How to make global cities: Information communication technologies and macro-level variables

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ABSTRACT

Increasing in the ranks among the global cities is a top priority not only for the city officials but also for the central governments. With the prevalent use of the information and communication technologies (ICTs), local governments and cities strive to make the best use of the newly emerging technologies. Many cities aspire to create smart, connected and intelligent environments. Although companies such as IBM, CISCO, Siemens, and Ericsson are offering latest ICT products to cities, technology as a standalone entity cannot flourish without a close cooperation at the macro (country) level. In this paper, we identify the significant factors that contribute to creating global cities, and analyze where and how ICTs make an impact for each dimension of success. Overall, the results demonstrate the crucial roles ICTs play in achieving success. The findings also emphasize that cooperation between central and local government is imperative in order to form globally successful cities. Our findings have implications on governors, city and country level technology managers and macro-level government officials.

1. Introduction

> "The axis of the earth sticks out visibly through the center of each and every town or city."
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> [Oliver Wendell Holmes, Sr.]

The uses of internet and telecommunication technologies fundamentally reshape the way city governments plan, carry-out their duties and evaluate their successes. Technologies are already in place for citizens to register, participate in their governments' decisions and vote at the convenience of their homes. Offering interactive services related to transportation, land use, taxation, planning, housing, etc. all become possible. Citizens can not only learn their tax obligations via e-government services, but also pay taxes by pressing a button. Similarly, starting a business is not a big deal; you can get the regulations, apply the licenses online, and start the business in a relatively short time. Constituents of many cities with the emergence of new, interactive Web 2.0 technologies build virtual communities and share user generated content through many social media platforms. Online citizen engagement platforms, network communities, virtual organizations, and learning partnerships make our lives already a richer place. Through many platforms provided by many companies such as Siemens and IBM, citizens could connect to social security, find their personal and family information, and order official papers; selecting cultural activities, buying tickets and searching the least congested, most convenient transportation means are all within possibilities.

In general, organizational support, B2B services, and relationship management systems that come with ICTs make government activities less costly, more effective, efficient and environmental-friendly. Although there is an increasing number of technologies with greatly differing implementation possibilities for the local governments and cities, an alignment at the country level is a precursor for achieving successful results.

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The purpose of this paper is to identify the country-level factors that contribute to creating global cities, and suggest important areas where and how ICTs should make an impact. We employ a rich methodology and construct our variables in three steps. Such an approach is compatible with the methodological guidelines established by IBM Business Valuation Analysis [1].[1] In the first step, we establish our key variables that define successful global cities. We call these variables dependent variables. They correspond to "systems" in IBM Business Valuation Analysis. We use two different data sources that come from A.T. Kearney (Global Cities Index and Emerging Cities Outlook) and Economist Intelligence Unit (Global Livability Survey) to determine the dependent variables. The second step is to determine the independent (macro) variables that might be directly related to the dependent variables. They correspond to "elements" in IBM analysis. These variables represent data which should provide a link regarding to ranking of a city. We use World Economic Forum Network Readiness Indicators, The World Bank Development Indicators, UNDP Human Development Indicators, OECD iLibrary and Euromonitor Market Research databases to gather these variables. Throughout the third step, we identify the most successful and least successful city–country clusters and explain the most prominent independent variables necessary for achieving global success. While doing this, we examine the ICT-related variables which significantly affect the city rankings. We use city–country cluster as the basis of our analysis and report our results accordingly.[2] We define success as achieving higher rankings based on eight different dependent variables.[3] Consequently, our definition of a global city is a city that ranks high on these parameters. We undercover the important ICT-related and macro-level variables that contribute to making global cities and form successful city–country clusters. We also identify the most and least successful cities as examples to guide researcher and decision makers.

Our results indicate that ICT-related variables have a positive relation with all dependent variables with the exception of cultural experience. Interestingly, teachers' salaries are influential on cultural experience. Our results also show the importance of macro-level variables with country governments playing significant roles on achieving a global city status. The findings show that pollution and production related variables are correlated with environment; government and military expenditures are correlated with stability; and community-wide health and population related variables are correlated with healthcare.

Our study has implications on governors, city and country level technology managers and macro-level government officials. Cities compete in many terms such as size, population, business intensity, investments, transportation, and tourism.

Not only ministers and governors, but also companies try hard to improve the city life through social responsibility activities. Our analysis shows that collaboration among central governments, local governments and private investors is necessary for a globally competitive city. A central plan should be supported by an organized effort from different participants. In general, our study sheds light on how central and local governments can prioritize and determine policies and jointly strive towards creating global cities.

The rest of the study is organized as follows. Section 2 reviews the literature. We present our data and analysis framework in Section 3. Section 4 presents our analysis and findings. First, we present the important independent variables, the most and the least successful cities for each of these variables. Then, we show how different independent variables can be grouped under common factors and investigate these factors' relative importance on different success measures. We conclude with a summary in the last section.

2. Literature review

Governments face a daunting task when serving increasingly complex and interpenetrated cities and technologies. According to the United Nations, more than half of the population lives in urban areas, where population density is expected to increase significantly in the future [1,2]. Newly emerging views take cities as complex networks of systems [3] and suggest managing them has become a new science where the state of the art information and communication technologies (ICTs) should be skillfully selected and implemented [4].

Increasing globalization and cross-border trade tend to pick winners and losers among cities. Cities need to stay competitive and one step above their competing rivals when attracting blue chip investments and talent globally. Hollands [5] depicts four attributes of an intelligent city: i) the application of electronic and digital technologies to cities and the residents, ii) the use of information technologies to transform life and work in a city, iii) the embedment of ICTs and people and iv) the enhancement of innovation, learning, knowledge and problem solving using information technologies. Santinha and de Castro [6] depict intelligent cities as interdependent agents between internal and external factors. They group governance, social and urban environment and entrepreneurial environment as internal characteristics; information collection network structure and information dissemination as external characteristics. According to the authors, the city government can be described as an agent that harmonizes the traditional city duties with ICTs. Being competitive requires large investments in technology. Their results show that, governments need to strike a balance between investing in technology and investing for people.

Arguably, implementing smart city technologies provides the greatest challenge on city governments. Smart cities should have network infrastructures that enable social, environmental, economic and cultural development with a proactive government style. Thus, smart cities bring the intelligence one step above and leverage the wired cities' infrastructure. With smart cities, meeting networking, innovation and creativity needs while forming sustainable partnerships and developing social capital become the focus of city governments [6–8]. Our analysis in this study also

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[1] IBM Business Valuation Analysis distinguishes the fundamental components of smart cities. These are city services, citizens, business, transportation, communication, water and energy. Then, it uses instruments, interconnection and intelligence to make cities smart. For example, transportation problem can be resolved by measuring traffic flows and toll use, integrated traffic, weather and traveler information services and road pricing.

[2] We use the term cluster loosely to define a pair established by a city and its respective country. We elaborate more on this in the literature review.

[3] They are business activity, human capital, education, cultural experience, environment, stability, healthcare, and infrastructure.