A new trilogy by Patri K. Venuvinod

Technology, Innovation and Entrepreneurship

"[E]very generation needs a new revolution"
—Thomas Jefferson

Period	Revolution
1st part of the last century	Experiments with socialism/communism
2nd part of the last century	Return to capitalism
Current generation	Entrepreneurialism

Given a supportive environment

- Personal *entrepreneurship* (E) can be more powerful than state capitalism in consummating innovation in the modern world
- *Innovation* (I) → New improved technologies
- Improved *technology* (T) → Productivity growth

  → Higher per capita income

Conclusion

Knowledge of the why and how of TIE has become a matter of critical importance to the economic/commercial success of every nation, firm, or startup.

Today, we will address the question of WHY at the National Level.

However, a depressingly large number of institutions (including universities) are still locked up in the 'isms' and managerial mindsets of the last century

- This trilogy and tecinnovent.com seek to help change such societal and institutional attitudes by explaining the how and why of TIE in a manner meeting the contemporary needs of both developing and developed societies.
- You can benefit by responding and engaging irrespective of whether you are a university student, professor, practicing professional, public official, entrepreneur, or just a citizen.

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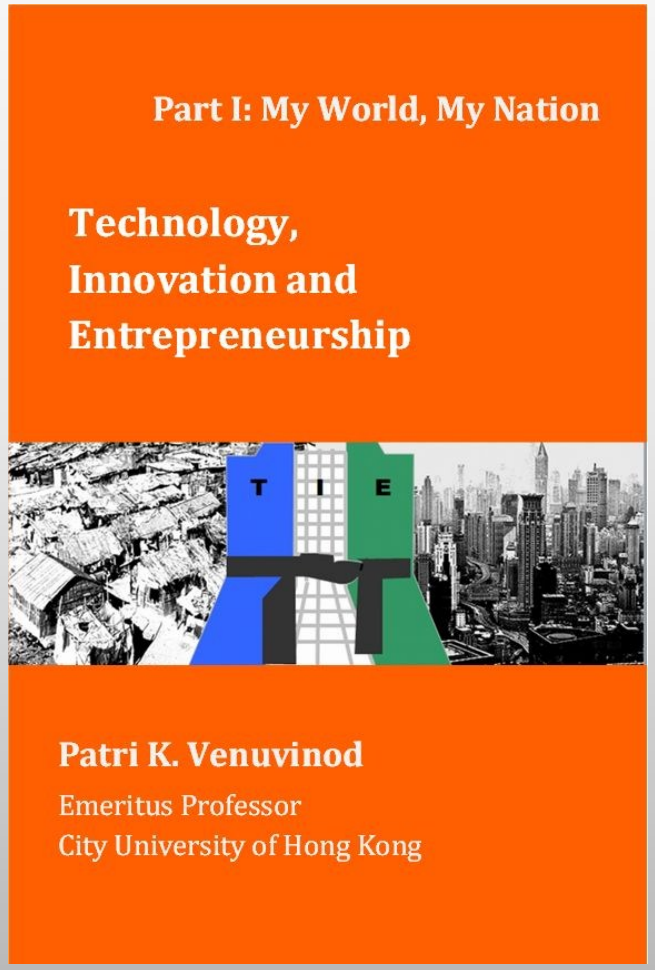
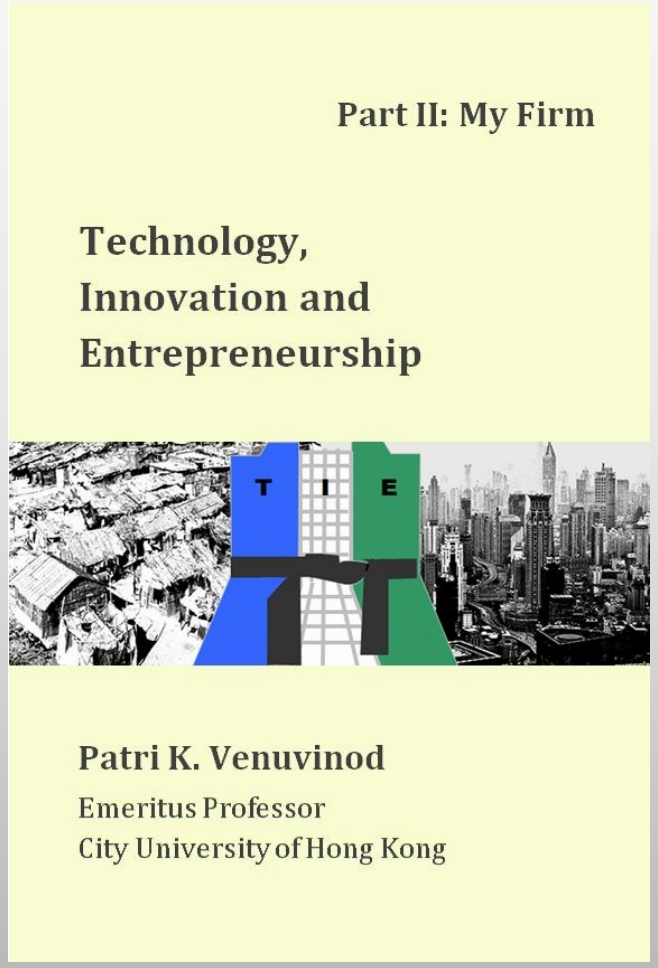
Part I: My World, My Nation



Adopts an evidence-based approach to examine a wide range of TIE issues from a world-perspective but stressing nation-building.

Part I: My World, My Nation Contents

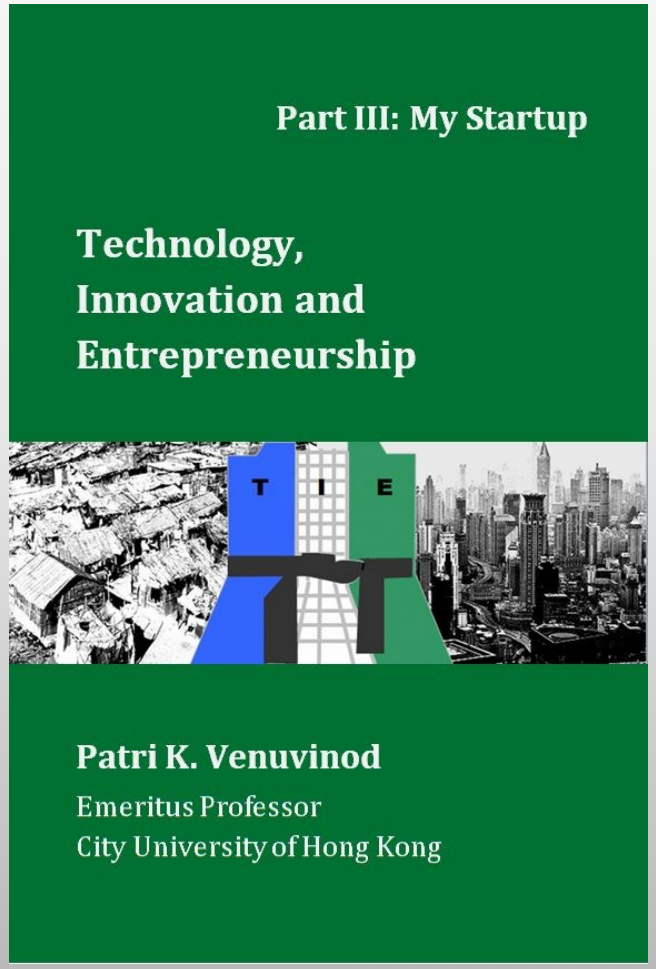
Part II: My Firm



Discusses how an established firm could prosper in the contemporary world of globalized competition by focusing on TIE.

Part II: My Firm
Contents

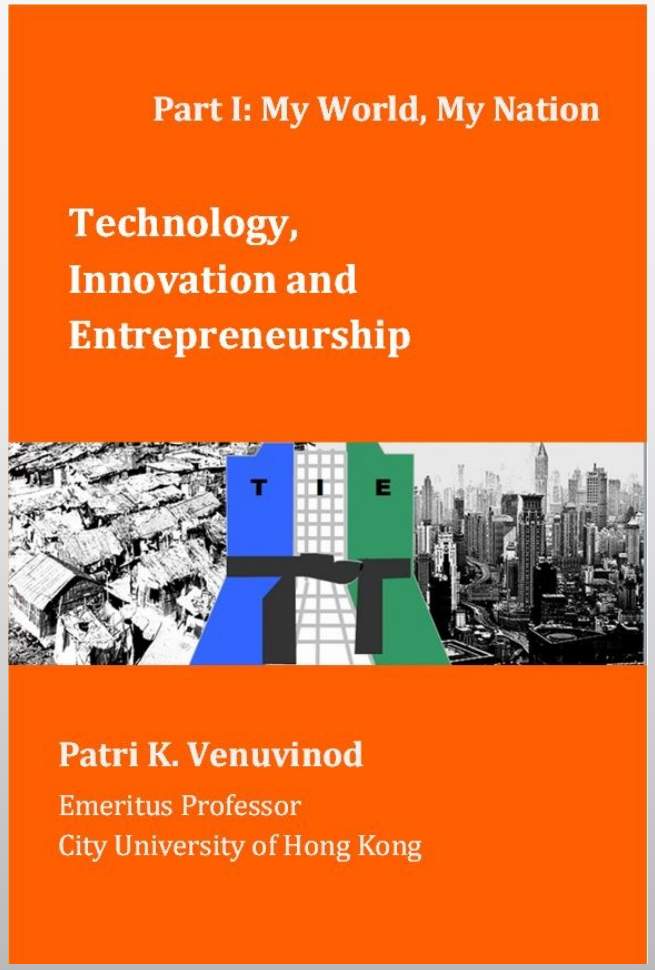
Part III: My Startup



Discusses TIE issues of particular importance to the growing number of youth pursuing an entrepreneurial career.

Part III: My Startup
Contents

Today, we focus on Part I: My World, My Nation



Adopts an evidence-based approach to examine a wide range of TIE issues from a world-perspective but stressing nation-building.

