



Global Sourcing 101: Why China

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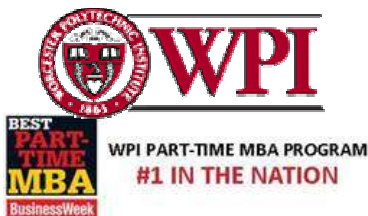
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Agenda



Overview



Geography & Infrastructure



Comparisons

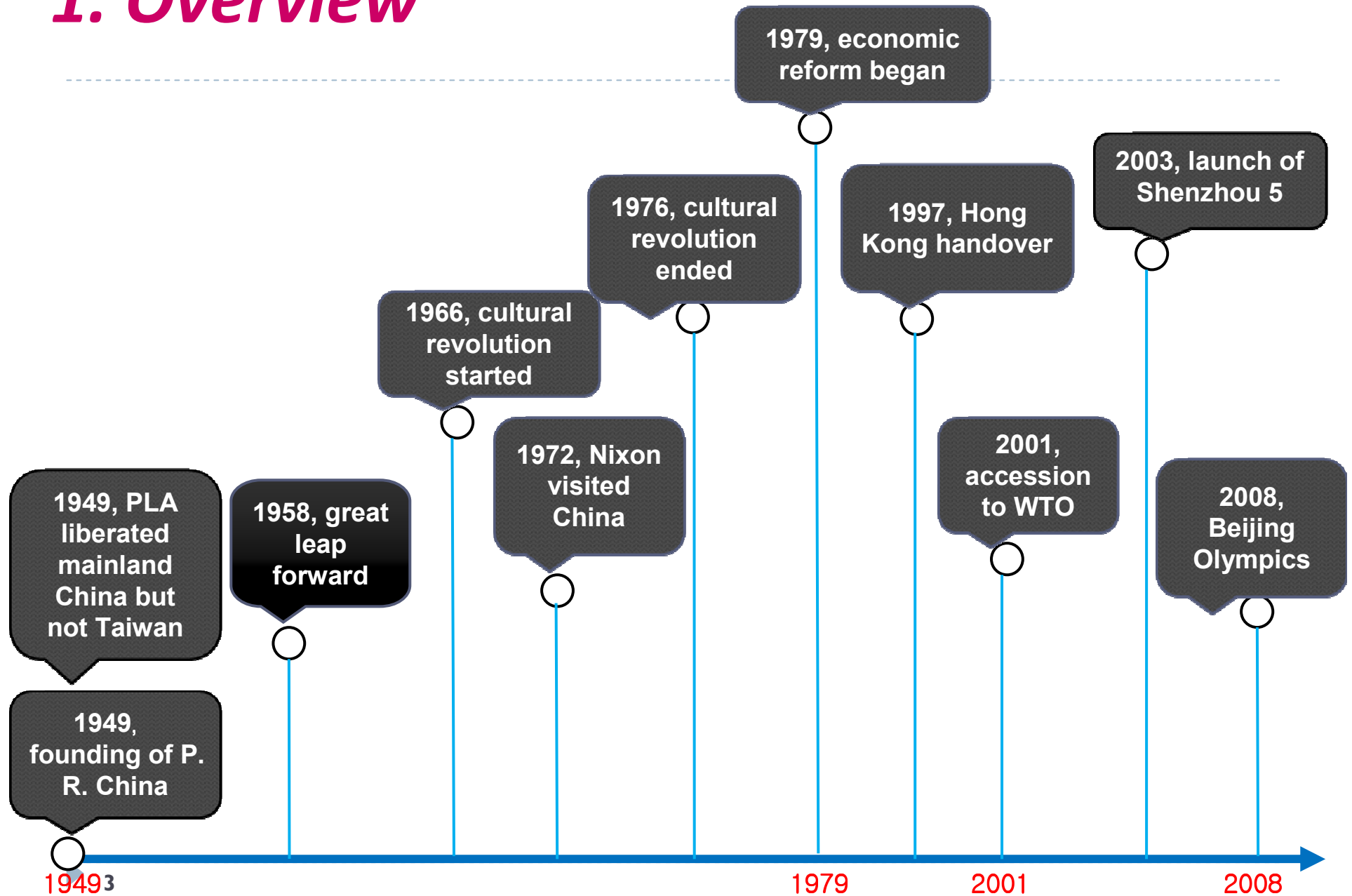


Sourcing in China



China Project Center @ WPI

1. Overview



China Celebrating 60 Years



60 Years in Facts & Figures (1)

http://news.bbc.co.uk/2/hi/in_depth/8283546.stm

Life expectancy (years)

1950–1955

39.3 **42.3**

Male

Female

2005–2010

71.3 **74.8**

Male

Female

Literacy

1949



20% literacy

2005



>96% literacy

Key events



1979 – One child policy

Introduced to curb China's population growth rate, this policy limited most families in towns and cities to just one child. It has proved the most effective population control measure so far adopted.

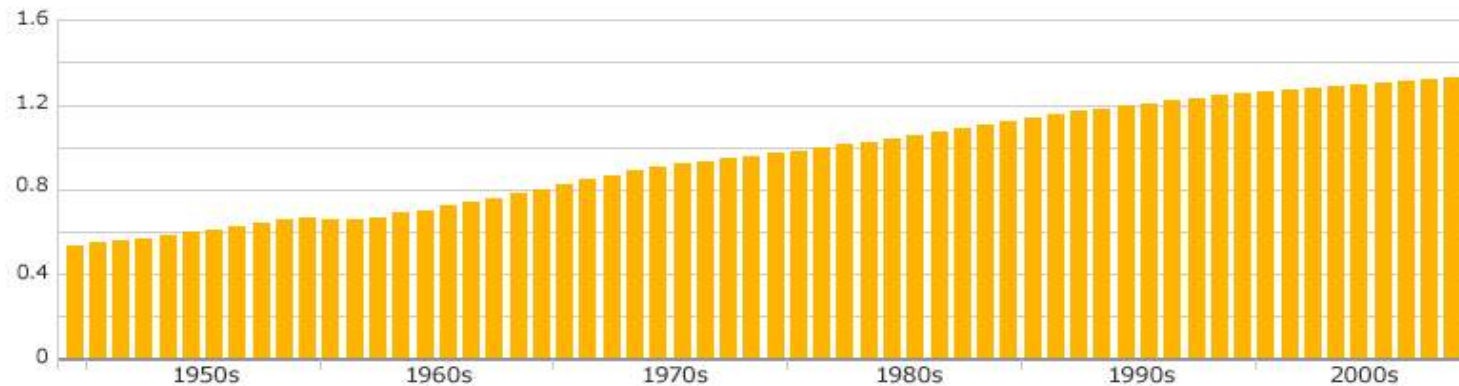


2005 – Population reaches 1.3bn

As China's population—growing by 10 million annually—approached the 1.3 billion mark, authorities reaffirmed the one-child policy, which, they claimed, had prevented at least 250 million births over the past 20 years.

Total population 1949–2008

Billion



60 Years in Facts & Figures (2)

Wealth

1952

\$17

GDP per capita

2008

\$3,388

GDP per capita

Foreign exchange reserves

1949

negligible

2008

\$2.2

trillion

Millionaires

2009

825,000

people are worth more than 10 million yuan (£1m)

Key events



1966 – Cultural Revolution

Launched by Mao Zedong to renew revolutionary zeal, it forced millions into manual labour. Thousands were executed. It sparked civil unrest and chaos. The economy was badly hit.

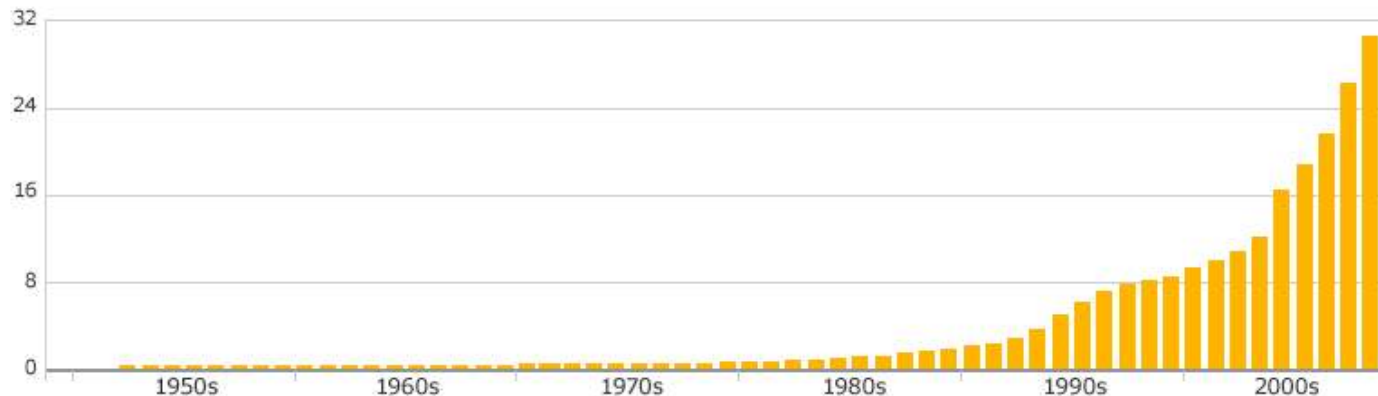


1979 – Economic reform

China announced it would embrace a market economy and open up to foreign trade and investment. The economy has been transformed, lifting hundreds of millions out of poverty, though inequality has increased.

