Wiley, 1999.
- Mattila J and W. Thompson. The Measurement of the Economic Base of the Metropolitan Area. *Land Economics*, 31:3, 1955, 215-228.
- Mayer H. Urban Nodality and the Economic Base. *Journal of the American Planning Association*, 20:3, 1954, 117-121.
- McGowan M. The Impact of Shifting Container Cargo Flows on Regional Demand for US Warehouse Space. *The Journal of Real Estate Portfolio Management*, 2005, 11:2, 167-185.
- Mueller G. Refining Economic Diversification Strategies for Real Estate Portfolios. *The Journal of Real Estate Research*, 8:1, 1993.
- Mueller G. and S. Laposa. The Path of Goods Movement. *Real Estate Finance*, 11:2, Summer 1994.
- Mueller G. and A. Mueller. Warehouse Demand and the Path of Goods Movement. *The Journal of Real Estate Portfolio Management*, 2007, 13:1, 45-55.
- Mueller G. and B. Ziering. Real Estate Portfolio Diversification Using Economic Diversification. *The Journal of Real Estate Research*, 7:4, 1992.
- NAIOP Terms and Definitions: U.S. Office and Industrial Market. *The National Association of Industrial and Office Properties Research Foundation*, 2005.
- NAIOP. Global Logistics: Goods Movement Panel (IMS Worldwide, DHL, TransSystems). *Development '07- NAIOP Annual Conference*, Winter 2007.
- Nuzum P. and C. Jonhson. Supply Chain Leaders share their Best Practices. *Prologis Supply Chain Review*, February 2005a.
- Nuzum P. and C. Jonhson. Offshore Outsourcing. *Prologis Supply Chain Review*, February 2005b.
- Nuzum P. and C. Jonhson. Product Proliferation. *Prologis Supply Chain Review*, May 2006.



Pearce-Snyder D. Commercial Real Estate in a Flat World: The Implications of Economic Globalization for Industrial, Office and Mixed-Use Real Estate in North America. *NAIOP Research Foundation*, 2008.

Pred A. The Spatial Dynamics of U.S. Urban-Industrial Growth, 1800-1914: Interpretive and Theoretical Essays. *The M.I.T. Press*, 1966.

Rabianski J. and R. Black. Why Analysts often make wrong Estimates about the Demand for Industrial Space. *Real Estate Review*, Vol. 27:1, Spring 1997, 68-73.

Reich R. The Work of Nations. *Alfred A. Knopf*, 1990.

Renaud B. The 1985 to 1994 Global Real Estate Cycle: An Overview. *Journal of Real Estate Literature*, 5, 1997.

RREEF. State of the US Industrial Market: Global Gateway & National Distribution Hubs Dominate. *RREEF Research*, Vol. 49. July 2006.

Sachs J. and H. Shatz. Trade and Jobs in US Manufacturing. *Brookings Papers on Economic Activity*, Vol. 1994, N. 1, 1994.

Sassen S. Cities in a World Economy. *Pine Forge Press*, 3<sup>rd</sup> edition, 1994.

Sassen S. The Global City: The De-Nationalizing of Time and Space. *Symposium AEC*, 2002.

Sheppard E. Positionality and Globalization in Economic Geography. In *The Changing Economic Geography of Globalization*. (G. Vertova, editor), Routledge, 2006.

Shin M. Measuring Economic Globalization: Spatial Hierarchies and Market Topologies. *Environment and Planning A*, Vol. 34, 2002, 417-428.

Sirkin G. The Theory of the Regional Economic Base. *The Review of Economics and Statistics*, 41:4, 1959.

Skjøtt-Larsen T., P. Schary, J. Mikkola, and H. Kotzab. Managing the Global Supply Chain. *Copenhagen Business School Press- Liber*, 3<sup>rd</sup> edition, 2007.

Speh T. Warehouse Management. In *Global Supply Chain Management*. (Mentzer J., Myers M. and Stank P., editors). Sage Publications, 2006.

Stalk G. and T. Hout. Competing Against Time: How Time-based Competition is reshaping Global Markets, *The Free Press, Collier Macmillan Publishers*, 1990.

Suarez-Villa L. The E-economy and the Rise of Technocapitalism: Networks, Firms, and Transportation. *Growth and Change*, 34:4, 2003.

Swann. G. M. Place is What We Think With. Spatial History, Intellectual Capital and Competitive Distinction. In *The Changing Economic Geography of Globalization* (G. Vertova, editor). Routledge, 2006.

Thompson R. and S. Tsolacos. Projections in the Industrial Property Market using a Simultaneous Equation System. *The Journal of Real Estate Research*, 19:2, 2000.

Thrall G. Business Geography and New Real Estate Market Analysis, *Oxford University Press*, 2002.

Tiebout C. Exports and Regional Economic Growth. *The Journal of Political Economy*, 84:2, 1956, 160-164.

Toffler A. Powershift. *Bantam Books*, 1990.

Torto Wheaton Research. Modelling the Industrial Market: Data and Methodology. *TWR Industrial Outlook*, 2002.