Chapter 1 Introduction

- Human Well-being
- Technology
- Innovation
- Entrepreneurship
- Inclusive Economic Growth

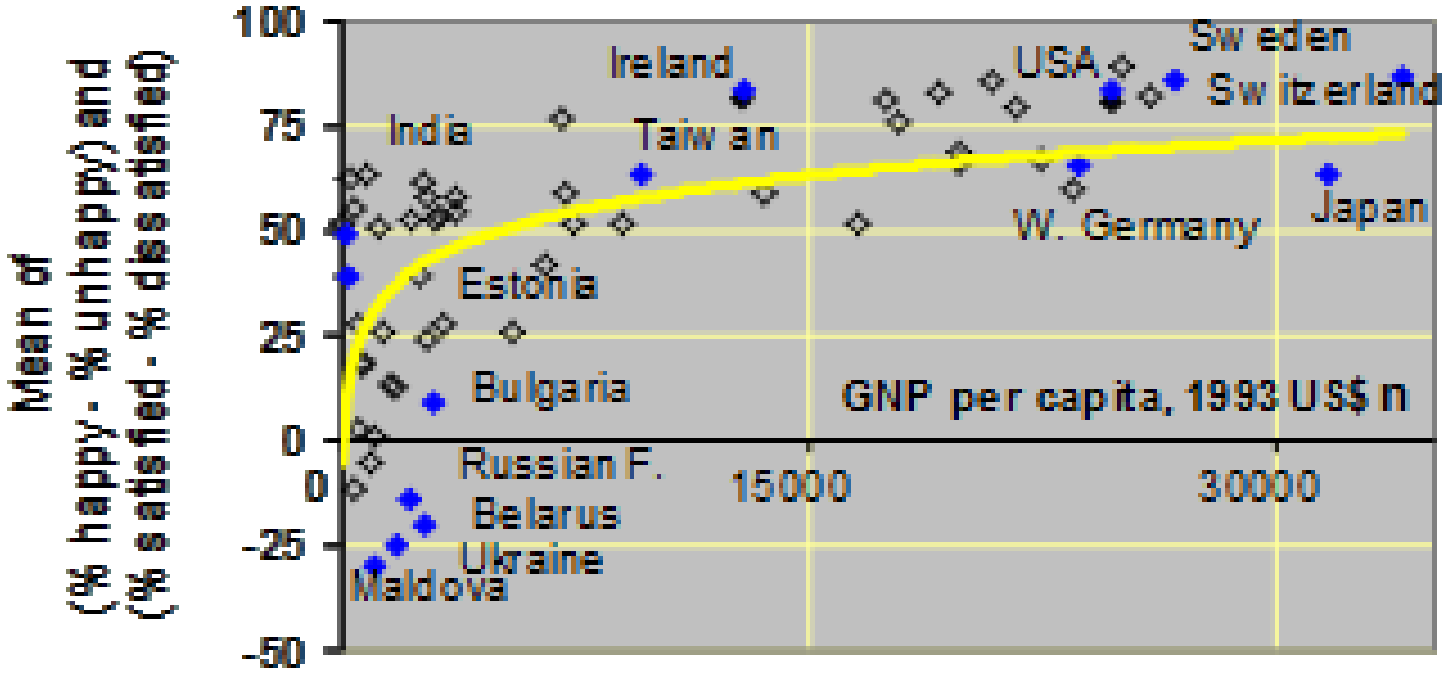
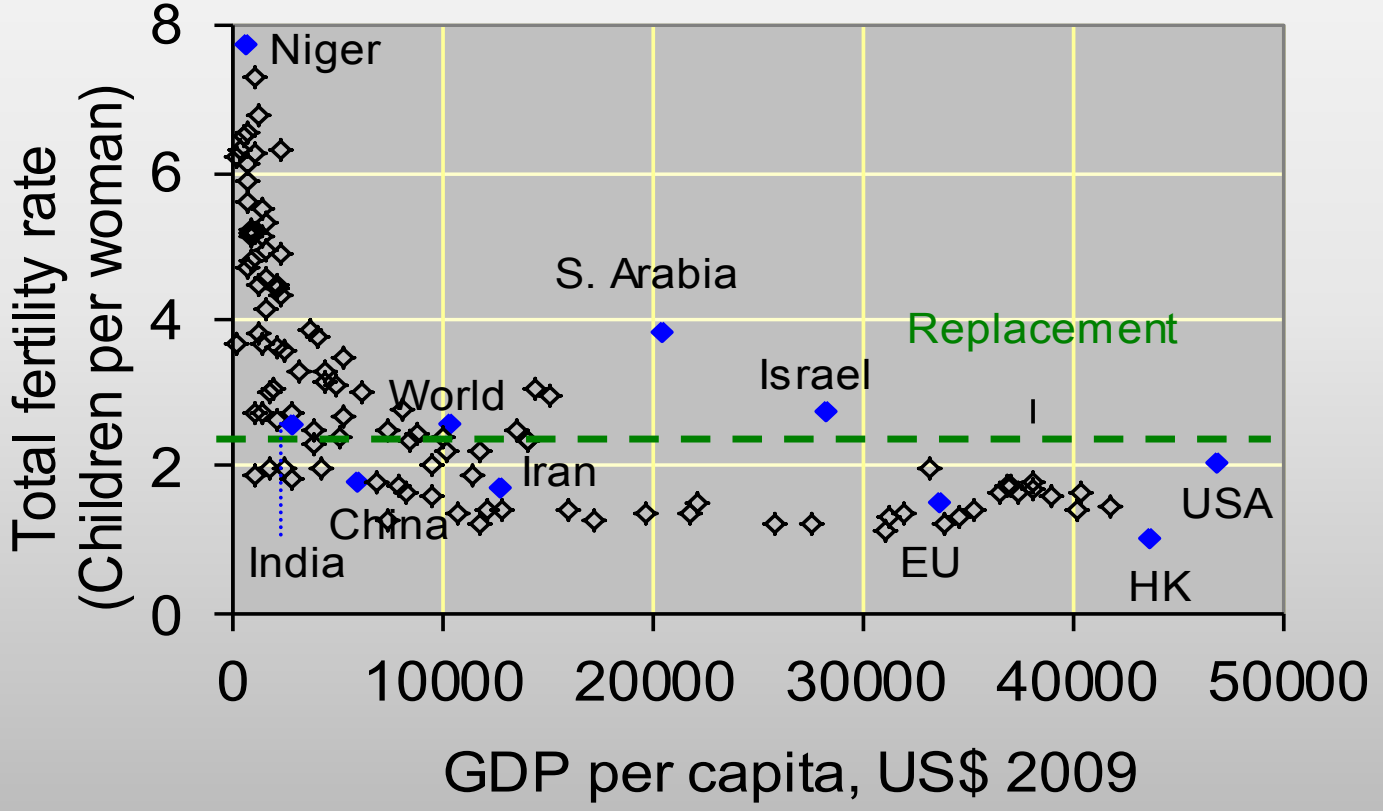


Figure 7.6 Economic prosperity versus human happiness. (Inglehart, 2000; EVS, 2006).

Video Chart

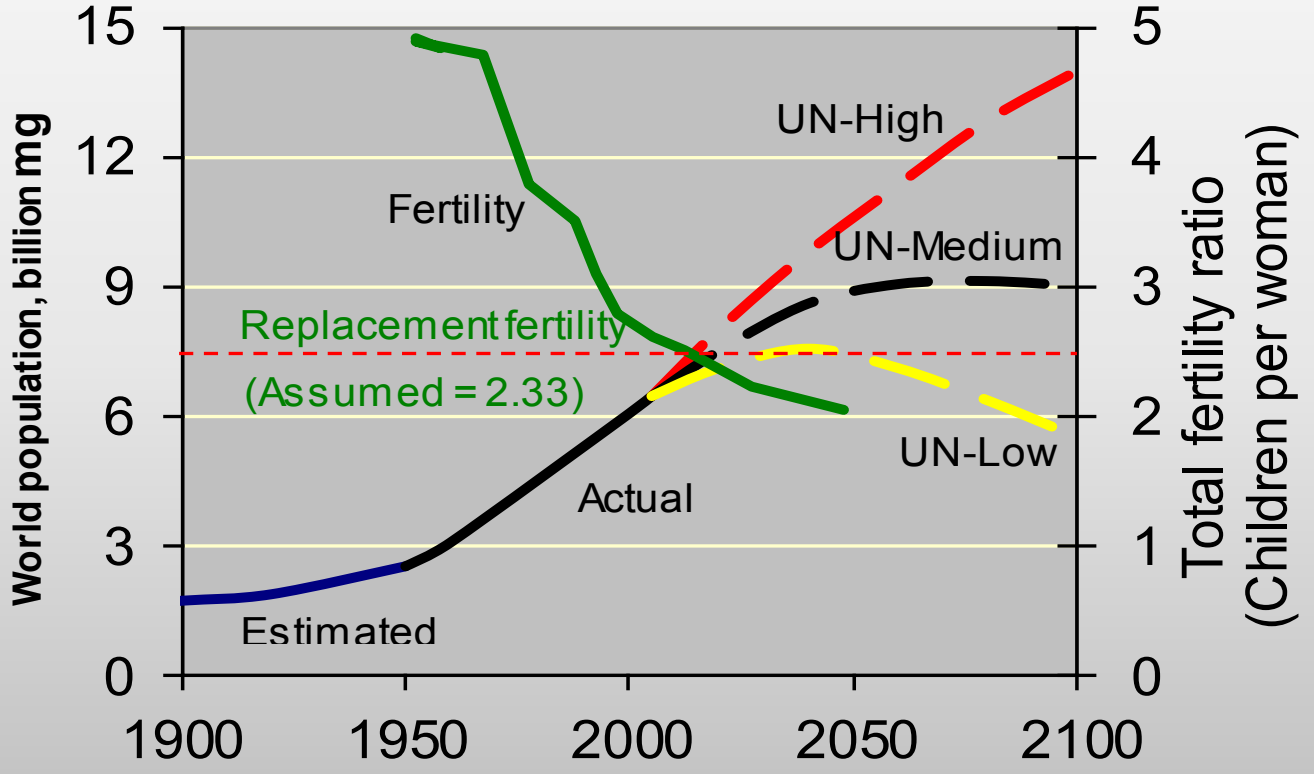
Income↑ Fertility↓

(Part I, Fig. 4.2)

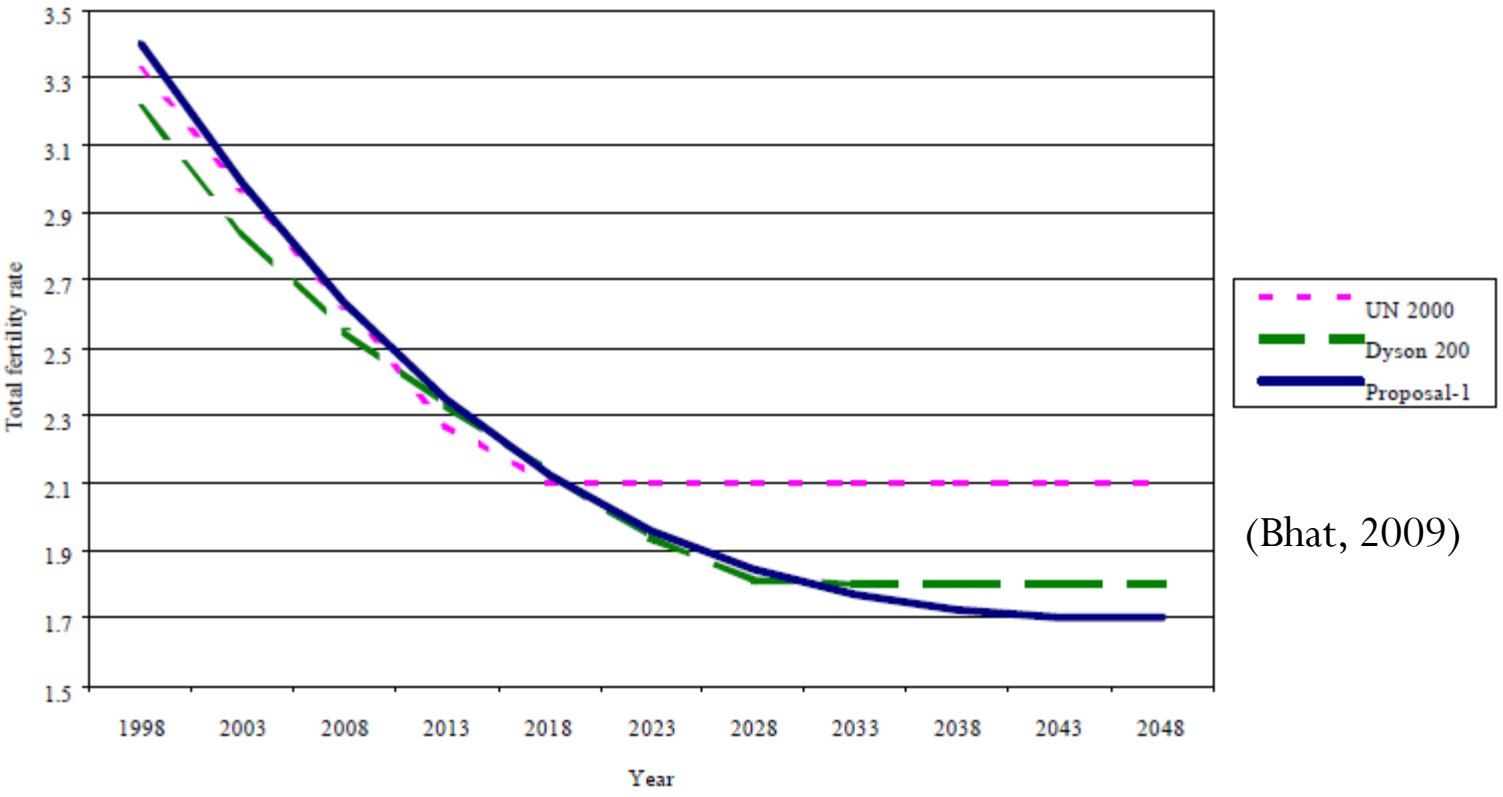


World population projections (UN, 2004)

