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On the

Evaluation of Key Drivers in the Development Performance of City Structures

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Evaluation of Key Drivers in the Development Performance of City Structures

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Certificate of Original Authorship

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I certify that the thesis has been written by me. Any help I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Michelle Leong Glastris

28 February 2014

The Sydney Harbour Bridge, Opera House and Sydney CBD Skyline from Blues Point Reserve, New South Wales, Australia

Source: Kyle Willimott

"*When a city begins to grow and spread outward, from the edges, the centre which was once its glory is in a sense abandoned to time. Then the buildings grow dark and a kind of decay sets in; poorer people move in as the rents fall, and small fringe businesses take the place of once flowering establishments. The district is still too good to tear down and too outmoded to be desirable. Besides, all the energy has flowed out to the new developments, to the semi rural supermarkets, the outdoor movies, new houses with wide lawns and stucco schools where children are confirmed in their illiteracy. The old port with narrow streets and cobbled surfaces, smoke-grimed, goes into a period of desolation inhabited at night by the vague ruins of men, the lotus eaters who struggle daily toward unconsciousness by way of raw alcohol. Nearly every city I know has such a dying mother of violence and despair where at night the brightness of the street lamps is sucked away and policemen walk in pairs. And then one day perhaps the city returns and rips out the sore and builds a monument to its past.*"

(Steinbeck 2000: "*Travels with Charley in Search of America*": 138-139)

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I accept sole responsibility for any errors, oversights and eccentricities that may follow.

For Kyle - We look to you, your cohorts and future generations to continue the remarkable evolution of our cities.

Abstract

Cities as a structural institution, are perceived to have little capacity to control their destiny. The thesis presents a different definition of city structure and contends there are a set of key drivers that can be consistently used to evaluate and guide city structure development performance. Whilst major events and structural changes may not be controlled directly, these key drivers can be used to navigate city structures, mitigate adverse risks and orchestrate change to improve a city structure's future capacity and responsiveness. Key protagonists impact these drivers and can affect changes in a city structure's development performance.

This research examines the key drivers that shape the evolution of city structures and their development performance. City structures have evolved in four key phases and it is the current "knowledge based development" phase that provides the impetus for this research. A "***City Structure*** *is an evolutionary process determined by its network of functional activities; relationships; capital and knowledge flows*" and undergoes various development stages with different rates of growth. The thesis posits key governance, economic, social and environment indicators and the compositional aspects of city structure population can collectively explain the development performance of city structures.

The purpose of the thesis is to develop an integrated, multidisciplinary approach and research methodology; construct and test an evaluative framework, toolkit and analyses to assess city structure development. This approach enables a comparison across 31 city structures in different development stages and geographic regions using 25 critical indicators and 11 derived trajectory indicators. The analyses were typically over a 20-60 year timeframe and capture a number of structural changes, macro and location specific events.

City structure population and GDP were identified as the key drivers of city structure development. The analysis adopted a rate of change approach for four critical indicators and their trajectory determinants (velocity, acceleration and resilience) which informed the evaluation of development trajectories and trends.

The thesis delves into an emerging field where research approaches, methodologies and evaluation processes are still evolving. In spite of the exploratory and multi-disciplined nature of the thesis' research focus and the paucity of city level data, at this early stage it is difficult (nor is it the thesis purpose) to definitively ascertain all aspects of city

structure development performance. However in light of the assumptions, limitations and methodology identified, the predictive variables are robust - the evaluative platform has been validated as a proof of concept and withstood an acceptable level of rigorous analysis.

Collectively the knowledge gained from this research proved the hypothesis valid; offers useful insights on the key drivers that shape city structure development; the historical and projected development performance of city structures; and makes contributions to theory, methodology, policy and practice.

Publication During Candidature

During this candidature, a conference paper was presented at the 2013 State of Australian Cities Conference and later published as part of the conference proceedings (Leong Glastris 2013a).

A condensed/edited version of the same conference paper will be published in the Australia and New Zealand Property Journal in March 2014 and the full version will be available online (Leong Glastris 2014).

Details of the conference paper and journal article are listed below:

- Leong Glastris, M. 2013a, "***GDP and City Population in the Development Performance of City Structures***", paper presented to the State of Australian Cities Conference 2013, Shangri-La Hotel, Sydney Australia, 26-29 November 2013.

- Leong Glastris, M. 2014, "***GDP and City Population in the Development Performance of City Structures***", *Australia and New Zealand Property Journal*, Vol. 5, No. 1, pp 21-28.

Glossary of Key Terms and Abbreviations

A glossary of key terms and abbreviations is presented below. For definitions of all the Universal and Critical Indicators, please refer to Appendices 2 and 3 respectively.