TWR-CBRE. Improvements in Industrial Technology: Re-engineering on Warehouse and Manufacturing Space, *L. Stone-Mortimer*, 5:1, 2006.

TWR-CBRE. Import Slowdown affecting Warehouse Demand in the Largest Port Markets, *L. Stone-Mortimer*, 9:2, 2008.

Van Cleef E. Trade Centers and Trade Routes. *D. Appleton-Century*, 1937.

Weimer A. Real Estate Decisions are Different. *Harvard Business Review*, 1966 (December).

Weimer A. and H. Hoyt. Principles of Urban Real Estate. *The Ronald Press*, 1939.

Wheaton W. Real Estate "Cycles": Some Fundamentals. *Real Estate Economics*, 27:2, 1999.

Wheaton W. and R. Torto. An Investment Model of the Demand and Supply for Industrial Real Estate. *AREUEA Journal*, 1:4, 1990.

Wilson P. and R. Zurbruegg. Isolating Important Driving Forces in Indirect Real Estate Markets. *Journal of Real Estate Portfolio Management*, 9:3, 2003.

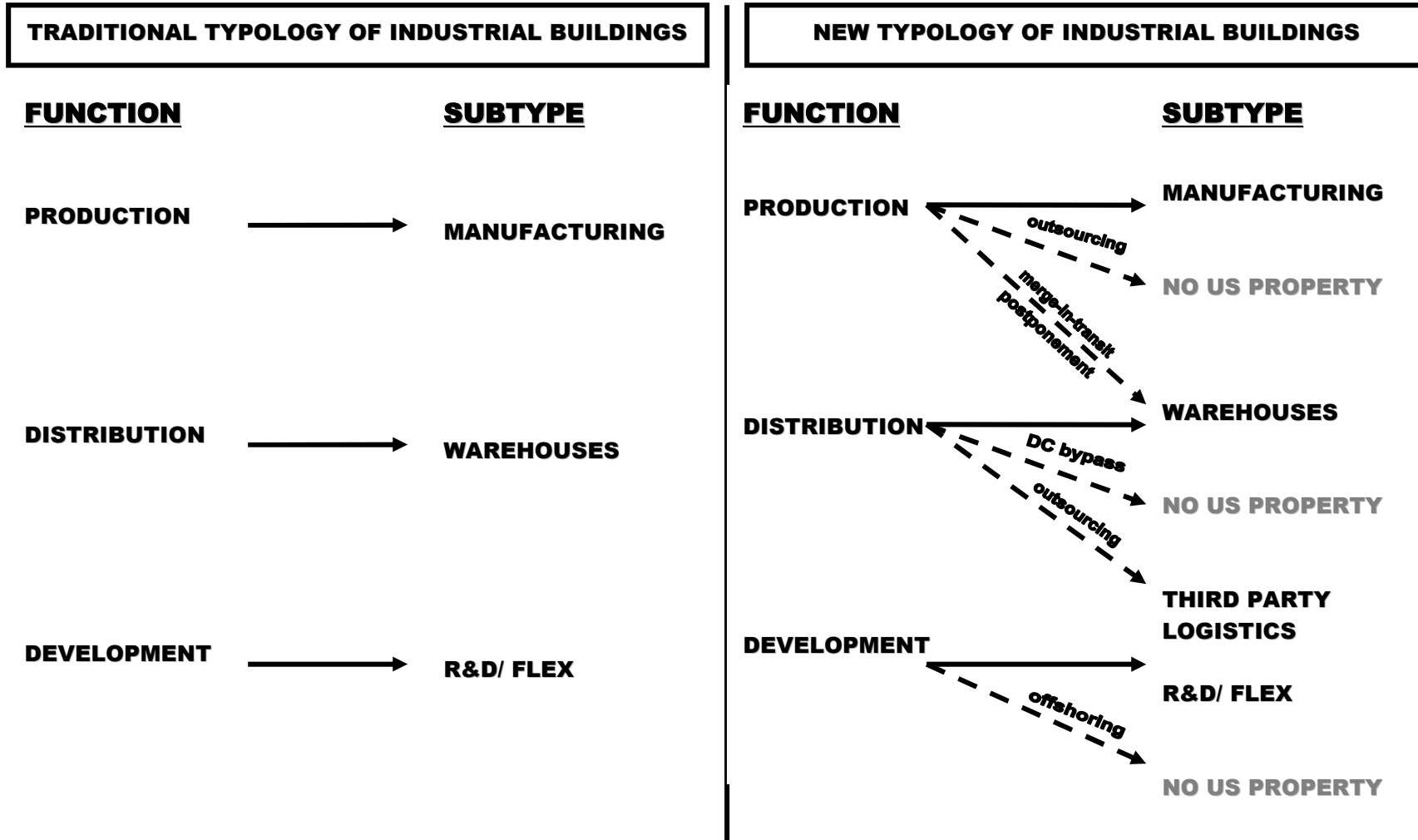
Winger A. Local Real Estate Demand in a Globalizing World. *Real Estate Review*, 27:3, Fall 1998.

