PERFORMANCE AND COMPETITIVENESS OF LATIN AMERICAN CITIES: THE PHYSICAL CAPITAL CASE

Ivan JILETA

IE Business School, María de Molina, 12, Madrid, Spain

iojileta.dba2013@student.ie.edu

Abstract

Today the urban phenomenon is present: cities generate over 80% of the global GDP, and at the same time half of the world's population lives in cities. In the developing world, the region with the greatest proportion of people living in urban centers is Latin America and the Caribbean (Un-Habitat, 2010). Besides the physical capital, there are other elements that make Latin American cities competitive; for instance, their culture, their global appeal, and in some cases their financial maturity and economic stability. However, the most important challenge for Latin American cities is how to manage all these variables to succeed. A problem that emerges under this scenario is to discover how the physical capital contribute to the performance of Latin American cities.

The purpose of this study is to identify the contribution of physical capital and their impact on the performance of Latin American cities. Performance and competitiveness are defined as elements that make a city more attractive for Foreign Direct Investment (FDI) and make it a good place to live in for its citizens. Additionally, characteristics such as social and cultural character, financial maturity, institutional effectiveness, global appeal and economic strength are constructs considered to appraise the city's performance.

Keywords: Cities, Physical Capital, Cities Competitiveness, Latin America, Foreign Direct Investment.

1. INTRODUCTION

"Today half of the world's population lives in cities, generating over 80 percent of the global GDP. Global businesses have already begun to plan strategies from a city's rather from a country's perspective" (Economist Intelligence Unit [EIU], 2012, p3). Over the last decades, the cities have had intense global competition. While some cities have emerged from quiet and rural environments and turned into dynamic cities, others have failed to sustain their leading position and have deteriorated over time. It's clear that policies and urban management play a key role to accelerate the city's performance. Lack of awareness or planning can have a negative effect in the region. The cities' policies to improve urban competitiveness have been the quest of policy makers. Infrastructure and human capital leveraged by city marketing, foreign direct investment and clustering have been a major focus for differentiation, and they have also been a subject of study in the developed and developing worlds.

The developing world is emerging as an economic power, but it still has to develop strong and clear policies to improve its cities' performance. Over the last decade, Brazil, Russia, India and China -known as BRICs and emerging markets- have driven the consumption and demand, and have vied for business and talent in the global scene. This competition will further intensify over time. To illustrate, cities that were just spectators of globalization in the past, Shenzhen and Dubai have become important players.

It can be alleged that London, Paris, and New York are cities that have been growing for a long time, and thus, are the most competitive for their maturity and refinement gained over the years. Conversely, there are cities –Singapore- that in just a few decades transformed from underdeveloped to highly developed. Singapore's infrastructure, financial maturity, clean environment, human capital, and global appeal place it as a top city. Besides the infrastructure and human capital that characterize cities as either small or big, the common variable is that the authorities have generated and implemented policies according to their circumstances and positioning.

An illustration of rising cities based on extraordinary urban management can be found in the emerging world. In an unprecedentedly short period, emerging cities and regions for instance Tianjin, Dubai and Shanghai have established and achieved a new urban identity to equal their rapid economic and social development. One example is China's investment in physical capital and infrastructure that has increased an average of 20 percent annually over the last ten years. China has built airports, utilities, roads, bridges, mass transit systems, telecommunications and others (McKinsey Global Institute, 2009). On the other hand, mature cities with long-established infrastructure are facing deficit budgets and risk of debt, which is the case of cities in Portugal, Italy, Greece and Spain. These countries have postponed investment in new infrastructure or renewal of the existing one since 2012.

In the 19th and 20th centuries, Latin America was well-established and known by its global economic contribution to natural resources benefiting agriculture, mining and oil drilling. Over the last decades, there has been a shift to manufacturing in many cities and regions. The textile, electronics and automotive industries play an important role in many countries and cities. In recent years, some Latin American cities have emerged as service hubs. Many cities in Latin America have evolved from primary to tertiary service renders. More educated and trained work force and developed infrastructure are required to compete regionally or globally. Unfortunately, the growth in many cities is not happening not due to lack of natural, human or financial resources, but because of lack of regulations and policies aimed at growth and institutional effectiveness.