(Part I, Fig. 4.1)

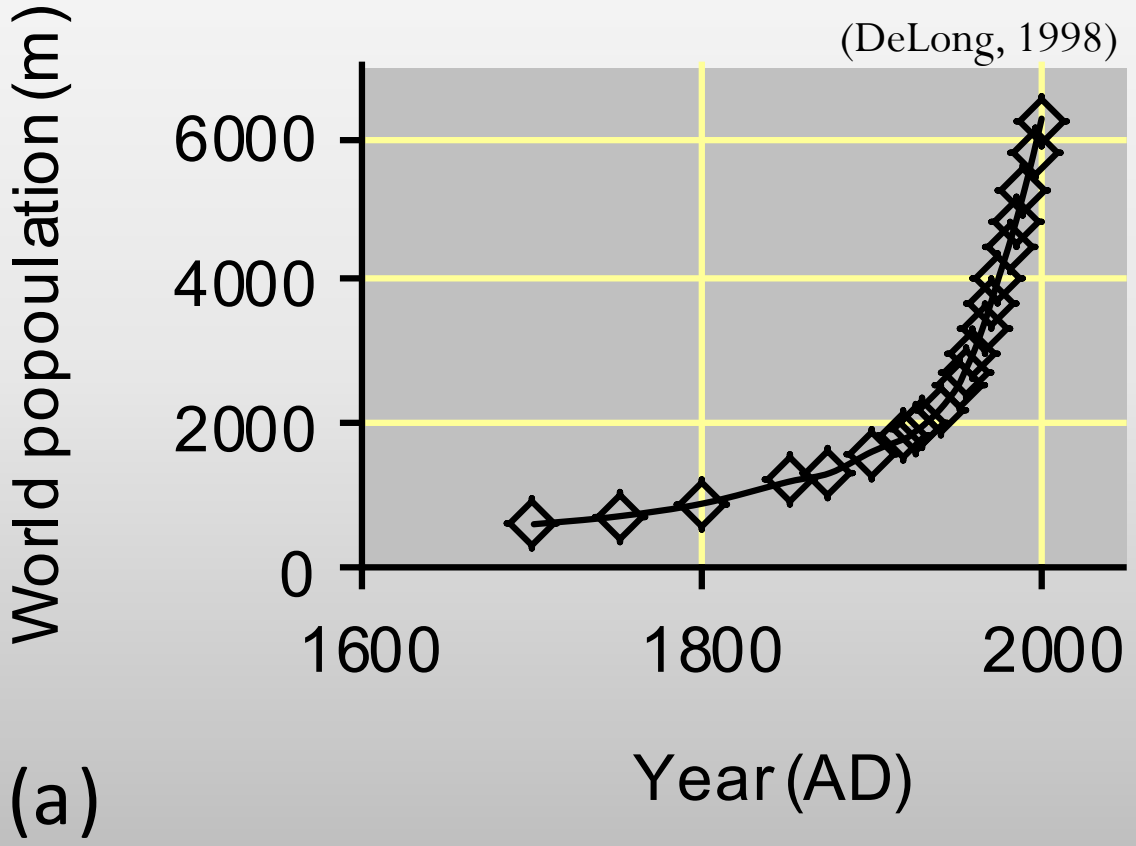


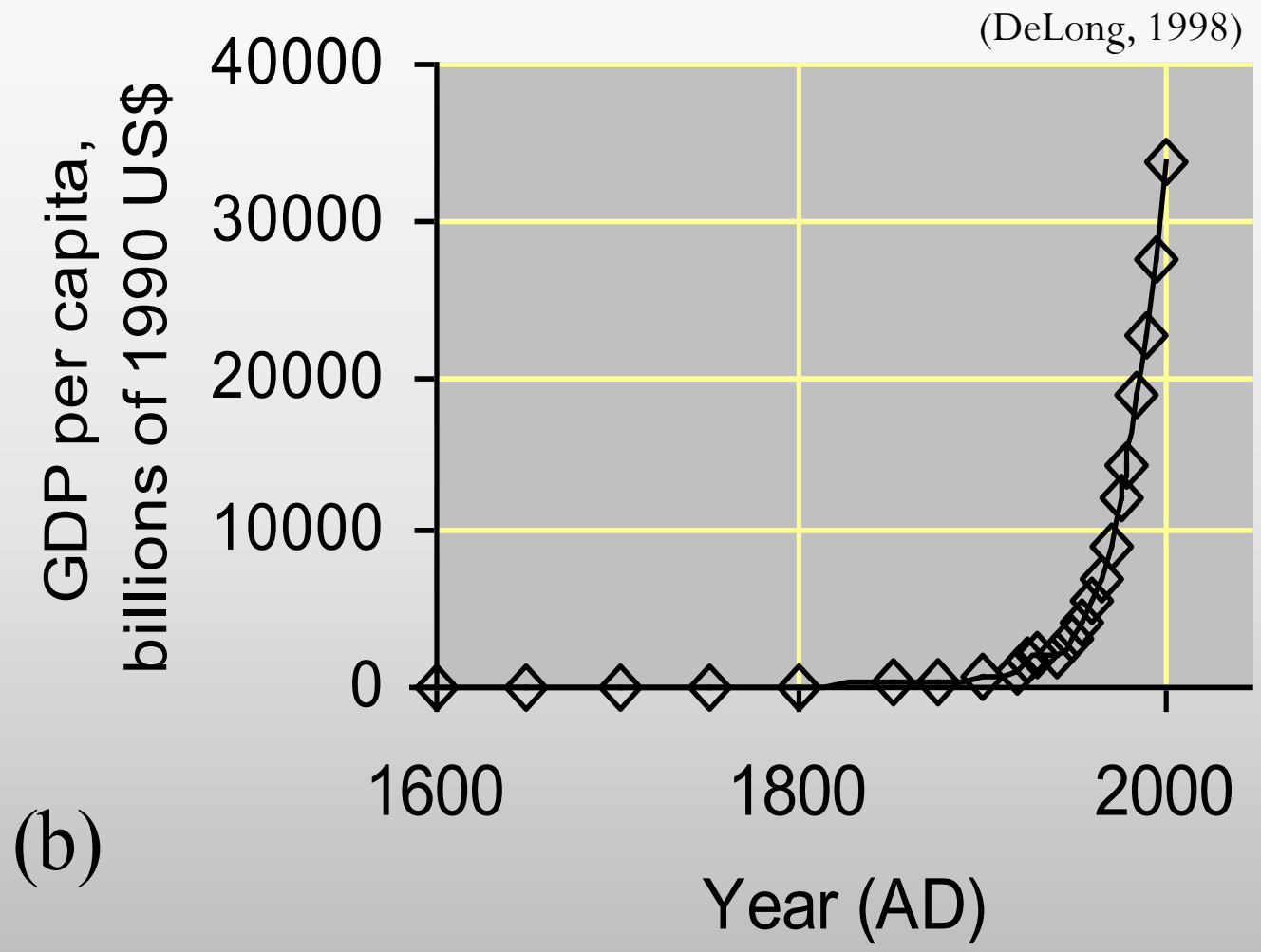
Indian fertility projections

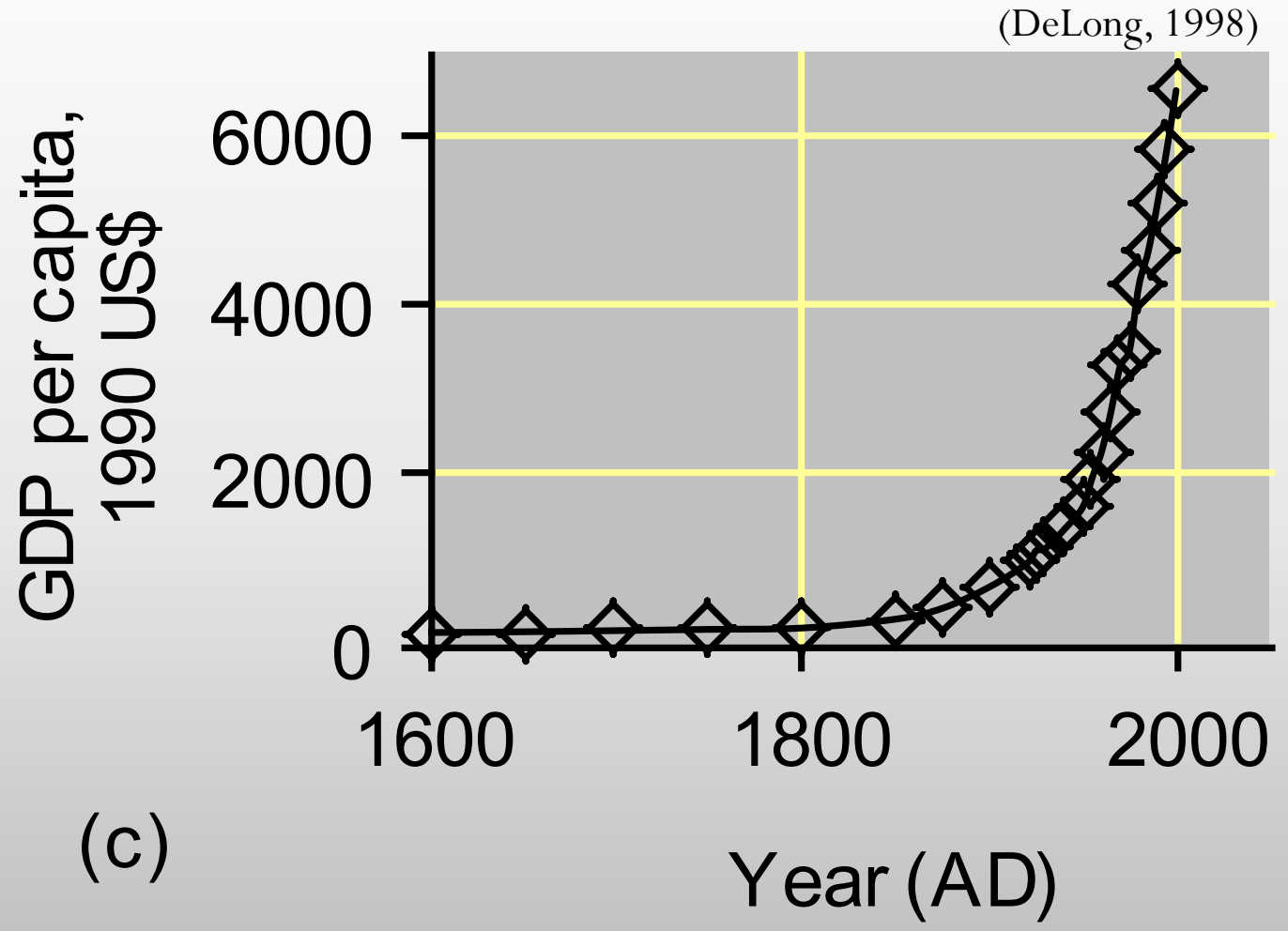


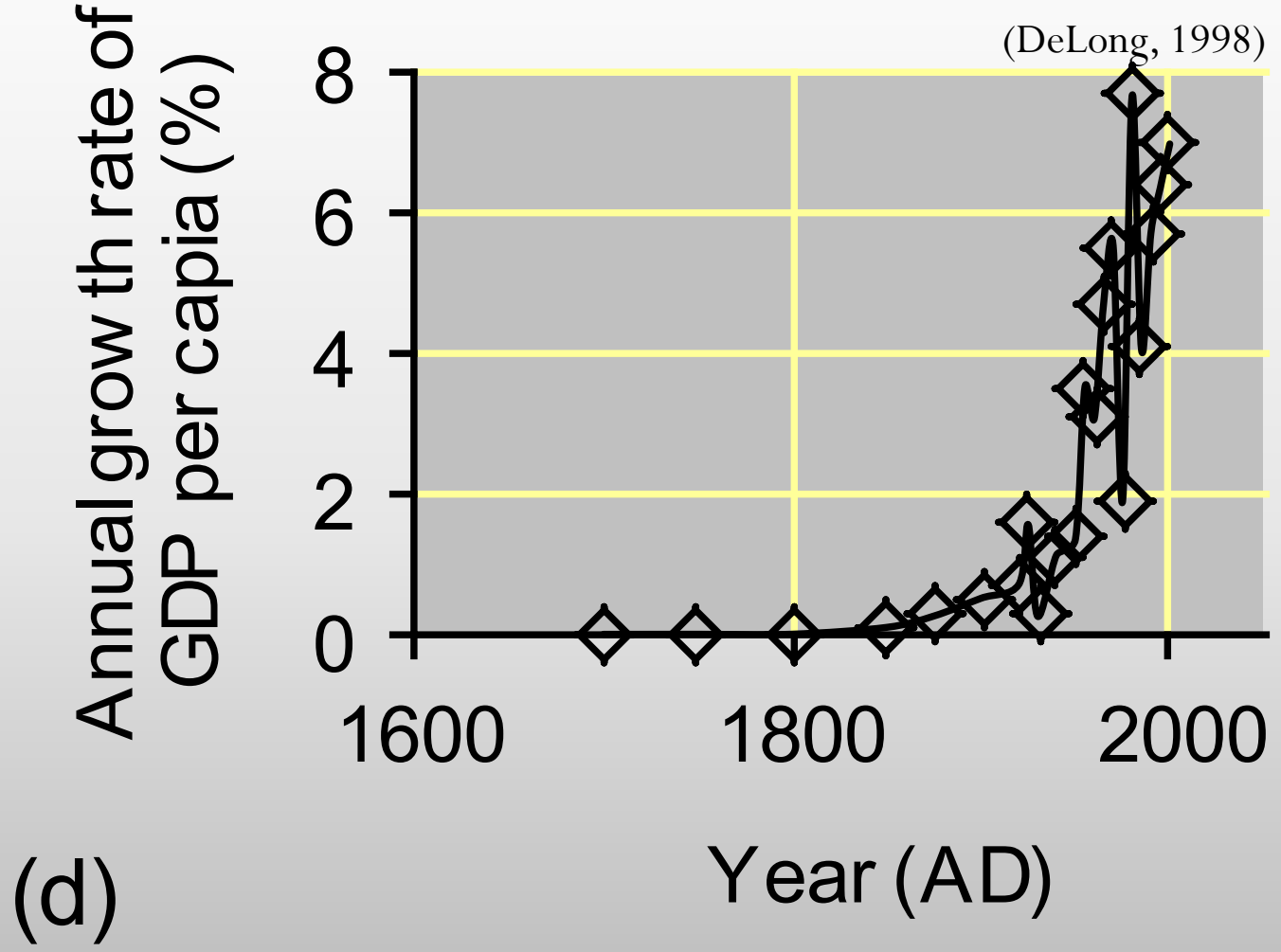
(Bhat, 2009)

How human material prosperity has changed over the millennia




(DeLong, 1998)
GDP per capita, billions of 1990 US$
40000
30000
20000
10000
0
1600
1800
2000
Year (AD)
(b)

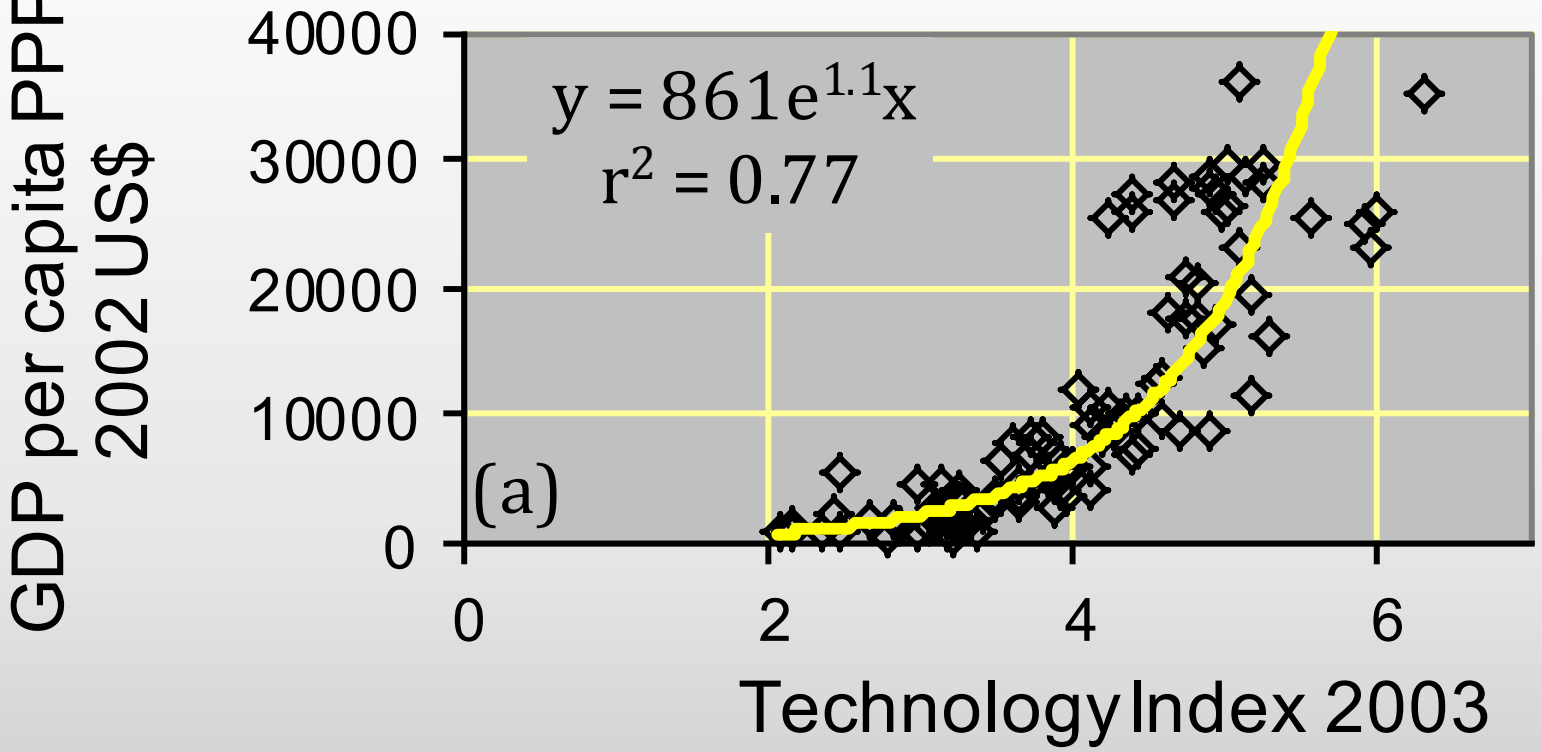

(DeLong, 1998)
GDP per capita, 1990 US$
6000
4000
2000
0
1600
1800
2000
Year (AD)
(c)


(DeLong, 1998)