Gross domestic product 1952–2008

Trillion Yuan



60 Years in Facts & Figures (3)

Military expenditure 2006

4.3% of GDP

Military capacity 2009

1.25 million active members of the People's Liberation Army
6,700 tanks
2,300 combat aircraft
6 nuclear submarines

Key events



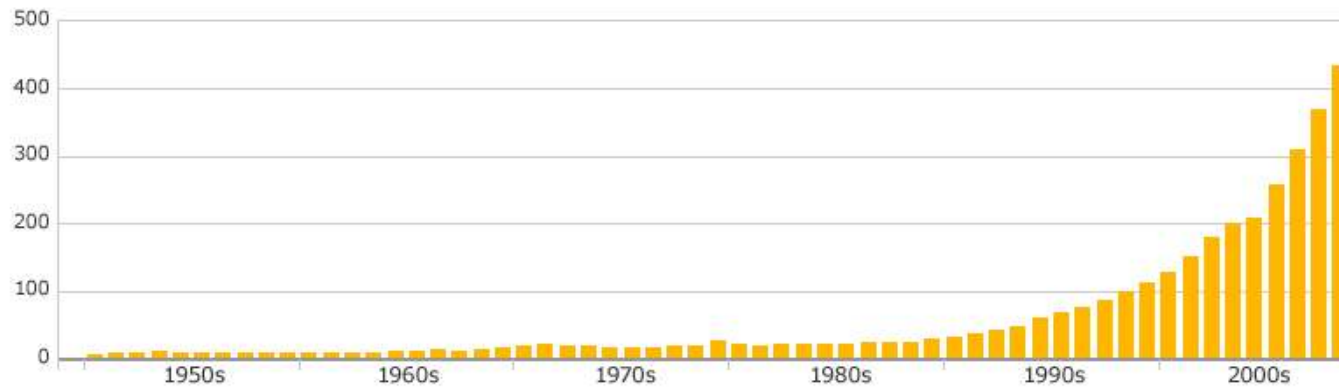
1949 – Victory for People's Army
What began life as a ragtag guerilla outfit grew into an effective military force during China's civil war. Throughout 1949, the People's Liberation Army swept through China ultimately pushing Nationalist forces off the mainland.



1989 – Tiananmen Square
After days of growing tension, under orders from Deng Xiaoping and elders in China's ruling party the People's Liberation Army was ordered into Tiananmen Square to clear away pro-democracy protesters. Hundreds were killed.

Military spending 1950–2008

Billion Yuan



60 Years in Facts & Figures (4)

Food

2008

73 million tonnes
of meat

2005

185 million tonnes
of rice

2005

107 million tonnes
of sweet potato

2005

34 million tonnes
of cabbage

Key events



1958 – Great Leap Forward

Intended to transform China's economy, the policy called for rapid industrialisation and the mass collectivisation of farmers. It resulted in disaster. Food production collapsed, provoking a famine in which 10-15 million people died.

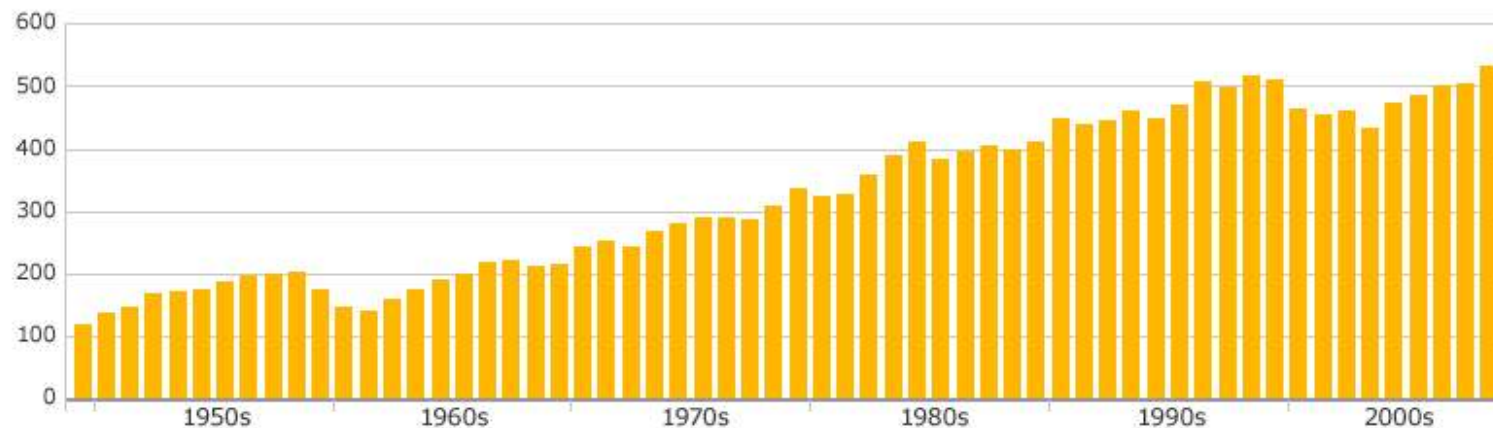


1970s – Communes abandoned

The commune system was gradually abandoned in favour of family farming. Prices paid for farm products were sharply increased in 1979. Peasants were also allowed far greater choice in what crops to plant. Food production rose.

Grain production 1949–2008

Million tonnes



In My Summary, China is

Rich & Poor

Young & Old

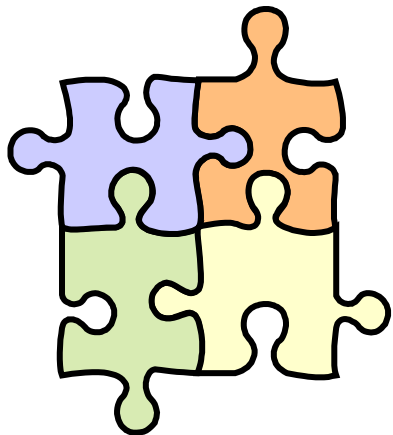
Strong & Weak

Primitive & Modern

Backward & Advanced

Innovative & Traditional

Aggressive & Conservative



2.1 Basic Chinese Geography



Country View

Globe View



China's Administrative Divisions

<http://www.chinatoday.com/city/a.htm>

Map of China

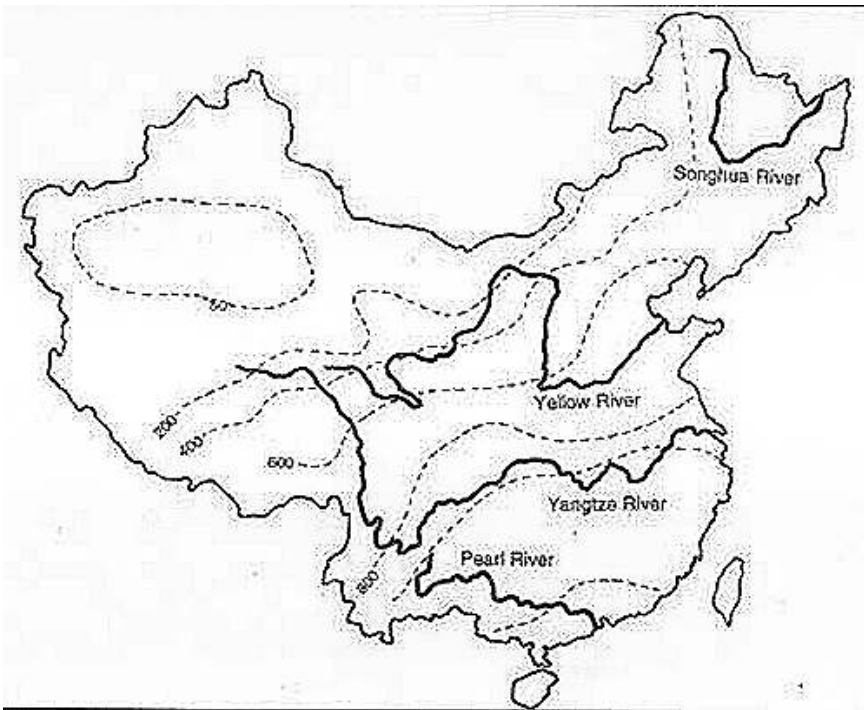
Locations of provinces,
autonomous regions
and municipalities.