Womack J., Jones D., and Roos D. *The Machine that Changed the World*. Rawson, New York, 1990.

Yeung H. *The Limits to Globalization Theory: A Geographic Perspective on Global Economic Change*. *Economic Geography*, 2002.

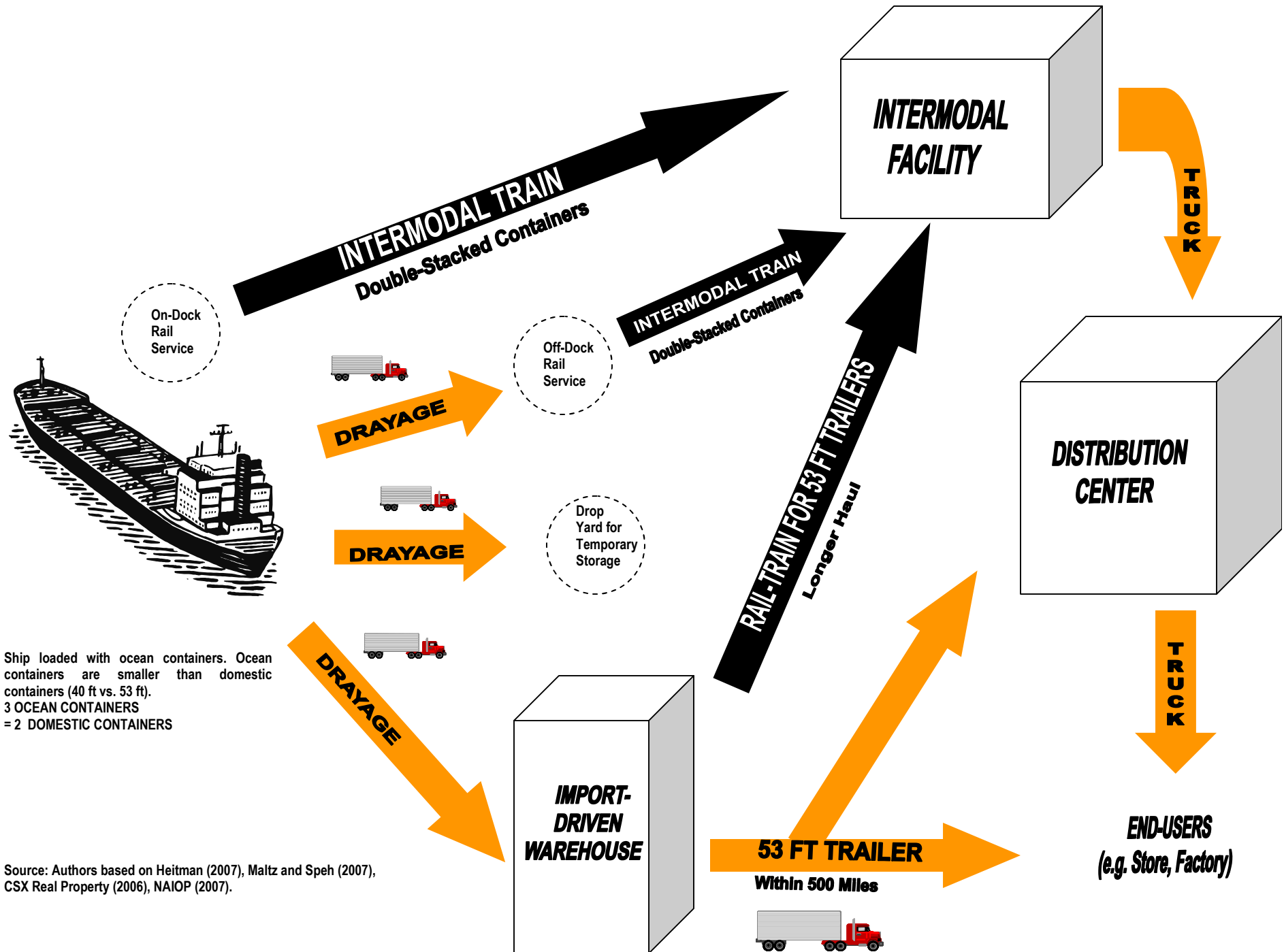
**EXHIBIT 1:**  
**THE NEW NEXUS BETWEEN INDUSTRIAL FUNCTIONS AND INDUSTRIAL BUILDINGS**

*Globalization and Logistics as Triggers to 'Building-Less' Industries*



**NOTE:** The global quest for process-based efficiencies made possible by the transport and IT revolutions has blurred the line between manufacturing and warehousing, often resulting in industries with no US-based properties.

**EXHIBIT 2: SEARCHING FOR THE BUILDINGS IN A TYPICAL GLOBAL SUPPLY CHAIN**



Ship loaded with ocean containers. Ocean containers are smaller than domestic containers (40 ft vs. 53 ft).  
 3 OCEAN CONTAINERS  
 = 2 DOMESTIC CONTAINERS

Source: Authors based on Heitman (2007), Maltz and Speh (2007), CSX Real Property (2006), NAIOP (2007).