Annual grow th rate of GDP per capia (%)
0
2
4
6
8
1600
1800
2000
Year (AD)
(d)

Solow Equation (1956)

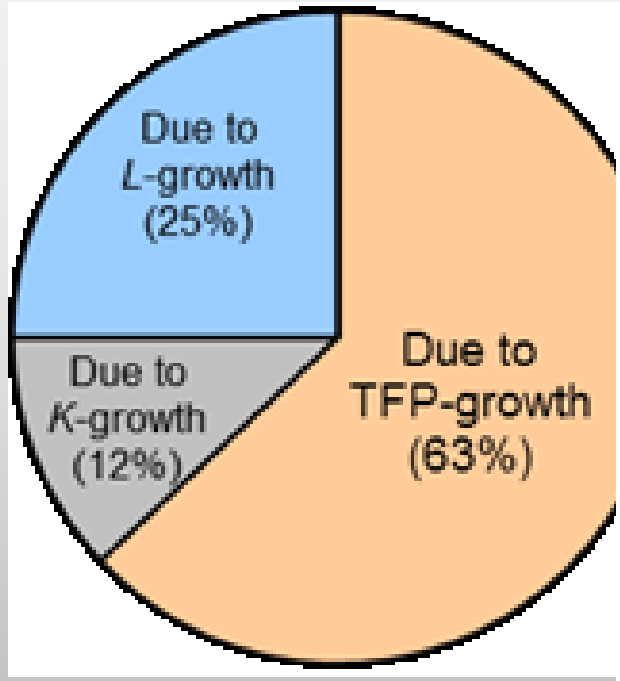
$$Y=K^{a}(A_{T}L)^{1-a} \mid_{0\leq a\leq 1}$$

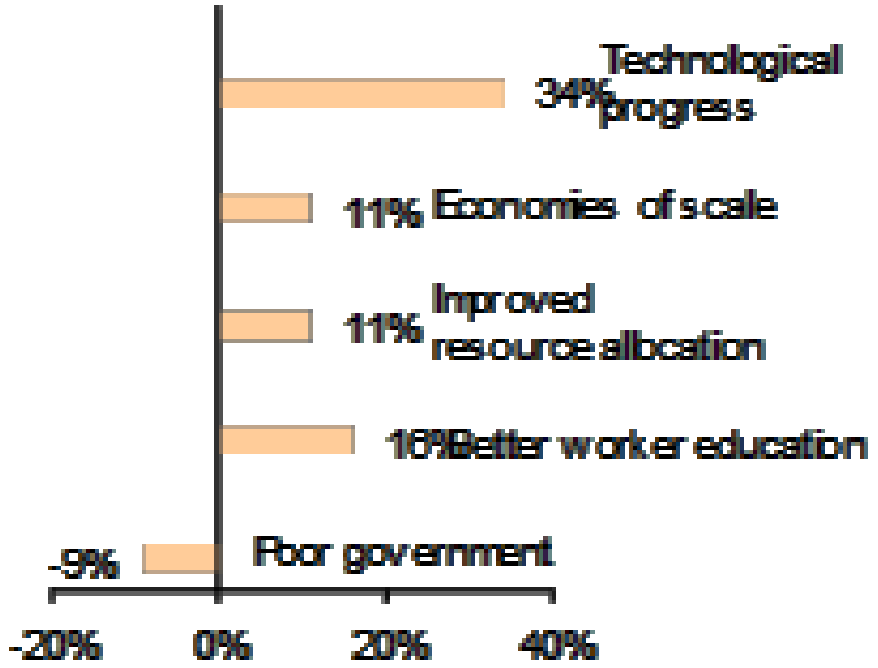
- L is labor
- K is capital (the money needed for acquiring the land, buildings, hardware, software etc. to sustain production)
- Solow found that a significant part of economic growth could not be accounted by known increases in K and L
- Solow then went on to interpret A_T as being equivalent to total factor productivity, T_m