- ▶ 4 Municipalities
 - ▶ Beijing
 - ▶ Shanghai
 - ▶ Tianjin
 - ▶ Chongqing
- ▶ 23 Provinces (including Taiwan)
- ▶ 5 Autonomous Regions
 - ▶ Inner Mongolia
 - ▶ Ningxia
 - ▶ Xingjiang
 - ▶ Tibet
 - ▶ Guangxi
- ▶ 2 Special Adm. Regions (SAR)
 - ▶ Hong Kong
 - ▶ Macau

Major Rivers and Economic Development

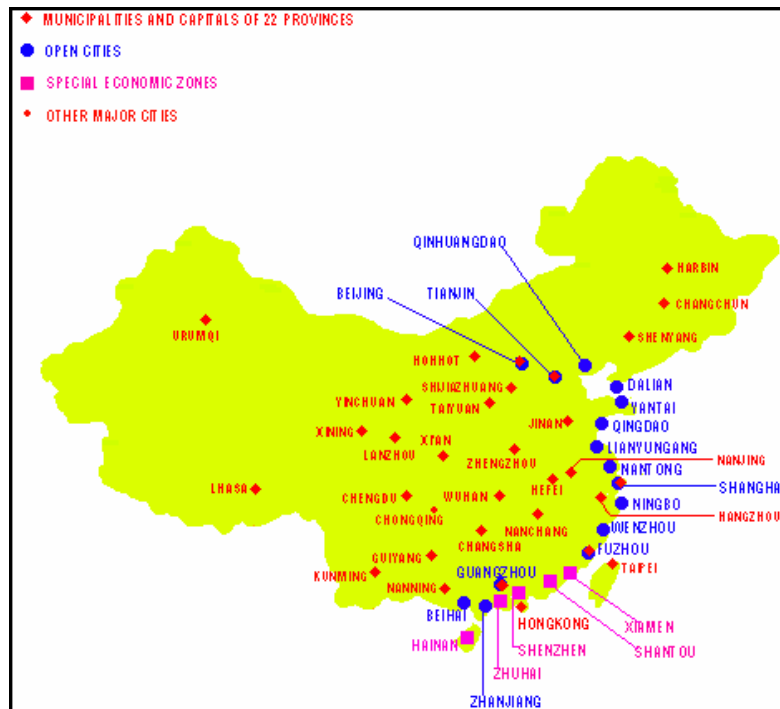
<http://afe.easia.columbia.edu/china/geog/maps.htm#2a>



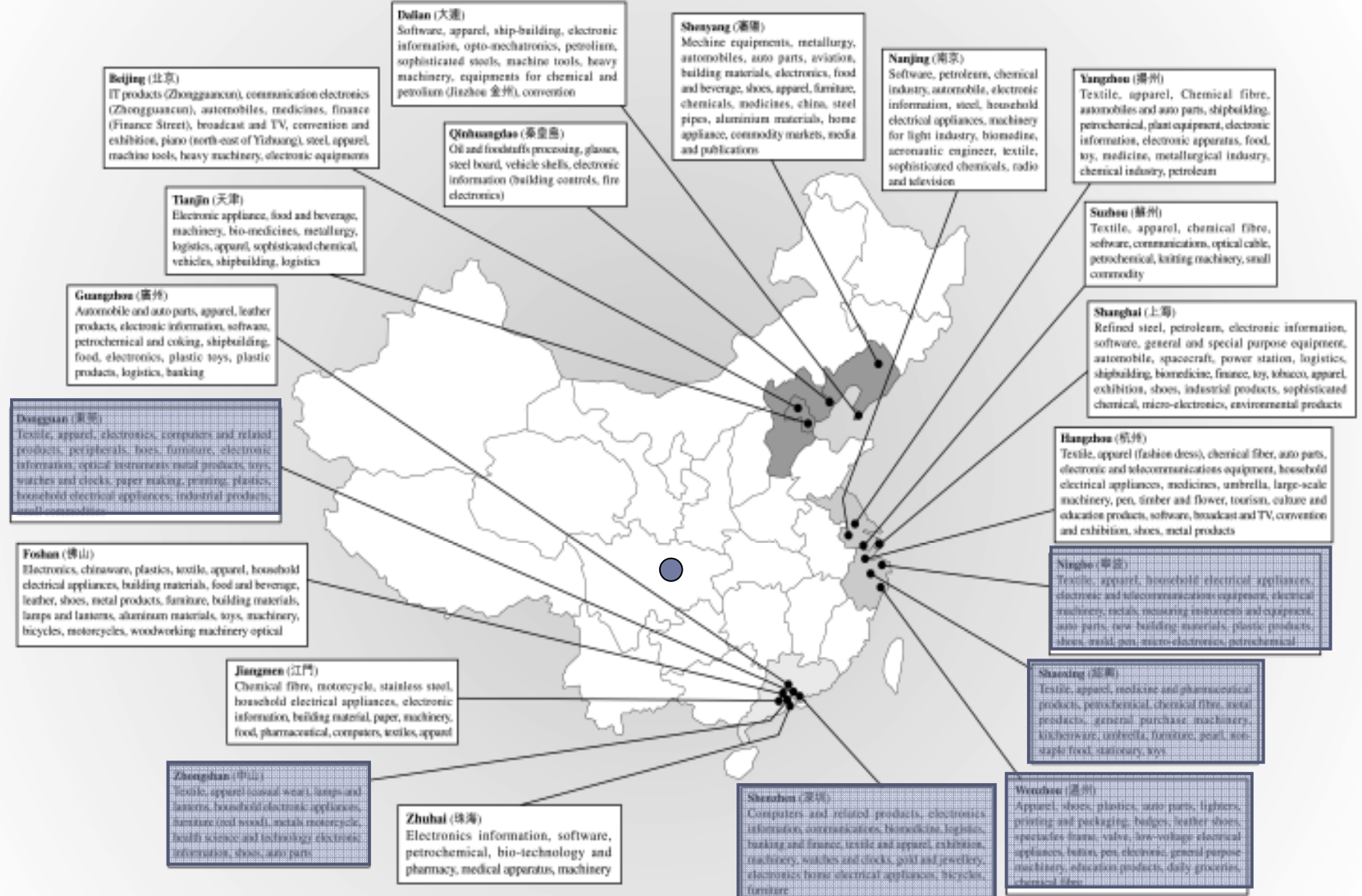
- Huang He (Yellow River): China's second longest river, the Huang He rises in Qinghai province and flows some 5,464 km to the Yellow Sea (**Bohai Economic Rim**).
- Chang Jiang (Yangtze River): As China's "main street," this artery runs over 6,300 km through several of China's most economically developed regions (**Yangtze River Delta**).
- Zhu Jiang (Pearl River): Situated in Guangdong province just to the north of Hong Kong and Macao, the delta of the Zhu Jiang is the most significant farming area in southeastern China (**Pearl River Delta**).

Special Economic Zones (SEZ)

The Chinese government grants SEZs special economic policies and flexible governmental control. This allows SEZs to utilize an economic management system that is especially conducive to doing business that does not exist in other parts of China



Selected industrial clusters in China*



Sources: Li & Fung Research Centre: "Annual Report on Urban Competitiveness, No.3, Ai Fenghai et al." Social Sciences Academic Press; "Regional Powerhouse: The Greater Pearl River Delta and the Rise of China", M. Enright et al. John Wiley & Sons (Asia) Pte Ltd, 2005

* Please refer to Industrial Cluster Series Issue 2 and 3 for more in-depth analysis of the PRD and YRD clusters

Industrial Zones – more snapshots

- ▶ China National Economic Technology Development Zones include 69 zones in different cities:



Dalian Economic Development Zone



Minhang Economic Development Zone



Hangzhou Economic Development Zone



Suzhou Industrial Zone



Fuzhou Economic Tech. Develop Zone



Wenzhou Economic Tech. Develop Zone

<http://www.qalex.com/upload/member/Environment/20090601/84e9b261-9f71-4cda-8b38-4a01b8d234a3.jpg>

<http://www.industrycome.com/upload/2008101451183101.jpg>

2.2 Infrastructure

► Highway



► Port



► Railway



► Power



http://www.qz828.com/pic/0/10/01/77/10017742_546819.jpg

<http://avela.com/wp-content/uploads/2010/07/DSCN0032.jpg>

http://news.xinhuanet.com/politics/2006-08/11/xin_2220803112021890133022.jpg

Highway

<http://zhidao.baidu.com/question/124811186.html?fr=qrl&cid=197&index=1&fr2=query>
<http://www.xxwhly.gov.cn/UploadFile/200910/20091026213619115.jpg>

- ▶ At the end of 2008, the total length of highways in China reached 3.73 million km.
- ▶ 45 times longer than early years from 1949.
- ▶ The second largest highway system in the world right after the U.S.