Lever and Turok (1999) asserted that cities did not compete in the way commercial enterprises did. Enterprises have a single hierarchical decision-making body and a single objective: profit maximization. On the other hand, cities compete for mobile investment, population, tourism, public funds and hallmark events like the Olympic Games. For example, they compete by assembling a skilled and educated labor force, by providing efficient modern infrastructure, by setting a responsive system for local governance, by establishing flexible land and property market, and by supplying high environmental standards and high quality of life. Latin American cities have increased their competition among them; differentiation is required to emerge as a competitive city. The city's competitiveness in Latin America is sustained in human capital and infrastructure, which are detonated by foreign direct investment, industry clustering and city marketing. These relationships are the ultimate goal to generate policies that enhance city performance.

Latin America

The world is made up of human concentrations in cities and regions. This concentration of people could be a source of cultural, political and economic strength; cities act as talent magnets and incubators of innovation and are generally the chief engines of economic growth. The top 25 global cities already account for more than half of the world's wealth. In developing nations, cities account for between 65 and 80 percent of the national gross domestic product (GDP): Sao Paulo, the largest city in Brazil (Brazil's capital is Brasilia but this is just political not economical), and Bangkok, the capital of Thailand. Each city accounted for about 10 percent of their particular country's population, but more than 40 percent of its GDP. Tokyo's GDP per capita is more than three times that of the rest of Japan. In China, population migrations are expected to bring over 350 million more people to cities in the coming years (United Nations – Habitat, 2012a). In the case of Latin America, according to McKinsey Global Institute (2011a) the 289 most important cities in Latin America are home of the 55 percent of the region's population and produce more than 75 percent of the region's GDP.

Latin America's 198 large cities —defined as having populations of 200,000 or more—together contribute to over 60 percent of the GDP. The 10 largest generate half of that output. Latin America's 198 large cities are expected to generate 65 percent of the region's growth over the next 15 years (MGI, 2011b). In Latin America and the Caribbean, urbanization happened very fast between 1950 and 1990. The region went from 40 percent of the population living in cities at the beginning of this period to 70 percent forty years later. Since the 1990s, the proportion of urban population has still increased but at a progressively slower pace. Forecasts indicate that this deceleration will continue into the future and that the proportion of urban population will approach 90 percent by 2050 (UN – Habitat, 2012b).

In the developing world, the region with the greatest proportion of people living in urban centers is Latin America and the Caribbean (Un-Habitat, 2010). The countries in Latin America region are still developing but already have a minimum level of social and economic environment in terms of human capital, infrastructure, economic maturity, and institutional stability as compared, for example, with Africa or the Middle East. Latin America is more urbanized than any other region in the developing world with 80 percent of its relatively young population living in cities. The share of urban population rose from 40 percent in 1950 to 80 percent today as population in cities grew 1.5 times the rate of the region's overall population growth (MGI, 2011b).

2. HYPOTHESES

The core assumption behind the study is that cities can perform better and be more competitive if they just focus on certain factors such as physical capital. Having this element present can strengthen the city's performance. A city's competitiveness and performance is defined as the factors that make the city more livable for their citizens and attractive for the foreign direct investment (FDI) such as the city's global appeal, economic strength, institutional effectiveness or financial maturity. Physical capital is expected to have a positive effect on the city's performance. The graphic representation of the model can be found in Figure 1: Model.
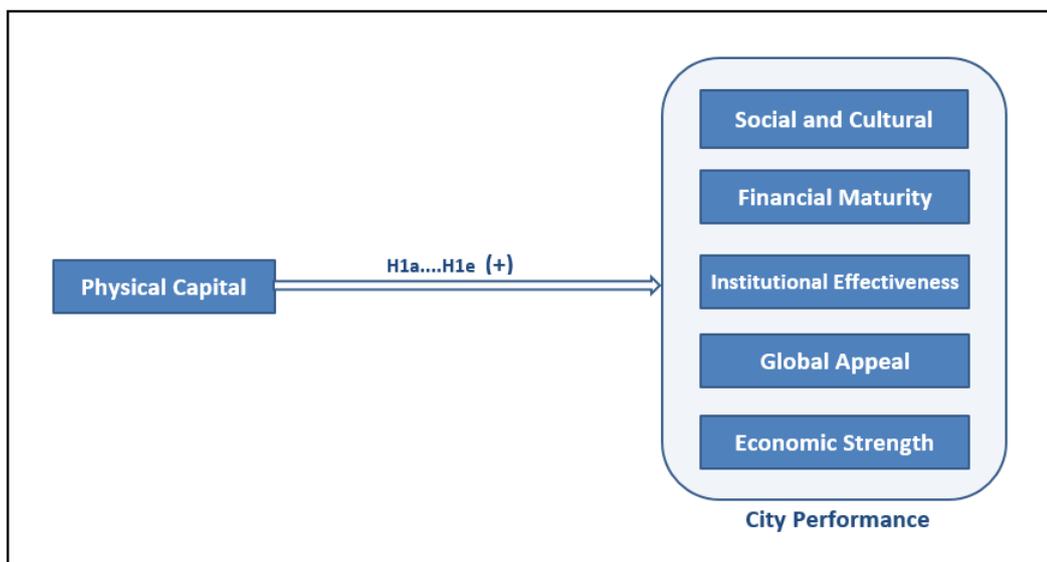