Glossary of Key Terms and Abbreviations	
Key Term or Abbreviation	**Definition or Full Name**
Acceleration	Acceleration measures the rate of change in City Structure POP, GDP, HDI or EMP Velocity over time. A negative sign denotes a slowing down in the POP, GDP, HDI or EMP Velocity. Each change in the slope of the velocity curve relates to an inflection point on the acceleration curve.
Analysis A: City Structure Development Performance Trajectory Analysis	**Analysis A** comprises **Key Indicator Analysis** (Chapter 5) – longitudinal and cross sectional indicator analyses; **Development Performance Trajectory Analysis** (Chapter 6) – development performance trajectory and derived trajectory indicator analyses; and **City Structure Development Stages and Points of Confluence** (Chapter 7). Collectively the outcomes from Analyses A and B are used to explain City Structure Development Performance.
Analysis B: Compositional Aspects of City Structure Population	Analysis B comprises **Compositional Aspects of City Structure Population** (Chapter 8) – analyses of compositional indicators; network structure; and development performance trajectory benchmarking. Collectively the outcomes from Analyses A and B are used to explain City Structure Development Performance.
City Structure (CS)	***A city structure is an evolutionary process determined by its network of functional activities; relationships; capital and knowledge flows which influence its growth and density as it transitions through a series of development stages.*** The term city will be used interchangeably with city structure as a short hand/abbreviation throughout the thesis and unless otherwise specified, refers to city structure.
CSDP	City Structure Development Performance.
City Structure Population or City Population	City Structure Population measures total city population (Oxford Economics) and/or the number of a country's people who agglomerate around urban centres/cities with over 750,000 inhabitants (United Nations).
City Structure Critical Indicator Matrix	The City Structure Critical Indicator Matrix comprises a shortlist of 25 critical indicators and their requisite datasets across the key Governance, Economic, Social and Environment sectors for key and cross reference cities.
City Structure Information System (CSIS)	The City Structure Information System is a frame of reference constructed to position segments of knowledge within a wider universe of knowledge regarding city structures.
City Structure Universal Indicator Matrix	The City Structure Universal Indicator Matrix is a frame of reference which acts as a repository of knowledge for a diverse range of indicators. It comprises a list of 76 universal indicators and their requisite datasets across the key Governance, Economic, Social and Environment sectors for key and cross reference cities.

Glossary of Key Terms and Abbreviations continued...	
Key Term or Abbreviation	**Definition or Full Name**
Compositional Indicators	There are 11 compositional indicators out of the 25 critical indicators used to explain changes from within a city structure's population that impact its potential productivity, capacity and resilience.
Critical Indicator	Constitutes one of the 25 indicators selected for the City Structure Critical Indicator Matrix and are used in Analysis A and/or B to explain city structure development. Refer to Appendix 3 for a full listing of critical indicators.
Cross Reference City Structure or Cross Reference City	These are an additional 25 city structures selected for cross reference purposes to supplement the analysis of the 6 key cities. The cross reference cities provide representation from a diverse range of development stages and geographic regions. Refer to Sub section 3.4.2 City Selection for further details.
Cross Sectional Indicators	Cross sectional indicators are critical indicators with datasets of typically less than 15 years used to provide brief snapshots.
Derived Trajectory Indicators	There are 11 Derived Trajectory Indicators used to examine rates of change with respect to velocity, acceleration and resilience. These have been derived from the four development performance trajectory indicators.
Development Performance	"***Development performance is defined as the manner in which a city structure fulfils and evolves/develops around its functional networks.***"
Development Performance Trajectory Indicators	The four development performance trajectory indicators (City Structure Population, Gross Domestic Product, Household Disposable Income and Employment) are critical indicators used to subsequently obtain the derived trajectory indicators.
Development Stage	Refers to the six development stages within a city structure's life cycle. These were identified as Early Emerging, Emerging, Maturing, Mature, Obsolescence-Decline and Obsolescence-Re-Growth.
Early Emerging	A development stage that refers to city structures in their initial growth phase of development. In this thesis it refers to key city structure Bangalore and cross reference city structures Jakarta and Johannesburg.
Emerging	A development stage that refers to city structures in their rapid growth phase of development. In this thesis it refers to key city structure Guangzhou and cross reference city structures Sao Paulo, Mumbai, Dubai and Tel Aviv-Jaffa.
EMP	Employment
FAv	Forecasted Average
Frames of Reference	Frames of Reference are used to position, store and/or filter segments of knowledge.
GaWC	Globalization and World Cities
GDP	Gross Domestic Product measures total economic activity within a city/country and is useful for tracking developments over time. In this instance, Oxford Economics use the Production Approach to calculate GDP in constant 2005 US prices.