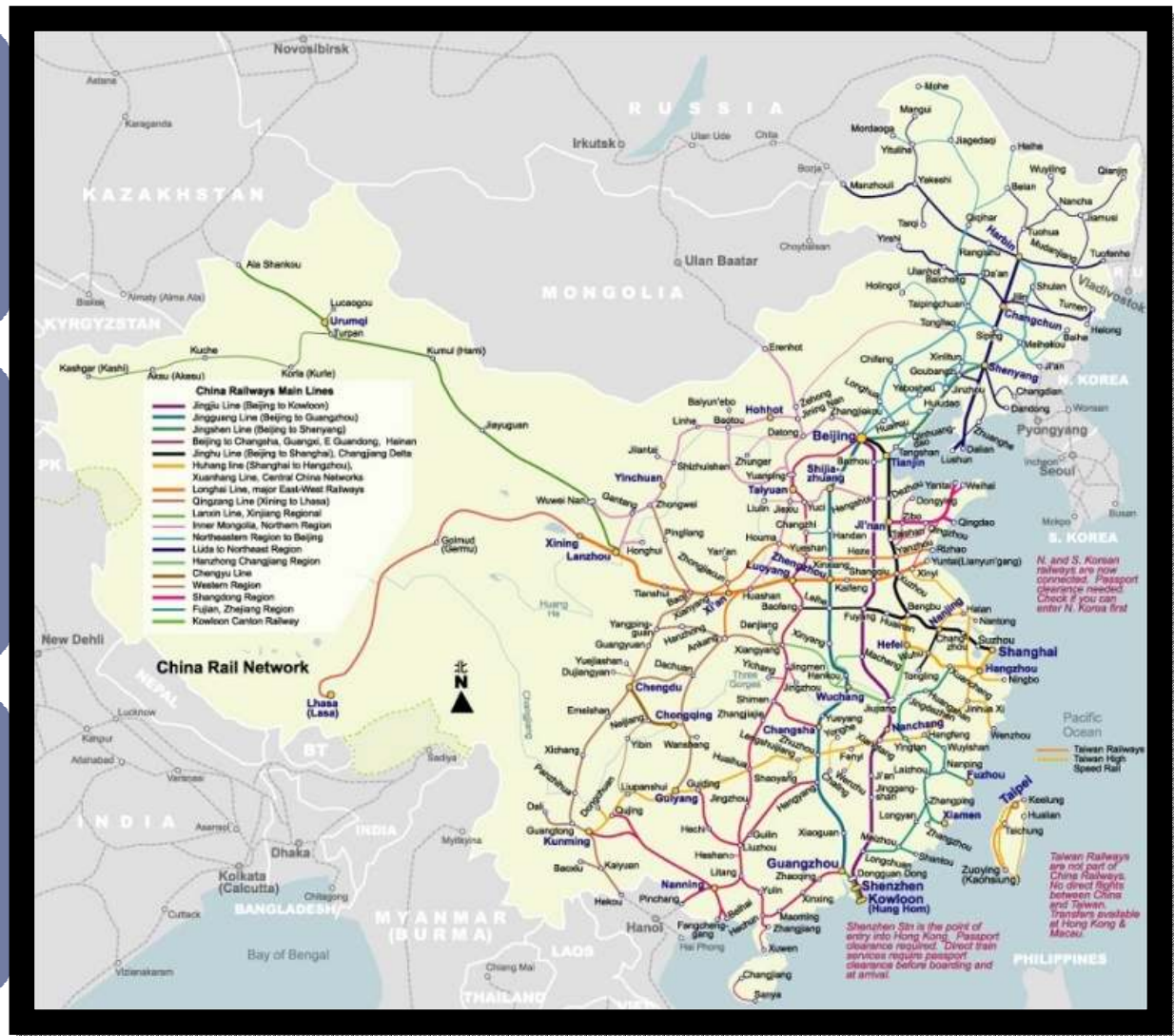
Railway

<http://zhidao.baidu.com/question/124811186.html?fr=qrl&cid=197&index=1&fr2=query>
<http://www.chinahighlights.com/image/tour-2010/china-train-travel/china-train-map.jpg>

By the end of 2008, the total railway mileage in China reached 161,100 km.

Ranking the second in the world (U.S. as No. 1)

The total length of electrified railway in China has reached nearly 26,000 kilometers, ranking the second in the world.



Transportation: High-speed Rail

http://en.wikipedia.org/wiki/High-speed_rail_in_China

- ▶ High-speed rail: commercial train service in China with an average speed of 200 km per hour (120 mph) or higher. By that measure, China already has the world's longest high-speed rail (HSR) network with about 6,500km (4,000 mile) of routes in service.
- ▶ Notable examples of high-speed train service include
 - ▶ **Wuhan–Guangzhou High-Speed Railway**, 968 km (601 mi) in 3 hours, top speed = 350 km per hour (220 mph), average = 310 km per hour (190 mph);
 - ▶ **Beijing–Tianjin Intercity Railway**, 117 km (73 mi) in 30 minutes, top speed = 330 km per hour (210 mph), average = 234 km per hour (145 mph);
 - ▶ **Shanghai Maglev Train**, an airport rail link that travels 30.5km (19mi.) in 7 minutes and 20 seconds, averaging 245.5km (152.5mph) and reaching top speed of 431km/h (268mph).



Transportation Infrastructure

- ▶ Upgraded train stations in China:

Shanghai South Station:



Beijing South Station:



<http://www.laowaihouse.com/blog/wp-content/uploads/2009/11/south-station-300x200.jpg>

Port

<http://zhidao.baidu.com/question/124811186.html?fr=qrl&cid=197&index=1&fr2=query>
<http://www.ec.cn/images/map.jpg>

- ▶ In 2008, China completed 7.022 billion tons of port cargo throughput, and 128 million container throughput.
- ▶ China holds 7 seats in the top 10 of the global port cargo throughput.



- ▶ China ranks the first in port throughput and container throughput in the world for 6 consecutive years.

Power

<http://zhidao.baidu.com/question/124811186.html?fr=qrl&cid=197&index=1&fr2=query>
<http://www.chinamapxl.com/images/power-map-of-china.jpg>

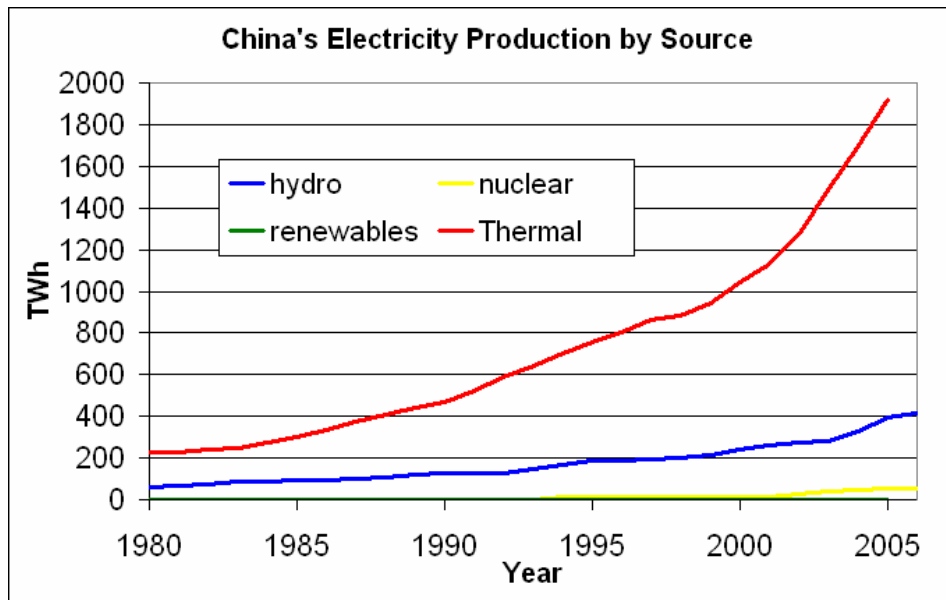
- ▶ By 2009, the installed power capacity in China had exceeded 800 million kilowatts, ranking the second largest in the world (U.S. ranked No.1)



- ▶ Transmission lines of 220 kV and above reached 375,000 km.
- ▶ The country's grid size ranks first in the world.

Energy - Electricity

► Electricity production



Three Gorges Dam Project



<http://www.internationalrivers.org/en/china/three-gorges-dam>

3. Comparisons

http://travel.nationalgeographic.com/places/images/photos/photo_lg_india.jpg

<http://beinglatino.files.wordpress.com/2010/06/latin-america.jpg>

http://bloomingtongreentravel.com/yourchoice/Portals/0/east_europe.jpg

With

► India



► Latin America



► East Europe



(1) Compared with India

► Risk of political instability

14	GERMANY	8.49
15	FRANCE	8.46
16	USA	8.16
17	IRELAND	8.09
18	NETHERLANDS	7.82
19	HONG KONG	7.49
20	UNITED KINGDOM	7.41
21	POLAND	7.26
22	BRAZIL	7.20
23	JORDAN	7.14
24	CHINA MAINLAND	7.12
25	INDIA	7.08
26	MALAYSIA	6.90
27	SPAIN	6.65
28	TAIWAN	6.42
29	ISRAEL	6.39
30	GREECE	6.32

India's Strengths

<http://en.wikipedia.org/wiki/India>

- ▶ Service : industries : agriculture = 54 : 18 : 28
- ▶ Major sourced/outsourced products:
 - petroleum products
 - textile goods
 - gems and jewelry
 - Software
 - engineering goods
 - Chemicals
 - Leather manufactures...
- ▶ India, among the European investors, is believed to be a good investment despite
 - ▶ political uncertainty
 - ▶ bureaucratic hassles
 - ▶ shortages of power and infrastructural deficiencies.

