The Incredible Growth of China – A Non-Sea Turtle View on Trends, Challenges, and Opportunities

Alan Paau, MBA, PhD - 鲍绍琦
Vice Provost, Cornell University

Executive Director
Cornell Center for Technology Enterprise & Commercialization

President, Cornell Research Foundation, Inc.
A. Rapid Change & Explosive Growth of China: Trends, Challenges & Opportunities (8 themes)

B. A Personal View on Knowledge Economy

C. Recent Activities & Experiences in China

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CCTEC 2014
> 300 M people moved to cities in the last 30 years

15 cities with more than 5 M people

another 160 cities with more than 1 M people

Mega-cities are being linked by new rails and road – creating mega urban areas of ~30 M people – larger than many countries (190+ of 238/204 by Olympic/209 by FIFA)

> 300 M (closer to 400 M) people moved out of poverty with disposable income per capita rose from $280 in 1980 to $3,000 in 2010 ($4,312 – Jan 2014)

Uneven distribution: urban/rural = 3.23 (2010), range = 2.06 (Tianjin) to 4.17 (Guizhou)

CCTEC 2014
Shanghai: Then and Now

From James Zhu
CCTEC 2014
Urbanization – Challenges

Heavy burden on the environment and infrastructure such as transportation and public services

- 40% of Chinese rivers are seriously polluted and unfit for use   e.g. “中國甘肅省蘭州市上周自來水測出含苯 (benzene) 量嚴重超標, 事件引發市民恐慌... 4/16/14”

- “Smogpocalypse” – Beijing 1/2012 PM2.5 >990 µg/m³ (WHO “red line” = 25 µg/m³)

- World’s Worst Traffic Jam: G110 “… thousands of vehicles for more than 100 kilometres (60 mi) and lasted for more than ten days... 8/14/2010”
Government will invest $636 billion in water-related projects through 2020

China Vanke (万科; SZSE: 000002), built > 80,000 apartments in more than 25 cities in 2012—and recorded annual sales topping 97 billion Renminbi (about $16 billion)

Green Industry

Local “mini-economy”
A2. Manufacturing – Incredible Scale

World’s largest manufacturer - $2.2 T in value added
- 90% of world’s PC’s
- 80% of world’s air-conditioners
- 70% of world’s solar panels
- 65% of world’s shoes . . .

- 40% of Chinese economy (US - 12.5% in 2012)
- Employs 130 M people (US - 17.4 M)

- From “local” to “global”: Huawai became the world’s top telecommunications-equipment manufacturer in 2012 with 2/3 of its $36B in revenues from outside of China and with products getting more sophisticated

- Changing, however due to rising labor costs, need to “level the playing field”: from coastal to inland
Quality and sophistication – quality and “brand” development; increasing sophistication with higher price products

New locations and market – from coastal areas to central and western China
Asia – Pacific: 2/3 of world’s middle class by 2030

China’s demand evolution: from “value for money” to “emotional needs”; from land and water use to logistics and retails

Everybody has to eat:
- 13 M tons of chicken consumed in 2012
- Shuanghui International (双汇国际) acquisition of American Smithfield, the world’s largest pork producer and processor with facilities in 26 states and owns 460 farms with another 2,100 others under contracts, in 2013 for $4.7B
- Modern agriculture: productivity, lessen reliance on chemicals, safety and quality to feed 1.36 billion (19%)
$12 T (Feb, 2014) in bank deposits and has been adding $2 T every year for the last several years

Foreign-Exchange Reserve = $3.5 T

Big (4) Banks – really function as an arm of the government – but lending to SMBs, which employ ~80% of the workforce, is limited

“Shadow Banking” system – underground financing, off-balance sheet lending, wealth management products that pool investors – no one REALLY knows how much debt China actually has
A5. Brain Power

College graduates grew from 1 M in 1998 to 7.5 M in 2012
R&D Investment grew from 2.2% in 1993 to 12.8% of world’s total R&D spending – surpassed Japan in 2011 and is now second only to the US

Huawei – total workforce = 150,000; 68,000 in R&D
Cisco – total workforce = 66,000; 21,000 in R&D
(job classification methods may be different)

Substantial “disconnect” between education, employment, and markets – ¼ of 2012 graduates failed to land a job by year’s end

Patent filings surged, but few of quality comparable to those in the west or Japan

CCTEC 2014
Lack of “ingrained” infrastructure and availability of inexpensive hardware create opportunities

- Relatively “recent” phenomenon: 60% of the ~618 M (2013) Chinese online only begun using the Internet in the past 3 to 5 years

- Overall penetration at only ~45% of the population (~80% in the US)

- Gravitated towards instant messaging (Tencent, founded in 1998 has more than 700 M QQ accounts – and is adding services to become an amalgam of AOL, Facebook, Gmail, Norton, Skype, Twitter, and Yahoo! And is expanding by acquiring video-game companies in the west, e.g. Riot Games, Epic Games etc..) and online video
A6. Internet – Fast Taking Over

1/13 – 9 of Top 10 Global Internet Properties ‘Made in USA’… 79% of Their Users Outside America

Top 10 Internet Properties by Global Monthly Unique Visitors, 1/13

- Google
- Microsoft
- Facebook
- Yahoo!
- Wikipedia
- Amazon.com
- Ask.com
- Glam Media
- Apple
- Tencent

USA Users vs International Users

Monthly Unique Visitors (MMs)
A6. Internet – Fast Taking Over

3/14 – 6 of Top 10 Global Internet Properties ‘Made in USA’...
>86% of Their Users Outside America...China Rising Fast

Top 10 Internet Properties by Global Monthly Unique Visitors, 3/14

- Google
- Microsoft
- Facebook
- Yahoo!
- Wikipedia
- Alibaba
- Baidu
- Tencent
- Sohu
- Amazon.com

[Bar chart showing monthly unique visitors for each property.]