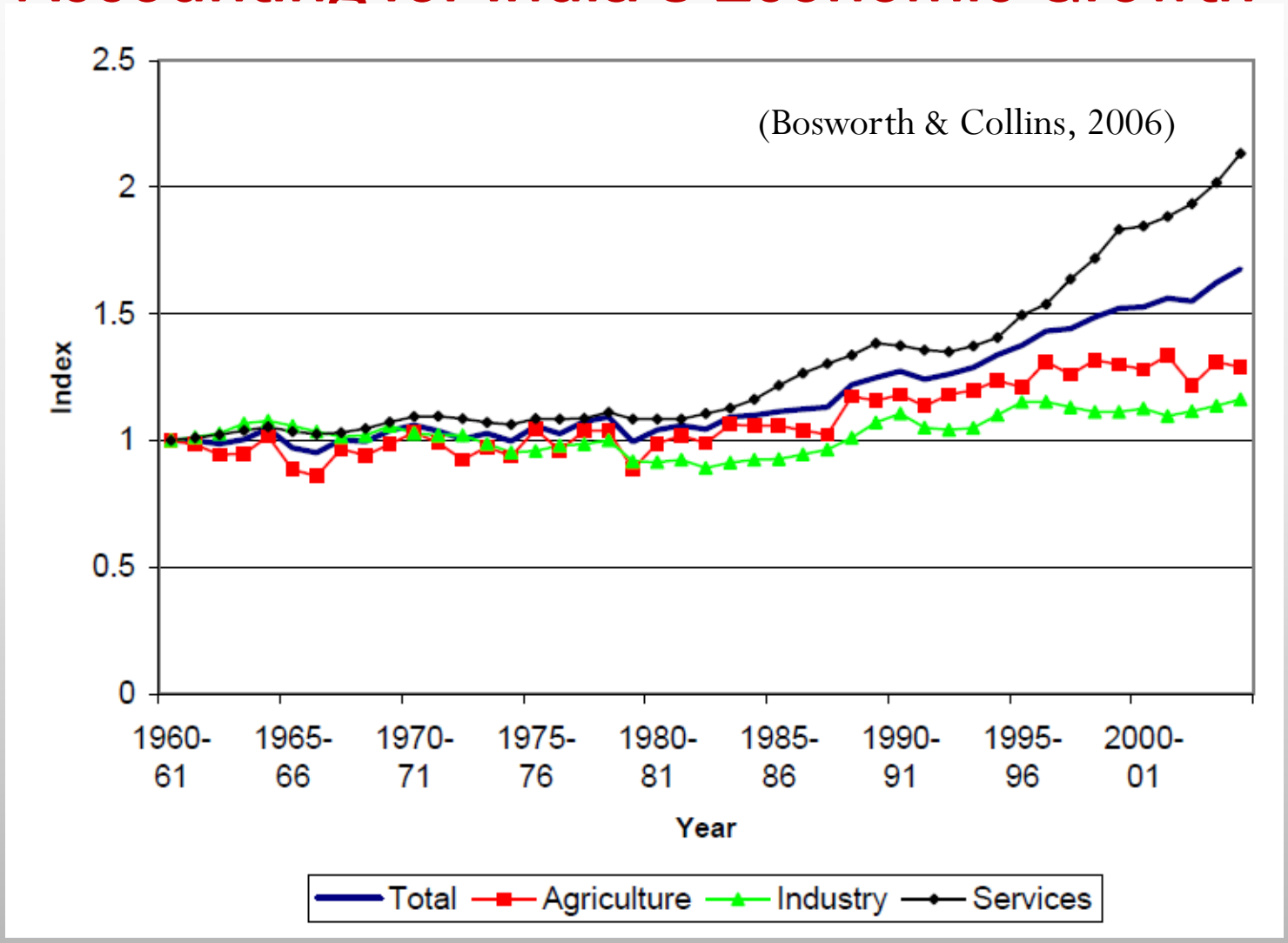
(UNDP 2004, WEF 2005)

Growth accounting for the observed average annual growth rate of +3.1% in U.S. (1929-1987





Accounting for India's Economic Growth



India and China 1978-2004

- Output growth in China is roughly double that of India
- Roughly equal division between the contributions of capital accumulation and TFP to growth in output per worker
- Acceleration of growth when the period is divided at 1993
- Post-1993, industry nearly 60 % of China's aggregate productivity growth. In contrast, 45% of the growth in India came in services.
- Reallocation of workers from agriculture to industry and services has contributed 1.2 percentage points to productivity growth in each country.

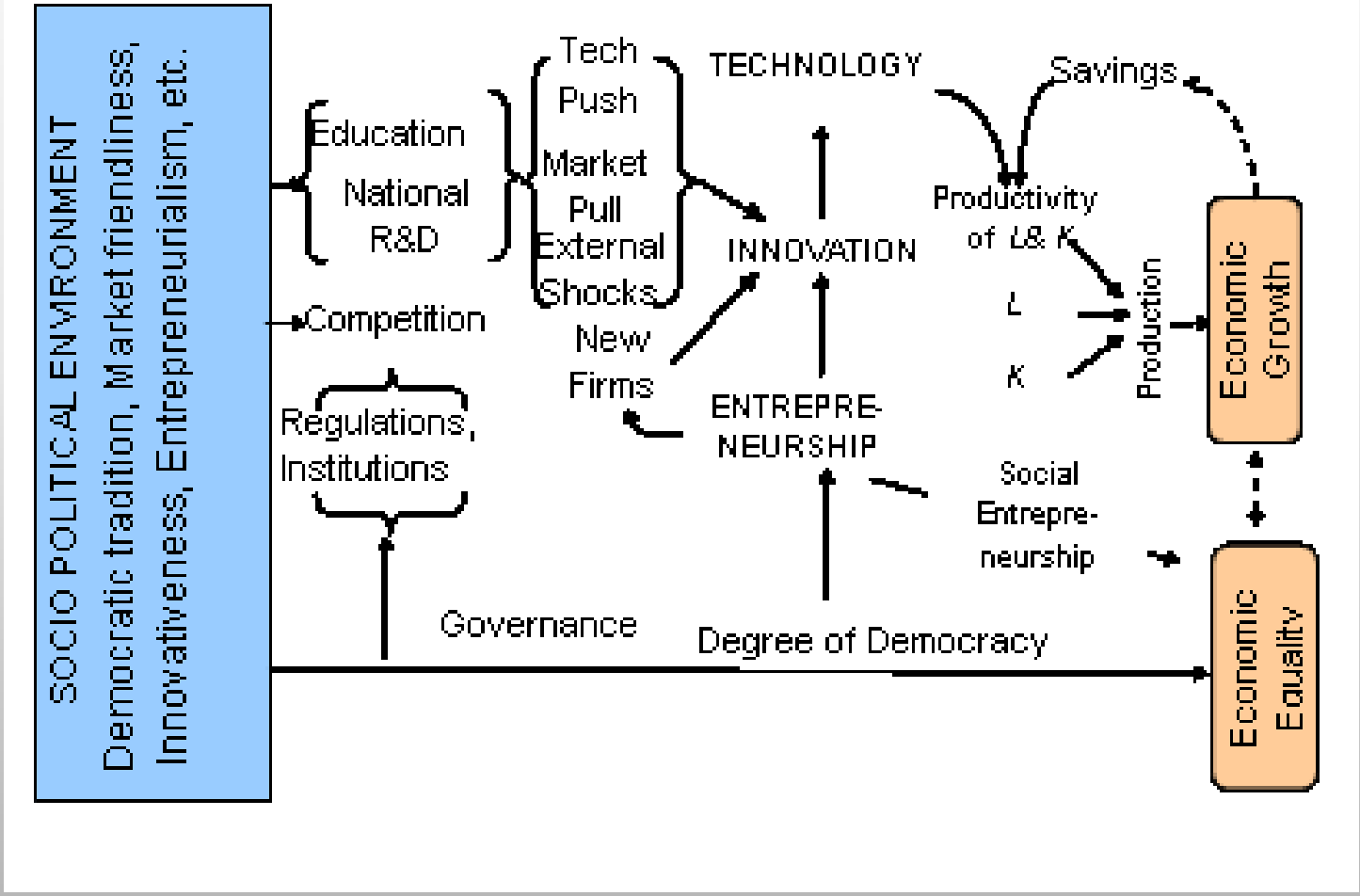
(Bosworth & Collins, 2007)

5 premises underlying the trilogy

Irrespective of the 'ism' being followed:

1. The key to economic growth is productivity improvement through improved **T**echnology.
2. **I**nnovation drives **T**echnology growth.
3. Competition spurs **I**.
4. **E**ntrepreneurship consummates **I**nnovation.
5. The above four premises are equally applicable at the levels of nation-building, managing an existing firm, as well as launching a new venture or a startup.