Compared with India

<http://www.bls.gov/news.release/ichcc.nr0.htm>

► Labor cost comparison:

China Hourly Compensation Costs for All Employees in Manufacturing, 2005-2008

Year	National Currency Basis (Yuan)	U.S. Dollar Basis (US\$)	Index (1) (United States =100)
2005	5.95	0.73	2.4
2006	6.44	0.81	2.7
2007 (2)	8.06	1.06	3.4
2008	9.48	1.36	4.2

India Hourly Compensation Costs for All Employees in Manufacturing, 2003-2005

Year	National Currency Basis (Rupees)	U.S. Dollar Basis (US\$)	Index (1) (United States =100)
2003	37.68	0.81	2.9
2004	38.55	0.85	2.9
2005	40.02	0.91	3.1

(2) Compared with Latin America

www.greaterzuricharea.ch

► Risk of Political Instability

9	CHILE	8.86
10	SINGAPORE	8.78
11	SWEDEN	8.77
12	NEW ZEALAND	8.76
13	QATAR	8.68
14	GERMANY	8.49
15	FRANCE	8.46
16	USA	8.16
17	IRELAND	8.09
18	NETHERLANDS	
19	HONG KONG	
20	UNITED KINGDOM	
21	POLAND	
22	BRAZIL	
23	JORDAN	
24	CHINA MAINLAND	
44	CZECH REPUBLIC	5.15
45	MEXICO	5.02
46	INDONESIA	4.94
47	PERU	4.90
48	HUNGARY	4.79
49	COLOMBIA	4.75
50	CROATIA	4.53
51	TURKEY	4.38
52	ROMANIA	4.29
53	PHILIPPINES	3.50
54	ARGENTINA	3.36
55	ICELAND	2.44

Compared with Latin America

► Labor cost comparison:

Table B. Hourly Compensation Costs of All Employees and Production Workers in Manufacturing, 2008

Country or area	All Employees (US=100)	Production Workers (US=100)	All Employees (US\$)	Production Workers (US\$)	Production Workers (All Employees=100)
Americas					
United States	100	100	32.26	25.65	80
Argentina	31	-	9.89	-	-
Brazil	26	27	8.28	6.93	84
Canada	101	116	32.69	29.78	91
Mexico	13	12	4.04	3.12	77

China

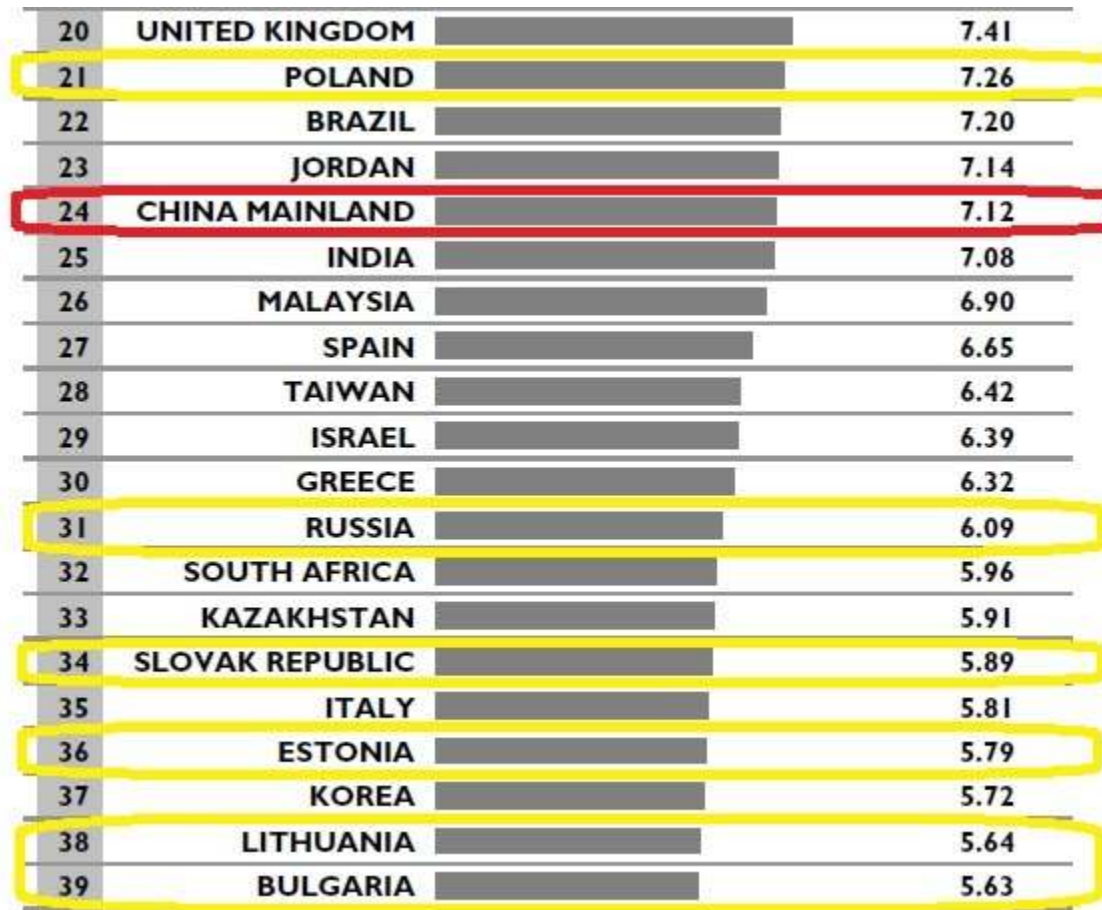
1.36

- Latin America has advantage in terms of shorter distance to the US – a logistical competitive advantage.

(3) Compared with East Europe

► Risk of Political Instability

www.greaterzuricharea.ch



20	UNITED KINGDOM	7.41
21	POLAND	7.26
22	BRAZIL	7.20
23	JORDAN	7.14
24	CHINA MAINLAND	7.12
25	INDIA	7.08
26	MALAYSIA	6.90
27	SPAIN	6.65
28	TAIWAN	6.42
29	ISRAEL	6.39
30	GREECE	6.32
31	RUSSIA	6.09
32	SOUTH AFRICA	5.96
33	KAZAKHSTAN	5.91
34	SLOVAK REPUBLIC	5.89
35	ITALY	5.81
36	ESTONIA	5.79
37	KOREA	5.72
38	LITHUANIA	5.64
39	BULGARIA	5.63

Compared with East Europe

- ▶ The main products in European industry are
 - ▶ automobiles
 - ▶ chemical and pharmaceutical goods
 - ▶ oil products
 - ▶ Food
 - ▶ clothing and electronics...

