CENTRE for LiveableCities SINGAPORE
LECTURE SERIES

Report:

Growth, Innovation, Economies of Scale and the Pace of Life

MNDAuditorium
14 March 2016

Highlights at the lecture:


A science of cities

Growth: Life vs cities

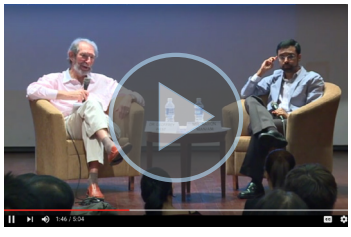
Scaling laws and cities


Fate of cities= fate of planet


The growth paradigm: Innovate or collapse


The growth paradigm: Collapse is inevitable


Why do cities scale in the same way?


How big can cities grow?

A science of cities is needed: Professor Geoffrey West

By Alvin Chua

> *"The problems we are facing on the planet today have come to the fore because of the exponential expansion of urbanisation. The stresses on resources, energy and the social fabric are an enormous challenge to the planet and we are all part of it."*

Global issues such as climate change, pollution and conflict over resources largely spring from cities and a science of cities is required to both understand and resolve them, says Distinguished Professor Geoffrey West of the Santa Fe Institute.

Speaking at a CLC Lecture, Professor West said: "If we are to have a sustainable planet, we (need) to have sustainable cities. If we are to survive, we desperately need...a theory, a science of cities that is quantitative and predictive. It has to involve...resilience, evolvability, growth and scalability.

> *"When you study complex adaptive systems, one of the things you learn is that if you treat only one piece of it, then you are very likely to have unintended consequences that will change everything else there. Even issues as grand as dealing with energy, climate change, health or the environment need to be thought of in one unified framework."*

Presenting data on urban networks that take in social interactions and physical infrastructure, Professor West showed that cities exhibit scaling laws, like other complex systems in biology and physics.

> *"The good things in cities— income, wealth, patents, colleges, creative people, restaurants; and the bad things— disease, AIDS, flu, crime - all of these increase by about 15% every time you double the size of a city, and at the same time, you save 15% on the physical infrastructure (through economies of scale)."*

Unlike the scaling laws and bounded growth seen in nature however, modern socio-economic systems are built on a paradigm of open-ended growth. This however raises questions over the sustainability of these systems.

"(An end to growth) is crucial in biology but it is considered disastrous in socio-economic systems. The system of exponential growth however has a dire consequence, which is that the system cannot continue (indefinitely). It must collapse at some stage. The way we have avoided collapses is to recognise that we are growing within an innovative paradigm," Professor West explained.

> *"You are going along this curve, life is getting faster and you would collapse. Somewhere along, you'd better reset the clock with a major innovation, like the discovery of iron, the Industrial Revolution, the invention of computers. If you want to have open-ended growth which is what we have demanded, then you*

have to be continuously on an innovation cycle. The catch however is that the time between those innovations gets shorter."

For Singapore, Professor West had one piece of advice: define and qualify your place in the world.

"When you look at scaling curves (of cities within a country), you can rank them, gauge their success and performance. The big issue for Singapore is you are not part of (a larger) urban system," he said.

"You are unique, you are part of the global urban system, but no one knows what that is. How can you prepare unless you know what is in the global urban system? Singapore (needs to) think about what it means to be a global city, where it sits within the global urban system, where it over-performs or under-performs in that system and its trajectory."

About the Speakers

Speaker:

Dr Geoffrey WEST

Distinguished Professor and Past President
Santa Fe Institute

Geoffrey West is a theoretical physicist whose primary interests have been in fundamental questions in physics, especially those concerning the elementary particles, their interactions and cosmological implications. West served as SFI President from July 2005 through July 2009. Prior to joining the Santa Fe Institute as a Distinguished Professor in 2003, he was the leader, and founder, of the high energy physics group at Los Alamos National Laboratory, where he is one of only approximately ten Senior Fellows.

Moderator:

Mr Aaron Maniam

Director, Industry Division
Ministry of Trade and Industry (MTI)

Aaron Maniam is currently Director (Industry) at MTI, responsible for coordinating economic policies on manufacturing, services and tourism. He first joined the Singapore government in 2004, working in the Foreign Service. Later, he was posted to the Strategic Policy Office (SPO), where he began working on scenario planning and analysis of long-term issues relevant to Singapore. After that, he was appointed the first Head of the Centre for Strategic Futures, while retaining his SPO portfolio. He was subsequently appointed Director of the Institute of Policy Development at the Civil Service College (CSC), where he started the CSC Applied Simulation Training Laboratory, and led efforts to develop public sector understanding of complexity and governance issues.

About CLC

The Centre for Liveable Cities was set up in 2008 by the Ministry of National Development and the Ministry of the Environment and Water Resources, based on a strategic blueprint developed by Singapore's Inter-Ministerial Committee on Sustainable Development. Guided by its mission to distil, create and share knowledge on liveable and sustainable cities, the Centre's work spans three main areas - Research, Capability Development, and Knowledge Platforms. The CLC Lecture Series is a platform for urban experts to share their knowledge with other practitioners. For more information, please visit: http://www.clc.gov.sg