FIGURE 1 - HYPOTHESES MODEL

Physical Capital is expected to have a positive relationship with the competitiveness and performance factors in Latin American cities. Therefore, is predicted a correlational explanatory positive relationship between physical capital, and city performance factors that trigger the city's competitiveness in Latin

America. Urban competitiveness is explained as the mix of factors such as productivity, employment rate, standard of living and business environment (Begg, 1999).

For this study, the city's performance and competitiveness factors are defined as follows: Physical capital or infrastructure is operationalized as the city's ability to develop and maintain infrastructure such as roads, telecommunications, public transportation, and ports among others. Physical capital is defined as the maturity and effectiveness assets that allow MNCs and individuals to operate in the city. Social and cultural character is constructed around the city's freedom to express its ideas, openness to diversity, cultural vibrancy and city safety for its residents. Economic strength is based on the city market size, purchasing power and growth prospects. Institutional effectiveness is explained as the city's stability and decision-making processes that affect the local government such as transparent electoral processes, local government autonomy and government effectiveness. Financial maturity is fundamental for the city to be a financial cluster and to have the sufficient financial infrastructure. Global appeal is operationalized as the city's capability to attract FDI, top talent living in the city, international flight frequency, international conferences, etc.

Infrastructure In Latin American Cities

Marketing a city or country can be perceived as an indispensable action, even before improving the infrastructure conditions in the region. Morisset and Andrews-Johnson (2004, p. 4) suggested: "Countries with relatively few assets, as reflected by poor investment climates or low levels of development, get better results from improving these conditions than from spending limited resources on investment promotion". It is important to have infrastructure in the city to attract investment, but at this point it is not completely understood how the city is affected in its performance in developing regions such as those in Latin America.

Cadena et al (2012) suggested the extraordinary economic power in the Latin American region. Basically they highlighted how urbanization would be the engine for the growth of the global economy. Nevertheless, this potential cannot be maximized if the country/region lacks the infrastructure in the right conditions to support it. A key concept about infrastructure is the one developed by Globerman and Shapiro (2002) referring to the country's governance infrastructure: the central drivers for FDI selection in a region are the political environment, the infrastructure, the policies, the urban management and the legal certainty that MNCs look for investment. Therefore, I will argue in this study that the level in infrastructure will play a positive role in the following relationships: Social and Cultural Character, Financial Maturity, Global Appeal, Economic Strength and Institutional Effectiveness; and the city's performance.

The infrastructure and the quantity of physical capital are not enough; quality and global appeal are fundamental differentiators. People and MNCs decide where to live and invest based on intangibles beyond just the physical capital. Lynch (1960) presented the concept of place legibility to refer to the people's ability to recognize the layout of a place (i.e. building, streets, landmarks, etc.) as an important differentiator for cities. Jacobs (1961) highlighted the need for city planning in which suburbs, public housing, economies of scale, open spaces, highways, among other factors are crucial for a balanced and planned region. All these intangible elements are framed to enable urban competitiveness. Lever and Turok (1999) defined urban competitiveness as "The degree to which cities can produce goods and services which meet the test of wider regional, national and international markets, while simultaneously increasing real incomes, improving quality of life for citizens and promoting development in a manner which is sustainable" (p.792).

Past studies have highlighted the importance of mature infrastructure or physical capital to detonate FDI and to improve the regions' economical and financial performance. Coughlin et al (1991) highlighted that the more developed the transportation infrastructure was, the more foreign direct investment was attracted. Latin America is a mixed case of some countries or cities that have well-developed infrastructure (i.e. Buenos Aires, Argentina or Brasilia, Brazil), while other cities are just in the threshold of development (i.e. Lima, Perú or La Paz, Bolivia). The level of infrastructure maturity plays an important role in FDI attraction. Wheeler and Mody (1992) suggested that the quality of the infrastructure was an important variable for those developing countries attracting FDI from the United States. Although past studies have proved the relationship between infrastructure and country performance, it has not yet been proved the linkage between infrastructure and city performance in Latin America. Subsequently, an important emphasis of this study is to corroborate the impact of infrastructure and city performance in Latin America. Therefore, I will argue in this study that the level of physical capital will also have a positive relationship with competitiveness factors and performance in Latin American cities.