http://en.wikipedia.org/wiki/Economy_of_Europe

Compared with East Europe

- ▶ Labor cost comparison: <http://www.bls.gov/news.release/ichcc.nr0.htm>

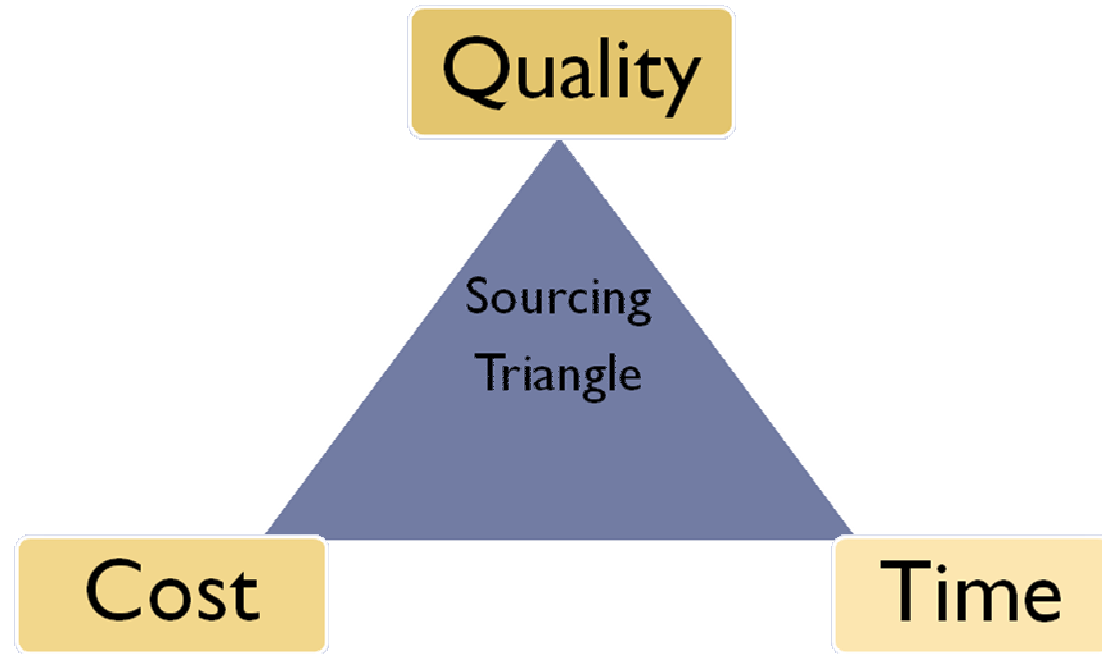
Europe					
Austria	148	152	47.72	38.88	81
Belgium	146	154	47.14	39.42	84
Czech Republic	38	40	12.20	10.35	85
Denmark	159	178	51.28	45.74	89
Finland	138	147	44.68	37.64	84
France	130	123	41.94	31.61	75
Germany	149	141	48.22	36.07	75
Greece	61	-	19.58	-	-
Hungary	30	29	9.56	7.52	79
Ireland	139	140	44.80	35.79	80
Italy	111	122	35.77	31.37	88
Luxembourg	-	130	-	33.37	-
Netherlands	137	145	44.32	37.15	84
Norway	177	193	57.18	49.54	87
Poland	31	32	10.07	8.26	82
Portugal	38	38	12.23	9.83	80
Slovakia	34	-	10.91	-	-
Spain	86	92	27.71	23.67	85
Sweden	134	150	43.33	38.39	89
Switzerland	134	145	43.28	37.12	86
United Kingdom	111	109	35.81	27.86	78
China			1.36		

- ▶ East Europe's manufacturing bases have better fundamentals.

Overall Comparison

	<i>Investment Environment</i>	<i>Wage</i>	<i>Logistics</i>	<i>Special AD</i>
China	Great	Great	Fair	Light Industry
India	Good	Great	Fair	IT
Latin America	Fair	Good	Great	Light Industry
East Europe	Fair	Fair	Good	Heavy Industry

4. Sourcing in China



China's Commodity Markets

- ▶ Manufacturing: automobiles, computers, electronics, cameras, toys, clothes...



- ▶ Service: software outsourcing



<http://chinatrade.foreignpolicyblogs.com/files/2008/08/made-in-china.jpg>
http://www.maximumpc.com/files/u57670/China_Microsoft2.png
<http://www.tipb.com/wp-content/uploads/2007/11/iphone-china-talks.jpg>

New Competency/Capability

- ▶ Contract manufacturing - mass production
 - ▶ White goods manufacture: China exhibits global dominance in production through global-scale contract manufacturing in this mature sector
 - ▶ Electronics: high-end advanced electronics players in Korea, Taiwan and mainland China have invested heavily in production.

- ▶ Research intensive - pharmaceutical
 - ▶ The challenges facing western MNCs and their role in manufacturing in China
 - ▶ China-based pharma where indigenous players focused on generics manufacture and traditional medicines have emerged.

http://www.ifm.eng.cam.ac.uk/service/books/documents/china09_sample.pdf

Who Are Sourcing in China



And many more...

Labor Costs in China

- ▶ The 2010 monthly salary in some cities/provinces in China:

Where	Amount (\$)
Shanghai	789.09
Guangzhou	700.59
Shenzhen	778.76
Hangzhou	734.51
Nanjing	557.52
Wuxi	471.98
Suzhou	634.22
Jinan	460.18
Guizhou	235.99
Xiamen	604.72
Wuhan	395.28
Shenyang	309.73

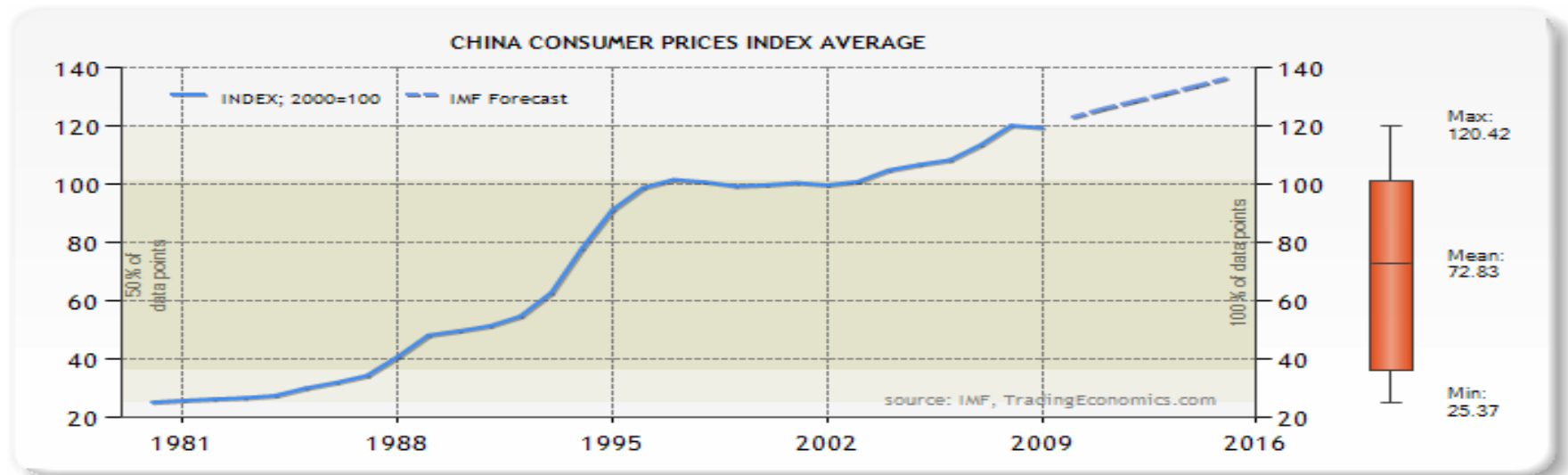
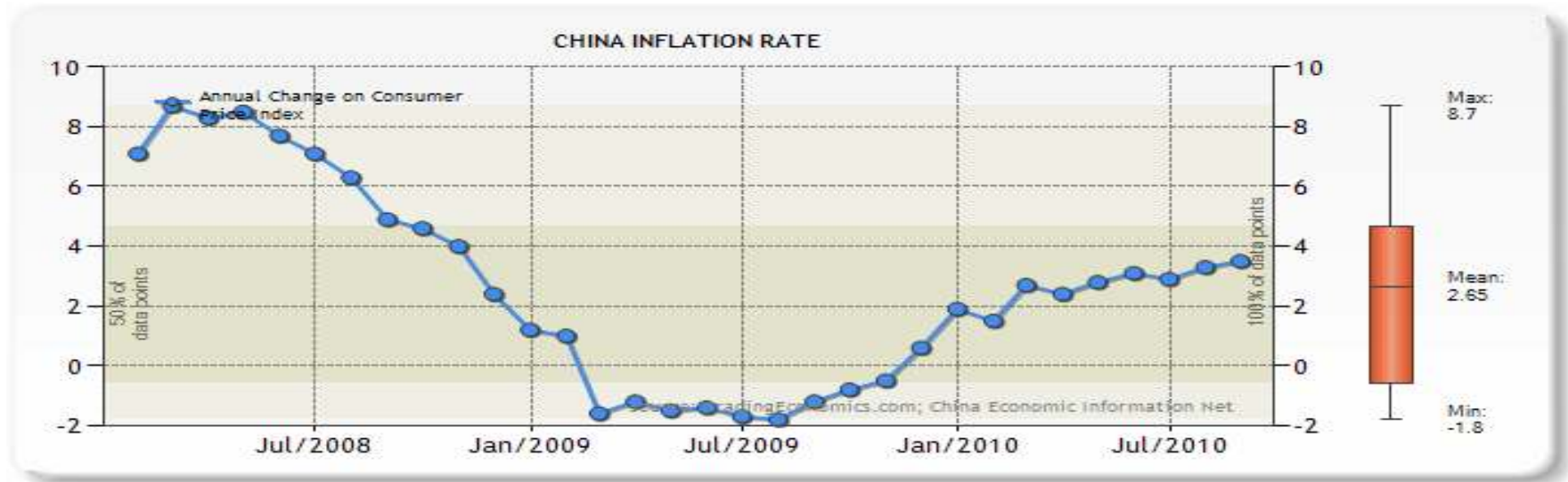


<http://www.tcpss.com/bbs/viewthread.php?tid=11442>

<http://tele5.bokee.com/photo/view.fcgi?mode=3&id=1820537>

Rising Costs

<http://www.tradingeconomics.com/default.aspx>



Rising Labor Cost

Shenzhen

On 1 July 2010, the Shenzhen municipal government raised the minimum monthly wage in the city to 1,100 yuan.²⁷

Before the adjustment, the level of minimum monthly wage in Luohu, Futian, Nanshan and Yantian districts in Shenzhen was 1,000 yuan; whilst that in Baoan and Longgang districts was 900 yuan.