TIE and Economic Growth



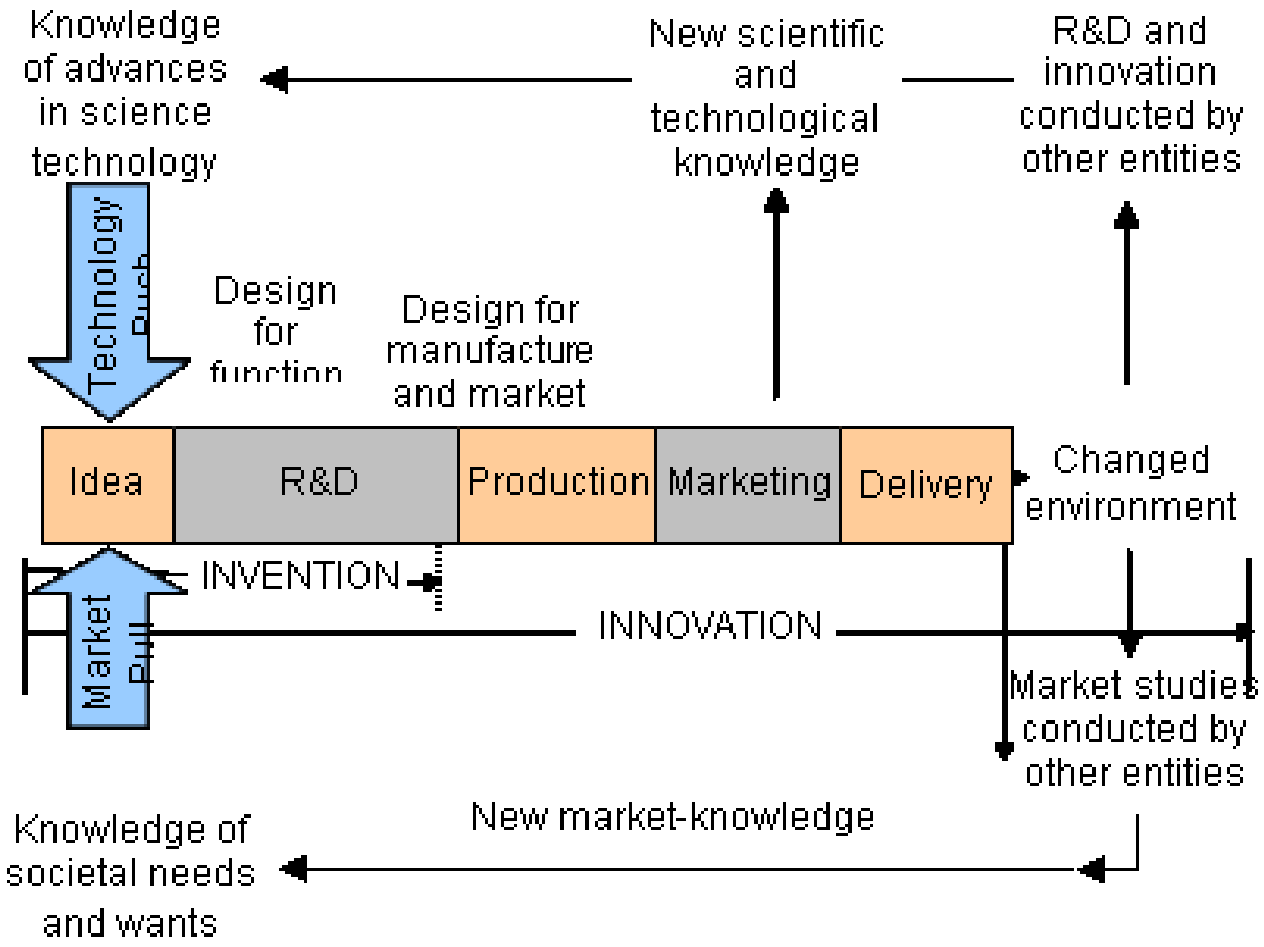


Figure 1.7 A model of new product development (NPD).

What is innovation (I)?

I = New ways of delivering customer value

I = Market insight + Technological Know-how

I = Invention + Commercial Exploitation

I = Creativity × Risk taking <firm level>)

I = aF(Creativity, Knowledge)^n <societal level>

Balance between desire/need for innovation & resistance to the same

Maturity level of the frameworks put in place to exploit innovation

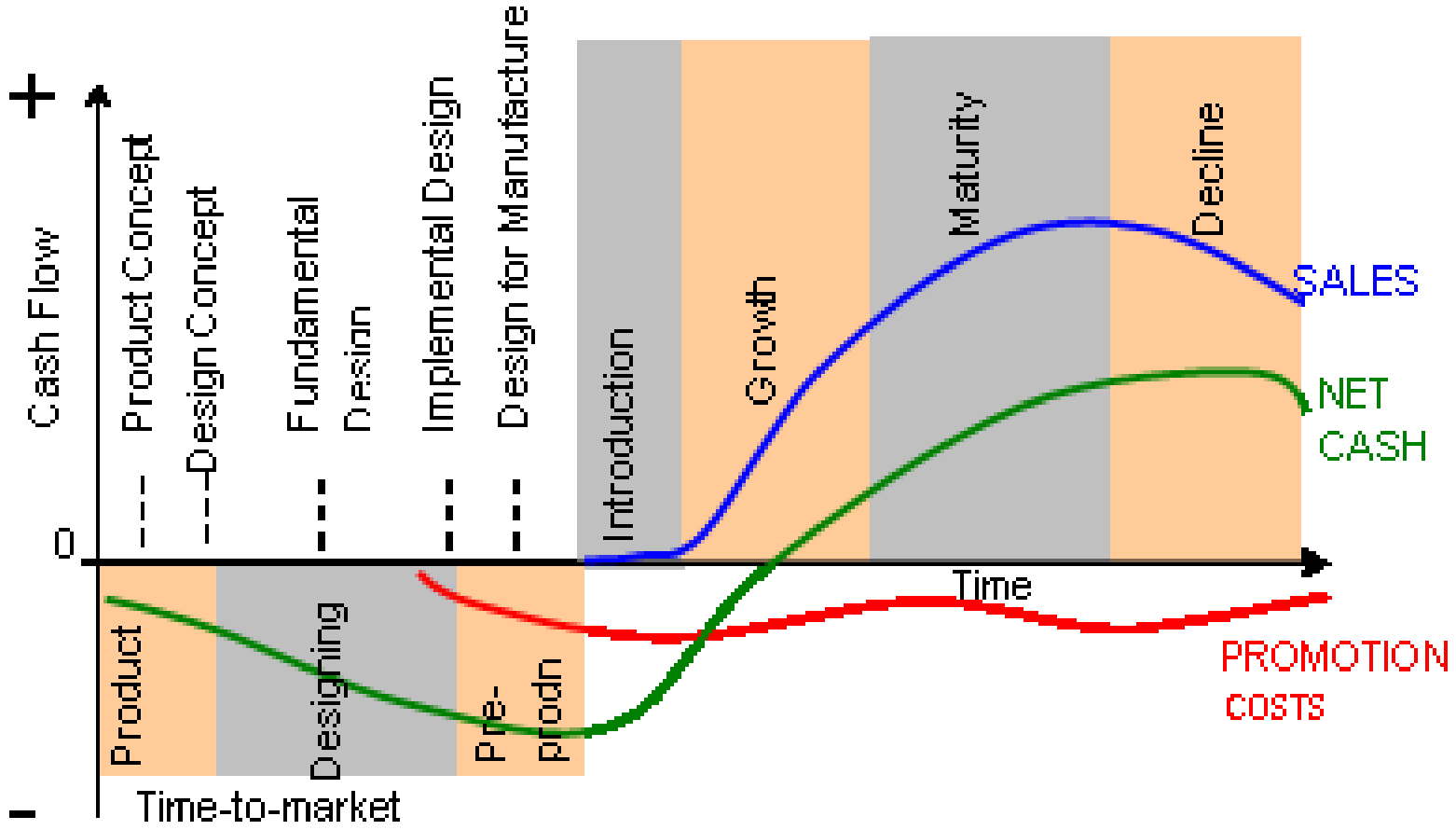
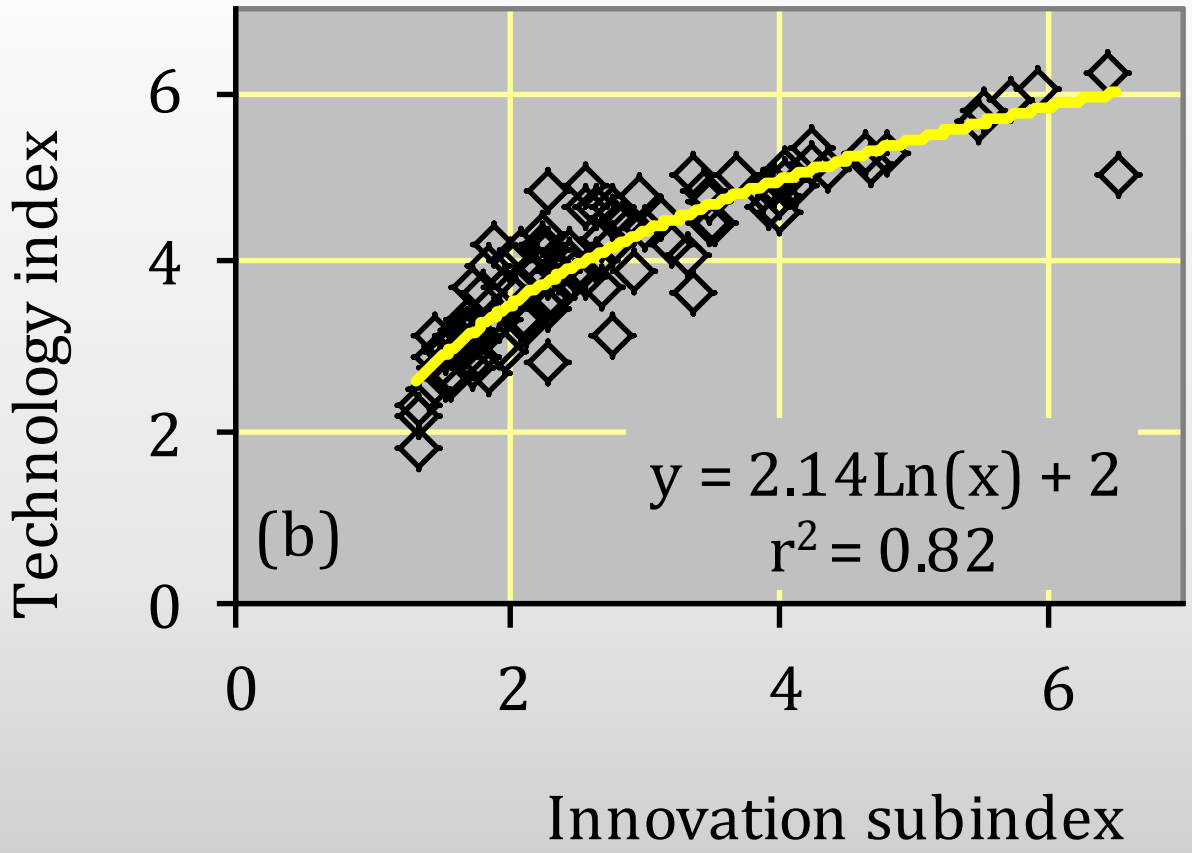


Figure 1.8 Product life cycle.

Whatever your professional capacity, you can contribute to I

- Scientific gatekeeper
- Inventor
- Process, product, service champion
- R&D strategist
- R&D sponsor
- Project manager
- Problem solver
- Business sponsor
- Process user gatekeeper
- Product user gatekeeper
- Quality controller
- Top management


Technology index
6
4
2
0
0
2
4
6
(b)
y = 2.14Ln(x) + 2
r2 = 0.82
Innovation subindex