Hypothesis 1a: There will be a positive relationship between the physical capital and the social and cultural character in Latin American cities.

Hypothesis 1b: There will be a positive relationship between the physical capital and the economic strength in Latin American cities.

Hypothesis 1c: There will be a positive relationship between the physical capital and the financial maturity in Latin American cities.

Hypothesis 1d: There will be a positive relationship between the physical capital and the institutional effectiveness in Latin American cities.

Hypothesis 1e: There will be a positive relationship between the physical capital and global appeal in Latin American cities.

3. METHODOLOGY

Introduction

The research design is a quantitative, explanatory, non-experimental, correlational, cross-sectional research. The design examines the explanatory nature of the relationships among variables. The correlational model seeks to describe one group and more variables. The population for this study was based on The Economist Intelligence Unit (EIU) data base report: Benchmarking global city competitiveness 2012. According to EIU (2012): "We assessed 120 cities across the world and examined 31 indicators for each city. Indicators were grouped under eight distinct, thematic categories: economic strength, human capital, institutional effectiveness, financial maturity, global appeal, physical capital, environment and natural hazards, and social and cultural character. There are 21 qualitative and 10 quantitative indicators. A city's overall ranking in the benchmark index is a weighted score of the underlying categories." (p. 5). Because this study focuses on Latin American cities, only the 13 Latin American cities included in the data base were evaluated.

The rationale in selecting this sample is that to our best knowledge this is the only city data base that includes cites of the five continents and utilizes cross-sectional and homogeneous criteria to determine a city's competitiveness. Other studies focus just on cities within countries or in some cases by regions. Our unit of analysis is the cities in Latin America; the EIU (2012) report is the most complete and comprehensive study about cities' competitiveness in the world considering tangible (i.e. infrastructure) and intangible criteria (i.e. global appeal) enabling a formal study.

Instrumentation

The EIU (2012) included eight categories; for this study six will be used: global appeal, physical capital, social and cultural character, economic strength, institutional effectiveness and financial maturity. One characteristic of this data base is its qualitative and quantitative focus; 31 indicators were established, from which 21 were qualitative and 10 were quantitative.

In the general index, the EIU (2012) gave certain weight to each indicator based on the significance of the city's information. For our study, the weight of each indicator is not relevant in order to build the

overall ranking and index. For our proposes the important driver is the index of each indicator and how it is built: 1) Economic strength: measured the city economic strength based on the market size, cost of living, purchasing power and growth prospects in the city. 2) Institutional effectiveness: evaluated the city's stability and decision making processes that affected the local government; elements such as electoral processes, pluralism, local fiscal autonomy and taxation were considered. 3) Financial maturity: assessed the city as a financial cluster (specialized or generic) and its adequate financial infrastructure. 4) Global appeal: measured the city capability to attract Fortune 500 companies, company headquarters, top universities, frequency of international flights, international conferences, etc.; 5) Physical capital: explained the city's ability to develop and maintain infrastructure such as roads, telecommunications, public transportation, etc. and 6) Social and Cultural Character: explained the citizens' freedom to express themselves, human rights, cultural vibrancy and the openness to diversity in the city. A summary on how the indicators were built can be found in Appendix II Indicator Construction.

In order to determine the effect of physical capital in the competitiveness in Latin American cities and answer the hypotheses, a linear regression was utilized, this is, for examining the relationship between a set of independent variables (Xs) and a single dependent variable (Y). Regressions are used for the purposes of description, interference and prediction (Lattin et al., 2003, p. 75). This study pursues to predict how the infrastructure affect the cities' competitiveness as well as to make inferences based on the results and analyses. In the linear regressions we were interested in finding the significance and perdition level between the independent and dependent variables. For the linear regressions we made sure it complied with the assumptions of a linear regression: (i) independence of the errors (no serial correlation), (ii) linearity of the relationship between dependent and independent variables, (iii) normality of the error distribution, and (iv) homoscedasticity (constant variance) of the errors.

There is an important trend and need to study cities and their characteristics. This emerging topic lacks reliable and updated information globally. It makes it hard to study cities and model their characteristics considering that the information is not homogeneous worldwide. To our best knowledge, the EIU is the best city data base that encloses different tangible and intangible characteristics of the cities. The uniqueness of the data base makes it a limitation because there are no additional data or sources to triangulate the information. Also based on the focus study of 13 Latin American cities founded on the data base, this region stands for a challenge to build a more robust model.