Anhui province

On 13 June 2010, the Anhui provincial government announced to raise the levels of minimum monthly wage in various districts within the province by 25.9-28.6%, effective from 1 July 2010.²⁸

Hunan province

On 8 June, the Hunan provincial government announced to raise the minimum wage levels in various districts within the province by significant amounts, effective from 1 July 2010.²⁹ For example, the minimum wage level in class I districts would increase from 665 yuan to 850 yuan, up by 27.8%.

Shaanxi province

On 1 July 2010, the minimum wage levels in various districts in Shaanxi province were adjusted upward to 760 yuan, 680 yuan, 630 yuan and 580 yuan respectively.³⁰

Henan province

On 1 July 2010, the minimum wage levels in Henan province were increased by more than 20%.³¹

Yunnan province

On 1 July 2010, the minimum wage levels in various districts within Yunnan province were increased by more than 20%.³² For example, the minimum wage level in class I districts was raised to 830 yuan, up by 22% from the previous level.

Liaoning province

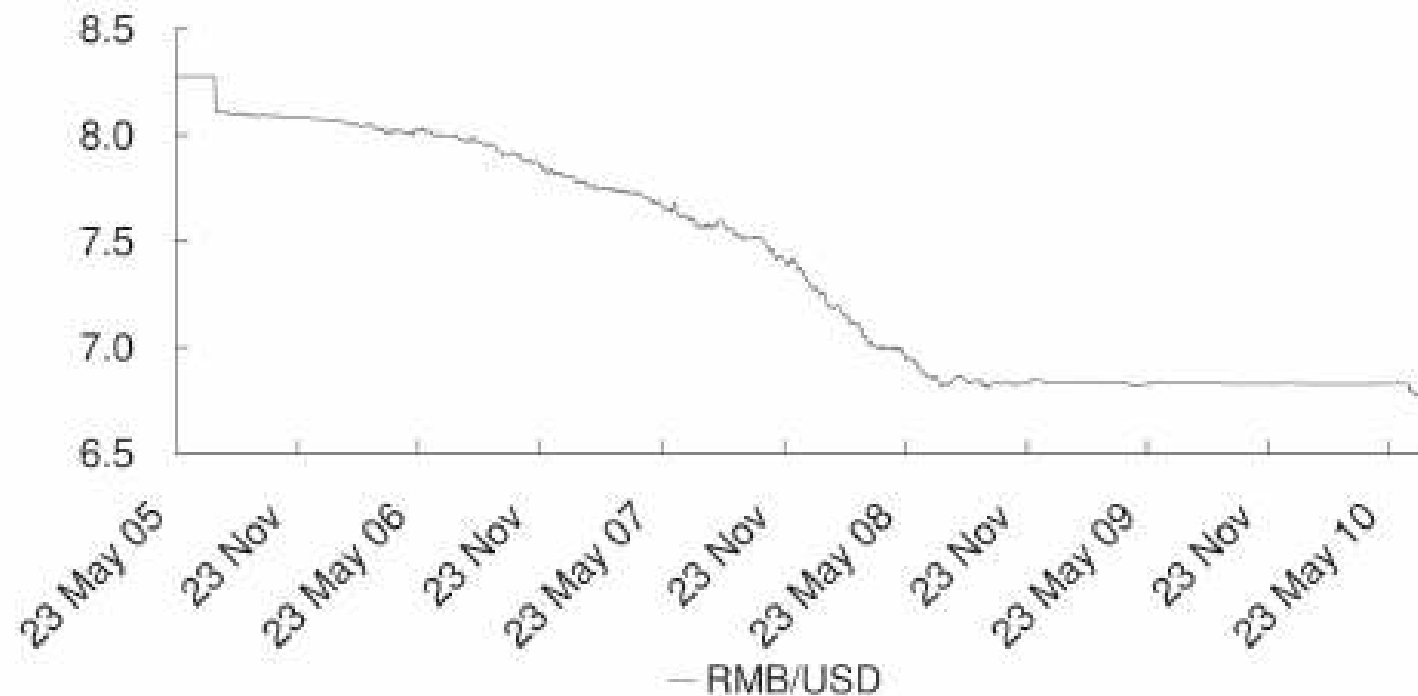
On 1 July 2010, the minimum wage levels in various districts within Liaoning province were increased to 900 yuan, 750 yuan and 650 yuan, up by 28.6-30%.³³

Hainan province

On 1 July 2010, the minimum wage levels in various districts within Hainan province were adjusted upward.³⁴ Particularly noteworthy is that the minimum wage level in class I districts was increased substantially by 31.7% to 870 yuan.

RMB vs. US Dollar

Exhibit 28: RMB/USD, May 2005 - Jul 2010



Source: State Administration of Foreign Exchange

Selecting Sourcing Areas



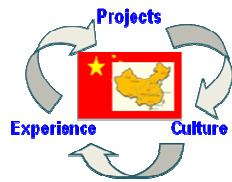
<i>Where</i>	<i>To Source</i>	<i>To Avoid</i>
Quality	East	C
	S	NW
		SW
Cost	C	E
	NE	S
	W	
Time	E	C
	S	NE
		W

- **Quality:** East and south China are well developed. The manufacturing bases are mature in those areas. The quality of products and services has better chances to be ensured.
- **Cost:** Central, northeast, and west China can provide a large amount of cheap labors.
- **Time:** ports are located in east and south China

Trends & Future

- ▶ Companies that procure goods from China must keep up with the country's evolving challenges to take full advantage of the opportunities.
- ▶ Pursue China as both a growth market and a market for lower-cost labor and sources, and integrate these operationally;
- ▶ Ronald Haddock, Vice President, Booz Allen. “China’s changing cost and currency structure have shifted, forcing companies to rethink how they structure their Chinese operations and how they perceive China in their overall global strategy. At the same time, **China is increasingly a major source of product and business model innovation**. We’re seeing globalization at work and China’s role has changed.”

http://www.boozallen.com/news/china_manufacturing_2008



China Project Center at WPI

Director: Y. Kevin Rong (Mechanical Engineering)

Co-Director: Amy Z. Zeng (Business)

Employment Opportunities

▶ **China – A new land of opportunity**

- ▶ Cities like Beijing and Shanghai are becoming magnets for recent American college graduates. The tough US job market caused by the recession is one reason, but they are also lured by China's surging economy, tower cost of living, and a chance to get ahead more quickly than they would in the US.

□ New York Time, Oct. 5, 2009

▶ **Go east, young MBA**

- ▶ The # of students taking international jobs usually sells in a recession; “Go east, young man” is a structural shift toward an internationalized, mobile talent market

□ Bloomberg BusinessWeek, Mar. 22&29, 2010

Major Achievements

- ▶ Founded in 2005, initially supported by a 3-year NSF grant (Prof. Rong)
- ▶ Currently supported by a 2-year DoE grant (2009-2011)
- ▶ The Center has partnered with the following five leading technological universities in China:
 - [HUST – Huazhong Univ. of Science & Technology](http://english.hust.edu.cn/) (Wuhan):
<http://english.hust.edu.cn/>
 - [SEU – Southeast University](http://www.seu.edu.cn/s/132/main.jsp) (Nanjing): <http://www.seu.edu.cn/s/132/main.jsp>
 - [BJTU – Beijing Jiaotong University](http://www.njtu.edu.cn/en/): <http://www.njtu.edu.cn/en/>
 - [SJTU – Shanghai Jiaotong University](http://www.sjtu.edu.cn/english/index/index.htm):
<http://www.sjtu.edu.cn/english/index/index.htm>
 - [SU – Shanghai University](http://www.shu.edu.cn/en/indexEn.htm): <http://www.shu.edu.cn/en/indexEn.htm>