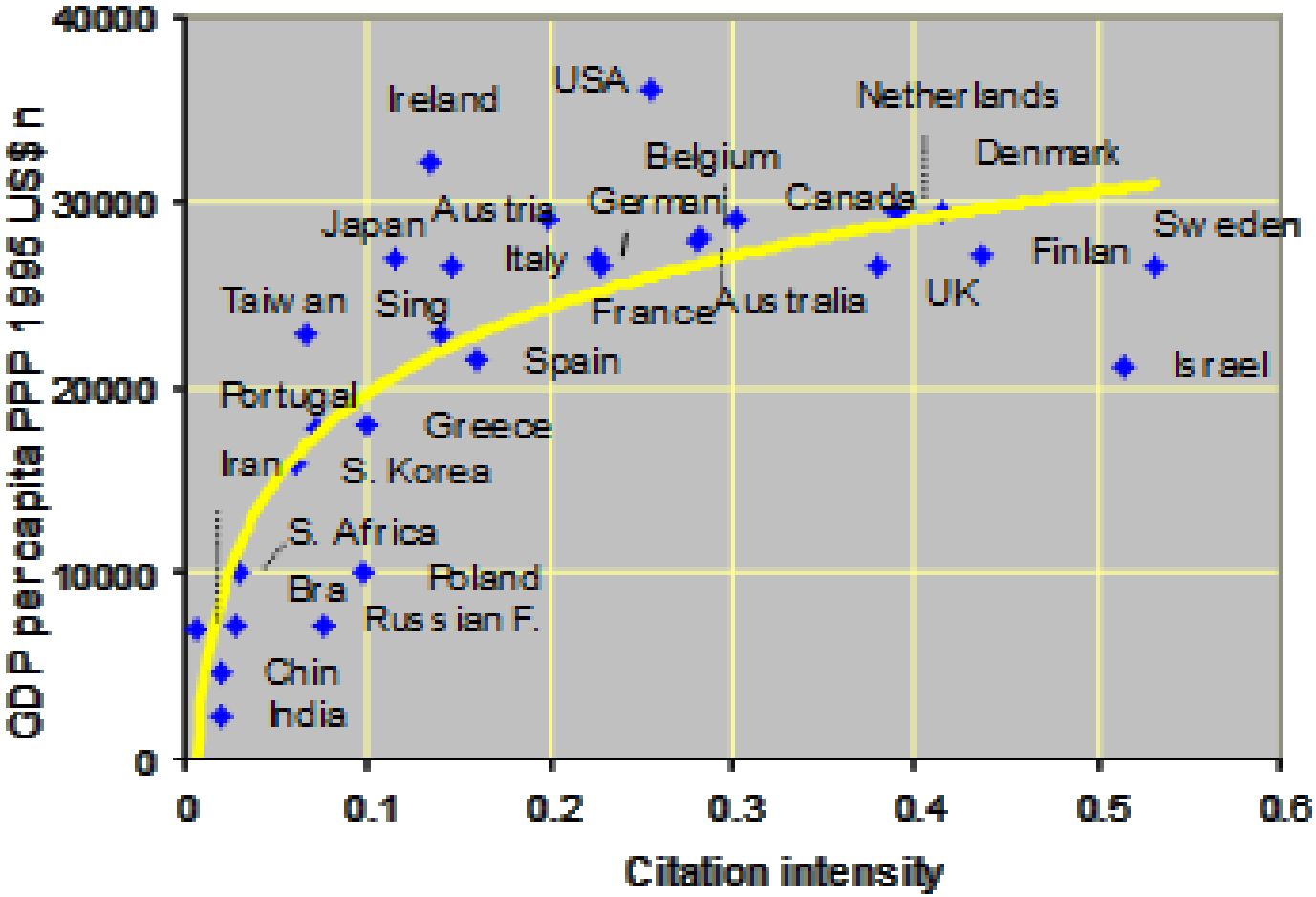
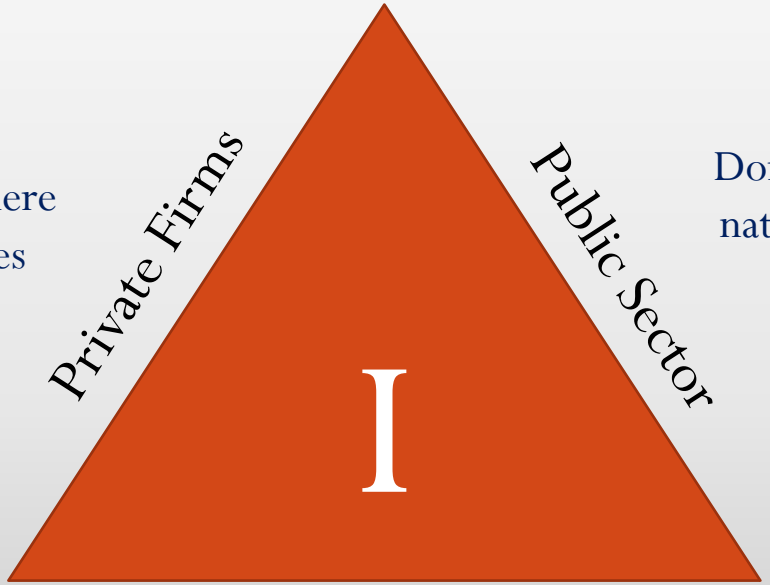


Figure 7.8 Impact of scientific capability on wealth intensity, data from (King, 2004).

Table 7.2 Exponential regression results related to the influence of major socioeconomic factors on national prosperity.			
Exponential regression: $y = ae^{bx}$ y = GDP per capita PPP 2007 US$[1] x	a	b	r^2
Technology Index[1] (Figure 1.4a)	861	1.10	0.77
Innovation Sub-index[1]	880	0.75	0.62
Networked Readiness Index[2]	55	1.27	0.71
Basic Requirements Score[2]	14.9	1.42	0.78
Efficiency Enhancers Score[2]	15.5	1.54	0.68
Innovation and Sophistication Score[2]	100	1.18	0.49
Global Competitiveness Score[2] (Figure 7.7)	8.5	1.66	0.73
Voice & Accountability Index[3] (Figure 7.13)	6729	0.70	0.29
Political Stability & Absence of Violence and Terrorism Index[3]	6704	0.87	0.39
Government Effectiveness Index[3]	6451	1.11	0.66
Regulatory Quality Index[3]	6418	1.06	0.59
Rule of Law Index[3]	6748	1.04	0.58
Control of Corruption Index[3]	6547	0.99	0.55
[1](UNDP, 2009); [2](WEF, 2009); [3](Kaufmann et al., 2009)			

Parties Contributing to Innovation

Have existed everywhere since the feudal times



Dominated in socialistic nations during much of the last century

Small entrepreneurial firm

Some 67% of inventions and 95% of radical innovations made in the U.S. since 1945 came from these

Is an entrepreneur is different from a manager

(Part III, Table 18.1)

Bureaucratic Manager	Entrepreneur
How can I improve the efficiency of my operations?	Where is the opportunity?
What opportunity is thus important?	How do I exploit it?
What resources do I control?	What resources do I need?
How can I minimize the impact of others on my ability to perform?	How do I gain capital control over them?
What structure determines our organization's relationship to its market?	What structure is best to exploit the opportunity?

Who is an entrepreneur?

- *Entreprendre* = between-taker (in French)
- "Get-rich-quick fast-buck artist" (outside US)
- One who starts his/her own, new, and small business to create a new satisfaction or new consumer demand

This one is NOT an entrepreneur

- Mainly engages in rent-seeking
- Functions on the fringes of law
- Engages in ethically acceptable behavior

He/she is an *evasive* entrepreneur

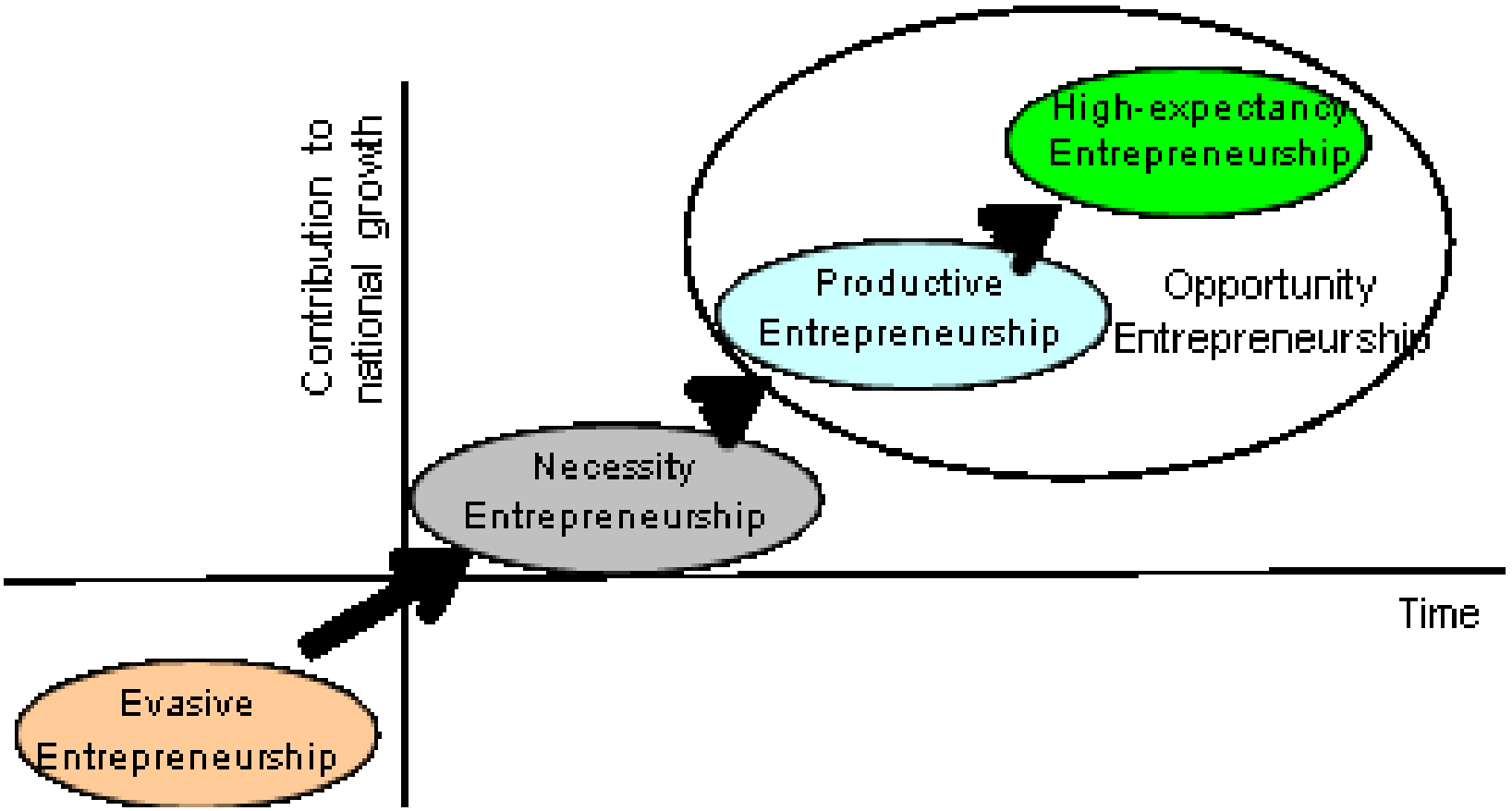


Figure 18.11 National entrepreneurial development (GEM, 2005a).

Don’t give fish. Don’t give a fishing rod. Transform the fishing business.

- “A *social entrepreneur* is someone who recognizes a social problem and uses entrepreneurial principles to organize, create, and manage a venture to make social change
- Business entrepreneurs seek profits. Social entrepreneurs seek to generate social value.