4. RESULTS AND FINDINGS

In order to address the hypotheses, 13 Latin American cities were studied. The number in parentheses refers to the ranking received in the 2012 EIU study.: Buenos Aires (60), São Paulo (62), Santiago (69), Mexico City (70), Rio de Janeiro (77), Panama City (78), Lima (88), Bogotá (89), Monterrey (90), Medellín (96), Belo Horizonte (98), Guadalajara (102) and Porto Alegre (103). Physical Capital was established as predictors of city performance in Latin America. The city performance construct was established according to five characteristics of the cities: Social and Cultural Character, Economic Strength, Financial Maturity, Institutional Effectiveness and Global Appeal.

Prior to the analysis, all 13 cases of Latin America cities were examined through various SPSS & MINITAB programs for accuracy of data entry, missing values, and fit between their distributions and the assumptions of multivariate analysis. During the analysis, an atypical point was identified, Santiago. Based on different scenarios run, Santiago was found in the residuals and graphs as an atypical point that added important variance into the model. Also, in the values for Physical Capital, higher values were observed compared with the values of other cities. The point was considered as an outlier and was removed from the data set. The study was elaborated with the balance of 12 cities; partial descriptive statistics about their characteristics are described in Table 1. It was also necessary to determine if there were any multicollinearity problems in the model, particularly in the dependent variables. The correlation among the study variables was obtained as summarized in Table 1, too.

TABLE 1 – DESCRIPTIVE STATISTICS AND CORRELATIONS

	Variable	Mean	s.d.	1	2	3	4	5	6	7
1	Social and Cultural	56.031	11.029	1						
2	Economic Strength	33.677	3.540	-.070	1					
3	Financial Maturity	30.777	14.962	.712(**)	.001	1				
4	Institutional Effectiveness	54.885	7.685	.411	-.562(*)	.193	1			
5	Global Appeal	8.615	6.561	.684(**)	.249	.878(**)	-.007	1		
6	Physical Capital	61.677	7.064	.661(*)	.367	.669(*)	.128	.773(**)	1	

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
n = 12 for each variable

The city performance constructs are elaborated on the dependent variables: Social and Cultural Character, Economic Strength, Financial Maturity, Institutional Effectiveness and Global Appeal. To asses normality the Kolmogorov- Smirnov test was utilized in all the regressions. In some cases the Box-Cox transformation was performed. This was applied when the normal distribution model and the constant variance were not achieved. For some atypical points that misaligned the model the residual

analysis was utilized. When atypical points were detected, the iteratively reweighted least squares (IRLS) were applied to adjust the influence on the regression. The findings are reported in this section, and the summary is in Table 2.

TABLE 2 – SUMMARY OF THE RESULTS OF REGRESSION ANALYSES

Variables		Social and Cultural	Economic Strength	Financial Maturity	Institutional Effectiveness	Global Appeal
Physical Capital	Uβ Coef.	1.162*	.285†	1.658**	-0.006	0.694**
	F (ANOVA)	8.668*	4.337†	10.378**	0.000	21.184**
	R²	0.411	0.303	0.509	0.000	0.679
	Hypothesis	H1a	H1b	H1c	H1d	H1e

** Correlation is significant at the .01 level.

* Correlation is significant at the .05 level.

† Correlation is significant at the .10 level.

n = 12 for each variable.

The first hypothesis to be tested was H1a: There will be a positive relationship between the physical capital and the social and cultural character in Latin American cities. The dependent variable to be analyzed was Social and Cultural Character. The results for the linear regression Physical Capital against Social & Cultural Character was significantly different from zero, $F(1,10) = 8.668$, $p < .05$. Hypothesis H1a supported. R² is 0.411. Kolmogorov- Smirnov test 0.915 and the model had constant variance. The independent variable Physical Capital was significant, $p<.05$.

The Economic Strength and the linear regression with Physical Capital was significantly different from zero, $F(1,10) = 4,337$, $p < .10$. R² 0.303. Data were normally distributed; the Kolmogorov- Smirnov was 0.947. H1b was supported. The independent variable Physical Capital was significant, $p<.10$. The variance was not constant so in order to obtain the presented data the model was transformed by Box-Cox: $\lambda=2$, SCE at 112.174. The variance showed no improvement, so Rio de Janeiro (point 4) was identified as an atypical point. A weighted regression (IRLS) was performed, making 4 iterations; with this approach the variance in the model was stabilized.