of Participating Students in the China Project Center

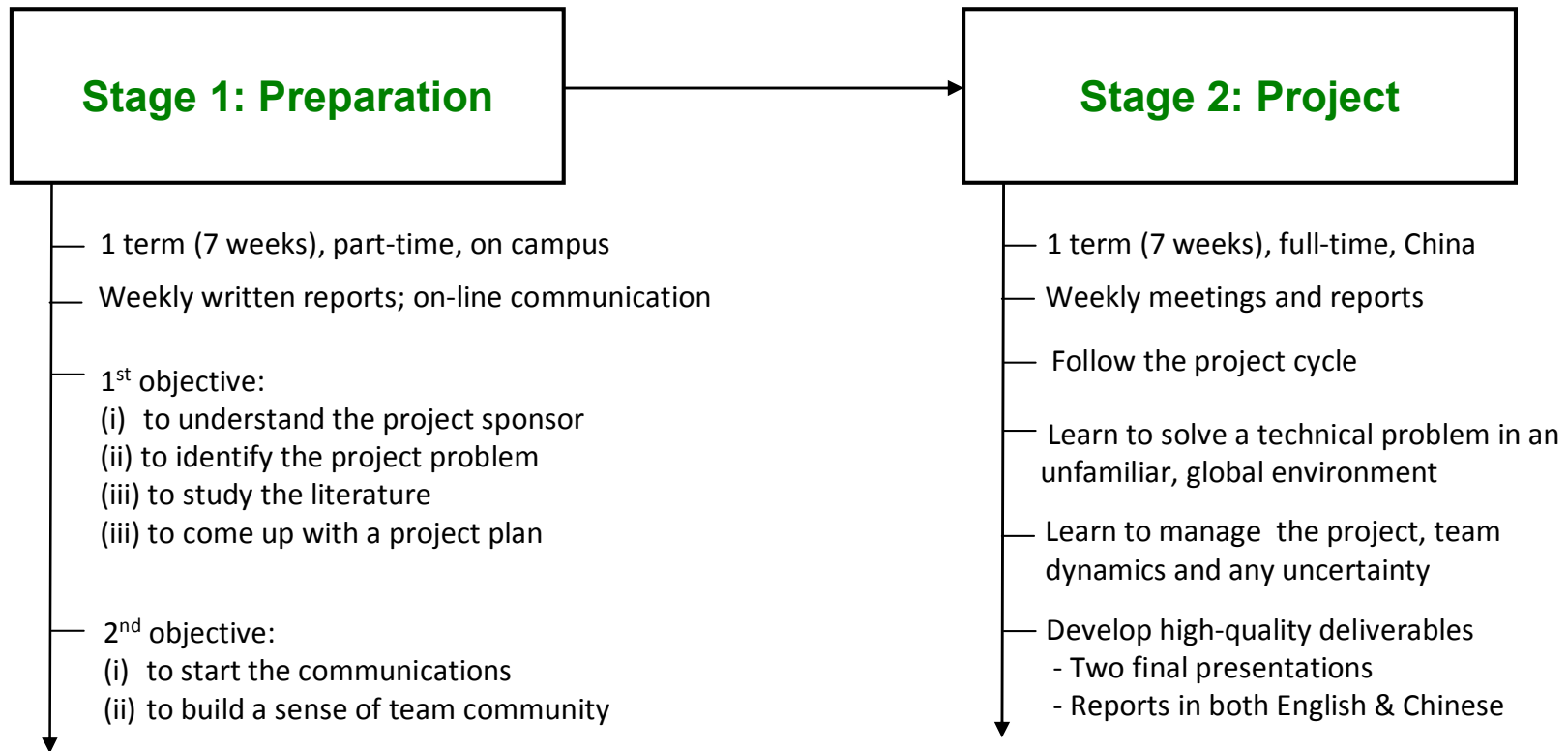
#	Terms Conducted	# of Projects	# of WPI Students	# of Chinese Students
1	Summer, 2005	2	4	1
2	Summer, 2006	5	9	15
3	Summer, 2007	7	14	21
4	Summer, 2008	8	14	25
5	Summer, 2009	8	21	23
6	Summer & A term, 2010	10	26	37

Project Sponsors for the China Project Ctr.

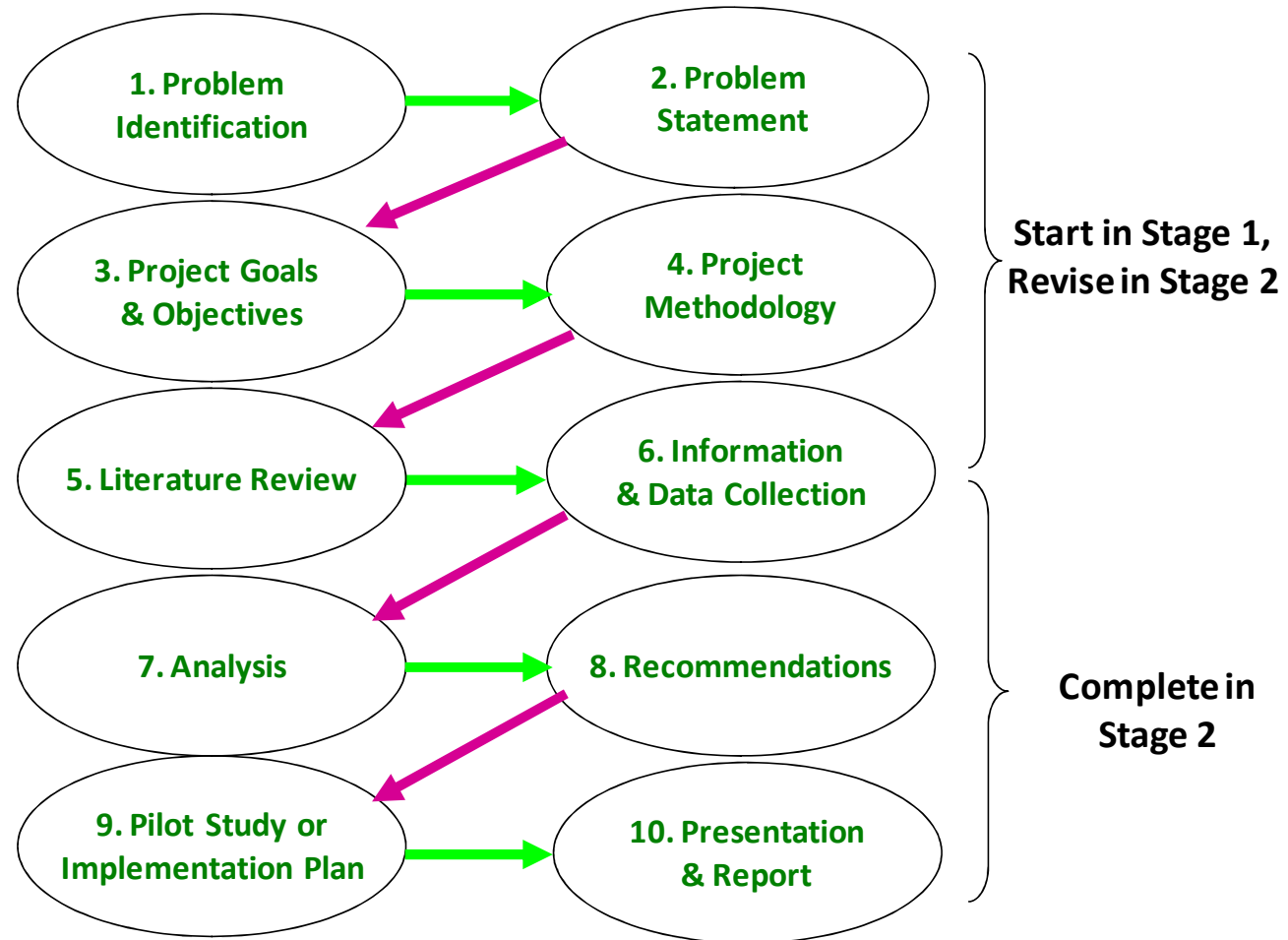
Multinational Corporations	China-based Organizations
ACS Inc. (S. Korea)	BASF-YPC
Air Products	BJTU
Amphenol – TCS	HUST
Caterpillar – China	Jiangsu Aucksun
Central Industrial Supply (CIS)	Second Construction Company of Sinopec
Hwashin Co. (S. Korea)	Shanghai University
Nypro	Tongji Hospital
REM – Wuxi	Yangtze Petroleum Co. (YPC)
Saint-Gobain – Shanghai	
Staples	
Tyco	

Process for China Projects

► Two-phase Process



China Project Cycle



China Senior Projects – Business related

#	Project Title	Terms Conducted	# of Students
1	Reduce, Reuse, and Recycle at Nypro-China Using the DMAIC Framework	Summer 2010	2 WPI + 2 HUST
2	Implementation and Operations of the China Export Distribution Center for Staples	Summer 2010	3 WPI + 3 HUST
3	Creating an Electro Galvanized Steel Price Index for Jiangsu Aucksun Metal Co. Ltd.	Summer 2009	2 WPI + 3 SEU
4	A Comparative Analysis of Procurement Management in Chinese Petrochemical Companies	Summer 2009	2 WPI + 3 SEU
5	Risk Management for International EPC Projects at the 2 nd Construction Company of Sinopec	Summer 2009	2 WPI + 3 SEU
6	Lean Manufacturing – Undercarriage Inspection at Caterpillar's AsiaTrak	Summer 2009	3 WPI + 3 HUST
7	MRO Spend Analysis at Nypro-China	Summer 2008	1 WPI + 3 HUST
8	Waste and Environmental Management at Nypro-China	Summer 2008	1 WPI + 3 HUST

Creative and Innovative Educational Model

- ▶ Studying pressing issues in an experiential way
- ▶ Learning by doing in mixed teams
- ▶ Multi-channel teaching and learning
- ▶ Multi-faceted teaching