USA Users vs. International Users
A7. Where Does BioPharma Fit In?

- Undoubtedly will become one of the world’s largest market + increasing consumer demand for quality healthcare + great demographic
- Highly fragmented with less “informed” users
- Infrastructural deficiency and highly provincial
- Heavy government involvement and top-down decision-making (from regulatory clearance to pricing practice to strategy development)
- Improving IP climate
- Opportunities for strategic alliances and growth
- Narrow “window” of opportunity (policy and legacy shift)
- Many “me too” and few genuine innovations
- Improving CRO’s and CMO’s to facilitate open innovation and lean development
- Long time-line is a key challenge (not unique to China)
- World’s largest consumer market for luxury goods
- World’s largest automobile market
- 2nd largest economy in the world (although per capita is still low)
- Leading the world in the scale of DNA mapping and synthesis
- Built the most underwater tunnels
- Building the world’s largest dam
- Built some of the world’s longest bridges
- Built the world’s fastest train
- Created the world’s largest “middle class”
- Designed an O/S for one of the world’s faster computers – 1.5x faster than Jaguar in the US
- Designed and built its own space station, put a probe on the moon, designed its own GPS Satellite System

BUT . . . What do all these mean as a “sustainable economy”
### B. Snapshot of Jobs in An Economy

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<thead>
<tr>
<th>&quot;Infrastructure&quot; Jobs</th>
<th>&quot;Multiplier&quot; Jobs</th>
<th>Primary Wealth &quot;Exhaustible&quot;</th>
<th>Creation Jobs &quot;Sustainable&quot;</th>
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<tbody>
<tr>
<td>Government</td>
<td>Retail</td>
<td>Natural Resource-Based Jobs</td>
<td>Knowledge- &amp; Creativity-Based Jobs</td>
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<td>Education</td>
<td>Hospitality</td>
<td>Extraction</td>
<td>CIT</td>
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<td>Healthcare</td>
<td>Entertainment</td>
<td>Processing</td>
<td>Biotechnology</td>
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<td>Non-Profits</td>
<td>Recreation</td>
<td>Export</td>
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**Social Support Systems**
- Retirees/Children/Disabled
- Unemployed
- Under-Employed

- New knowledge & ideas
- Talent and Financial Resources
It’s all in the “balance” –


“Infrastructure” Jobs and Social Support Systems are NOT unimportant = they are significant contributors to community construct and social fabrics that determine the “quality of life” in a community; but they cannot be an excessive burden
B. Planning for Jobs for a Healthy Economy

Understand and exploit where the “sustainable Jobs” may come from in your community (understand your strength and assets) and encourage them to grow and try your best to make “exhaustible jobs” last longer (or even sustainable)

Decide the “desirable” balance to encourage growth

Set policies and regulations that do not get in the way but encourage and facilitate the above

Implement to incent and not to create barriers

Understand the reality that the world is changing (getting faster with the advances in CIT) and therefore be diligent to “keep fingers on the pulse” and respond accordingly with agility
C. Recent Activities in China

1. Southwest Jiaotong University (Chengdu, Szechuan)

2. Nanjing Agricultural University (Nanjing, Jiangsu)

3. Guangda Cooperation International Technology Center Corporation, Ltd. (Shenzhen, Guangdong)
Recent Activities in China

1. **Southwest Jiaotong University** (formerly Imperial Chinese Railway College, founded 1896 - currently ~38,000 students) – **Center for Social Innovations** (State-, province-, and municipal-, private- funded projects)

Cornell partners:

**JGSM** Center for Sustainable Global Enterprise
Stuart Hart: Entrepreneurship at the bottom of the pyramid (technology licensing)
Xiaojian You: China Program manager (needs identification)

**ENG** School of Civil & Environmental Engineering (projects)
Oliver Gao: transportation system engineering; air quality and environment sustainability

**CCTEC**
Technology + Visiting scholar (Sixiang Zhou)

Personally
Honorary lifetime professor; co-chair, strategic planning committee
Recent Activities in China

2. Nanjing Agricultural University (Crop Production in Plant Genetics and Germplasm Development cooperation with Cornell since 1980's through Prof. Norm Scott - Center for Agricultural Technologies & Innovations founded in 2012):

Cornell partners:

CALS (State- and province- funded collaboration)
- Susheng Gan (Horticulture): molecular regulation of plant senescence (Cornell work - leaf; NAU Cooperation - flower)

VetMed (State- and province- funded collaboration)
- CONSULTANT Database – an online diagnostic support system for animal diseases

CCTEC
Technology + Visiting scholar (Professor Liyan Zhao)

Personally
Co-chair, steering committee
Recent Activities in China

3. Guangda Cooperation International Technology Center Corporation, Limited (Shenzhen, Guangdong) – a privately-funded Joint Venture with government support (PPP)

Cornell partners:

**CCTEC/CALS/VetMed/WCMC (Technology Licensing)**
- Functional Food (processing, supplements)
- BioTools (reagents and research instrumentations)
- Advance Immune Systems (vaccines, diagnostics, therapeutics)

**CCTEC/ENG/A&S/WCMC (Technology Licensing)**
- Scientific Application Components & System

Personally
- Chairman of the Board of Directors
Stay in Touch

apaau@hotmail.com
607-229-9810