Glossary of Key Terms and Abbreviations continued...	
Key Term or Abbreviation	**Definition or Full Name**
GFC	Global Financial Crisis, a macro event that occurred in 2007-2009 and had systemic repercussions globally. Refer to Appendix 6 for further details.
HAv	Historical Average
HDI	Household Disposable Income
Key City Structures or Key Cities	Key City Structures comprise six cities that represent different development stages and are primarily used in Analyses A and B – Bangalore (Early Emerging), Guangzhou (Emerging), Sydney (Maturing), New York (Mature), Detroit (Obsolescence-Decline) and Shanghai (Obsolescence-Re-Growth). The analyses are supplemented by analyses of cross reference cities. Refer to Sub section 3.4.2 City Selection for further details.
Key Protagonists	Key Protagonists refer to a frame of reference constructed to classify a range of major stakeholders involved in the development of city structures. These comprise Regulators, Generators and Actuators. Refer to Section 4.4 for further details.
Key Sector	Identified as one of the four major sectors (Governance, Economic, Social and Environment) from which the universal and critical indicators can be broadly classified into.
Knowledge Based Development	Identified as the fourth and current phase of city structure evolution. It is based on the proposition of technological transformation, knowledge generation and space of flows.
Longitudinal Indicators	Longitudinal indicators are critical indicators with datasets of typically more than 15 years used to provide long term trend insights.
Mature	A development stage that refers to city structures approaching a growth plateau in development. In this thesis it refers to key city structure New York and cross reference city structures Tokyo, Paris and London.
Maturing	A development stage that refers to city structures which have entered a moderate growth phase of development and can be further divided into Early Maturing and Established Maturing city structures. In this thesis it refers to key city structure Sydney (Established Maturing) and cross reference city structures - Early Maturing (Singapore, Auckland, Melbourne, Brisbane, Adelaide, Perth, Boston and Berlin) and Established Maturing (Los Angeles, Moscow, Toronto and Hong Kong).
Megacity	In this thesis, the quantitative city population threshold of 20M advocated by the United Nations was used as the primary criteria to clearly and quickly identify and classify megacities within the range of key and cross reference city structures.
Network Structure	A network structure is delineated by the physical geography and development of transport routes, industry clusters and activity networks and interactions within a city structure.
Obsolescence - Decline	A development stage that refers to city structures which have entered an obsolescence phase and/or are in development decline. In this thesis it refers to key city structure Detroit and cross reference city structures Athens, Budapest and Manchester.

Glossary of Key Terms and Abbreviations continued...	
Key Term or Abbreviation	**Definition or Full Name**
Obsolescence – Re-Growth	A development stage that refers to city structures which have entered an obsolescence-decline phase but have been re-invigorated and are in a re-growth phase. In this thesis it refers to key city structure Shanghai and cross reference city structure Beijing.
OE	Oxford Economics – One of the primary data source providers used in the thesis.
Points of Confluence	An analytical approach developed to examine different combinations and subsets of derived trajectory indicators to further determine signature characteristics of the six development stages.
POP	City Structure Population
Profile Overlays	Profile Overlays are a frame of reference constructed to filter segments of knowledge in order to compare city structures by different categories e.g. development stages, geographic region, primary economic industry and GaWC City classification.
Resilience	Resilience measures the responsiveness of City Structure Economic prosperity, Household prosperity or Employment opportunity relative to City Structure Population. It is the capacity of a City Structure Population to absorb elastic deformation or big impacts i.e. Boon/bust forces and external macro events e.g. GFC. A negative sign denotes a slowing down in the rate of GDP, POP, EMP and/or POP velocity and therefore the City Structure's resilience is under strain/declining/weakening.
Scale of Significance	Scale of Significance is a frame of reference constructed at a category specific scale to determine the level of scale that an analysis needs to be undertaken and also at what level an indicator's dataset is available at. For this thesis, all of the indicators and their respective datasets were primarily obtained at either a country or city level.
UN	United Nations – One of the primary data source providers used in the thesis.
Universal Indicator	Constitutes one of the 76 indicators selected for the City Structure Universal Indicator Matrix and is used to shortlist critical indicators for the City Structure Critical Indicator Matrix. Refer to Appendix 2 for a full listing of universal indicators.
Urban Agglomeration	Defined by the United Nations as the number of a country's people who agglomerate around urban centres/cities with over 750,000 inhabitants.
Velocity	Velocity measures the change in City Structure GDP, HDI, EMP or POP growth.

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