The regression for Financial Maturity with Physical Capital was significantly different from zero, $F(1,10) = 10.378$, $p < .01$. R² 0.509. The data were normally distributed; the Kolmogorov- Smirnov test was 0.835. Based on these, H1c was supported. The independent variable Physical Capital was significant, $p<.01$. In this case the variance was not constant, either; the described data in the model were transformed by Box-Cox: $\lambda=0$, SCE at 1075.188. The variance showed no improvement, so point 6 (Lima) was identified as an atypical point. A weighted regression (IRLS) was performed, making 3 iterations; based on this technique, the variance in the model was stabilized.

The linear regression Institutional Effectiveness with Physical Capital was not significantly different from zero, $F(1,10) = 0.000$. R^2 is 0.000. H1d was not supported; had a normal distribution; and the Kolmogorov- Smirnov test was 0.753. The independent variable Physical Capital was not significant. In this model the variance was not constant. Panama City (point 5) was identified as an atypical point. A weighted regression (IRLS) was performed, making 6 iterations. The variance in the model showed no improvement, so the original values were reported.

The last dependent variable to be analyzed was Global Appeal and the linear regression with Physical Capital. The regression was significantly different from zero, $F(1,10) = 21.184$, $p < .01$. R^2 0.679. The data were normally distributed; the Kolmogorov- Smirnov test was 0.865. H2e was supported. The independent variable Physical Capital was significant, $p<.01$. In this model the variance was not constant; the described data in the model were transformed by Box-Cox: $λ=0$, SCE at 112.929 and the variance was improved. The data presented include the model of the corrected constant variance.

5. CONCLUSIONS

The findings and interpretations in this study are focused on Latin America cities. In the developing world, the region with the greatest proportion of people living in urban centers is Latin America and the Caribbean (Un-Habitat, 2010). What is important to understand is how the Physical Capital enable the city competitiveness. Urban competitiveness is explained as the mix of factors such as productivity, employment rate, standard of living and business environment (Begg, 1999). We can conclude that urban competitiveness in Latin American cities can be predicted based on the Physical Capital.

The Physical Capital is a good predictor of competitiveness for Social and Cultural Character, Economic Strength, Financial Maturity and Global Appeal. In the case of Latin America, infrastructure plays a central role; telecommunications, public transportation, and roads are also important factors to predict the city's performance. The region has been left behind in investment in infrastructure compared with their rapid demand, making it a slowing factor. Lack of investment in Latin America has led to other problems that slow down the city's competitiveness such as traffic congestion, insufficient housing, institutional effectiveness, urban sprawl, etc. The infrastructure in Latin America is determining to achieve city performance. As suggested by Loree and Guisinger (1995), infrastructure is important to attract FDI, at some point more significant than government incentives. Also Wheeler and Mody (1992) suggested that the quality of the infrastructure was an important variable for those developing countries attracting FDI.

Emerging economies like China have been able to keep up with the infrastructure needs in terms of roads and public transportation. Latin America is more urbanized than any other region in the developing world with 80 percent of its relatively young population living in cities (MGI, 2011b). In Latin America, investment in infrastructure is still needed in order to create better city performance. This study established the link between Physical Capital and city competitiveness in Latin America. The investment in the infrastructure should be a combination of resources of the private and public sectors in order to guarantee long term sustainability. As suggested by Kresl (1995): "The individual city's government and private sector entities can do a great deal to enchase that city's competitiveness and to enable it to achieve the most desirable economic future possible." (p. 66).

It was observed that the cities studied could belong to either of these two groups: mega-cities with close to or over ten million inhabitants or secondary cities with a range between one and five million inhabitants. In 1950 mega-cities in Latin America were nonexistent. Today, there are eight: Buenos Aires Mexico City, Rio de Janerio, Sao Paulo, Belo Hoirzonte, Botota, Lima and Santiago (UN-Habitat, 2012b). In this study, thirteen Latin American Cities were analyzed based on the EIU database. Eight out of the thirteen are megacities which might have de-economies of scale based on their size and population. Latin America is characterized by a rapid increase in the number of secondary cities and the reduction of urban primacy (Un-Habitat, 2010). An important future study is to explore these secondary cities which are the ones that will have important development and growth over the next decades. As suggested by MGI (2011b), secondary cities that can provide an efficient environment, attractive to businesses. and skilled workers will not only boost their growth significantly but could also become the model for a better-designed and more sustainable urban future for Latin America.

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