Benefits derivable by the individuals engaging in entrepreneurship

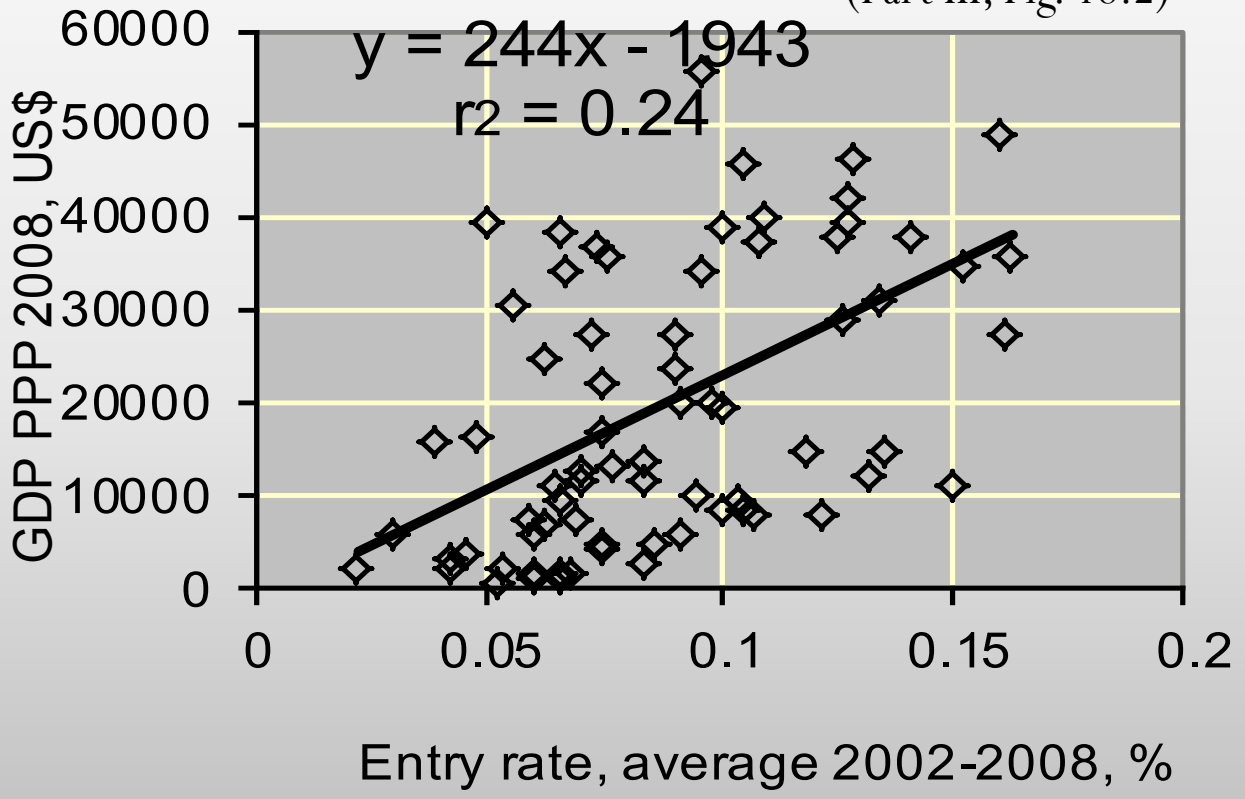
- You can obtain enormous personal financial gain although the risks can also be high.
- You will have self-employment, own bossing, greater job satisfaction, greater decision-making, freedom from dependency on job provided by others, and so forth.
- You have the satisfaction of providing employment for others, often in better jobs.
- Ability to have great accomplishments.
- You may enjoy significant tax advantages.

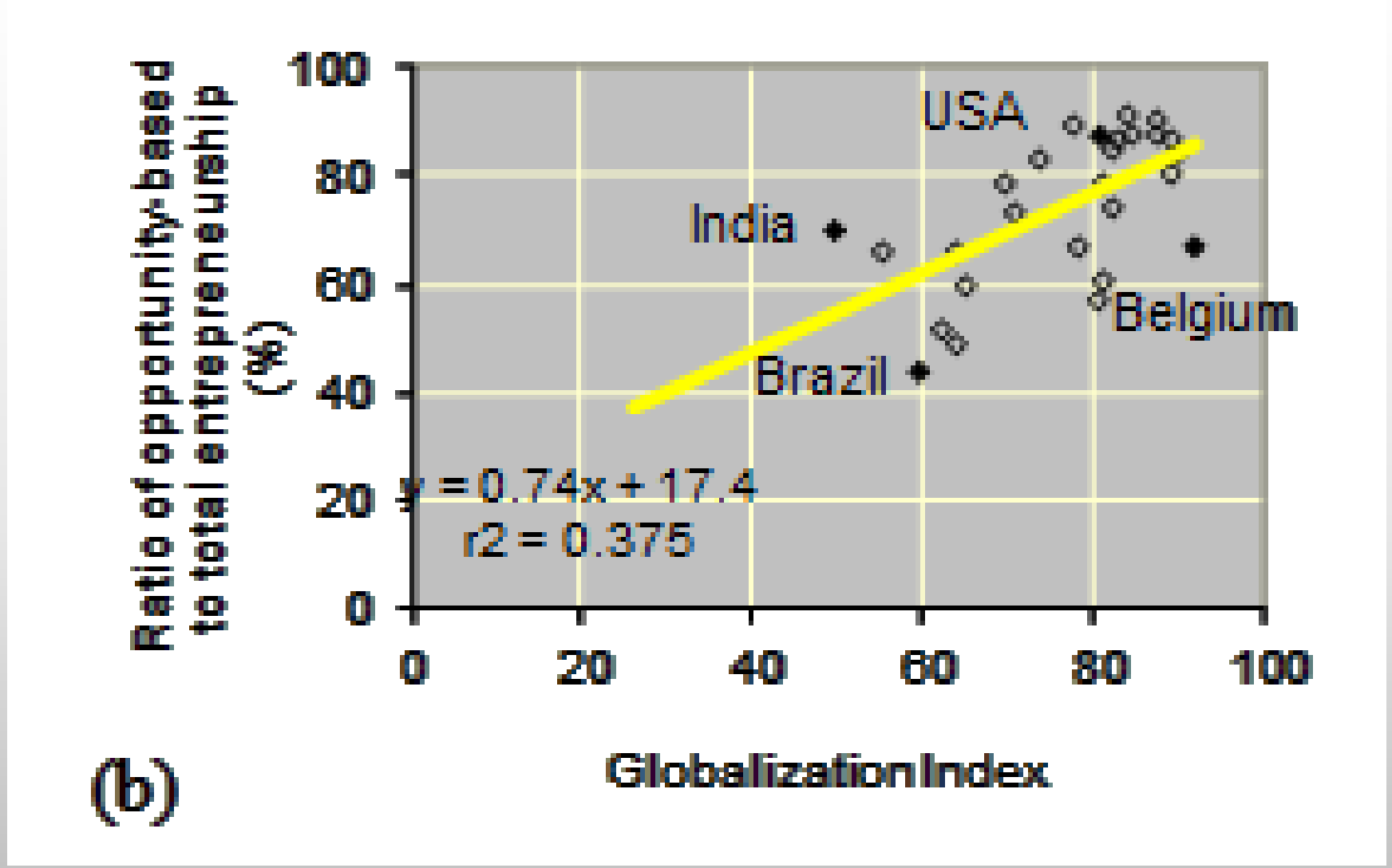
Benefits accruable to countries encouraging entrepreneurship

- Incomes increase owing to economic growth
- Higher quality products because of increased healthy competition
- More goods and services become available
- New markets get developed
- Productivity is enhanced in the small-scale sector owing to the increased use of modern technology
- More R&D is encouraged
- Rural areas get rejuvenated through imaginative activities undertaken by locals.
- The informal ('black') economy becomes weaker
- There is reduced emigration of talent

Entrepreneurship and the Economy

(Part III, Fig. 18.2)





(Part III, Fig. 18.14)

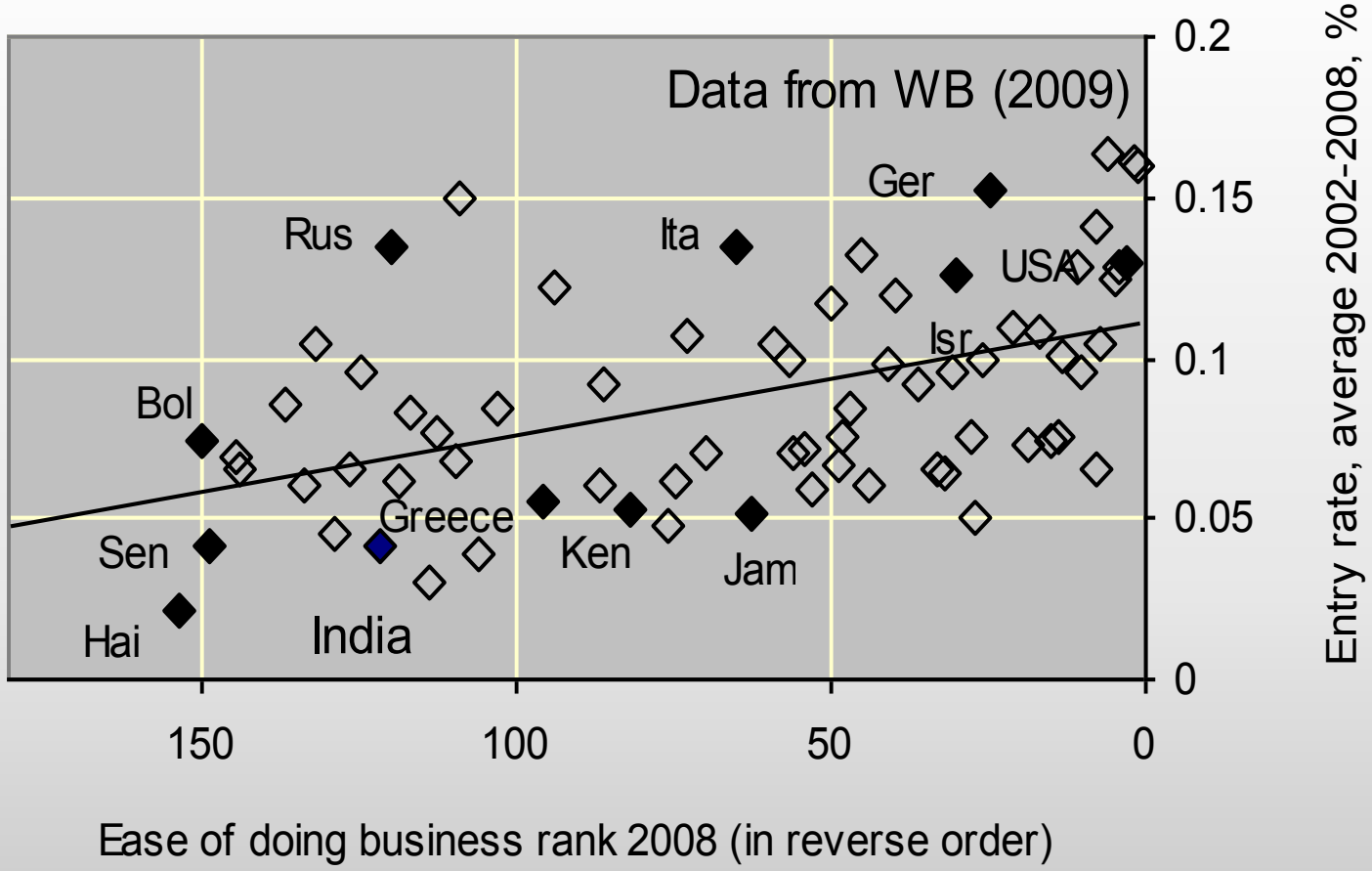


Figure 18.10 Impact of ease of doing business on new business formation.

Factors affecting ease of doing business (WB)

- Starting a business: procedures, time, cost and paid-in minimum capital to open a new business.
- Dealing with construction permits: procedures, time and cost to obtain construction permits, inspections and utility connections.
- Employing workers: difficulty of hiring index, rigidity of hours index, difficulty of firing index, firing cost.
- Registering property: procedures, time and cost to transfer commercial real estate.
- Getting credit: strength of legal rights index, depth of credit information index.
- Protecting investors: strength of investor protection index, extent of disclosure index, extent of director liability index, and ease of shareholder suits index.
- Paying taxes: number of tax payments, time to prepare and file tax returns and to pay taxes, total taxes as a share of profit before all taxes borne.
- Trading across borders: documents, time and cost to export and import.
- Enforcing contracts: procedures, time and cost to resolve a commercial dispute.
- Closing a business: recovery rate in bankruptcy.

Table 18.2 The cultural profiles of a selection of countries (Hofstede data).				
	PDI	II	MI	UAI
Australia	36	90	61	51
China	80	20	66	40
India	77	48	56	40
Malaysia	104	26	50	36
U.K.	35	89	66	35
Brazil	69	38	49	76
HKSAR	68	25	57	29
Israel	13	54	47	81
Pakistan	55	14	50	70
U.S.	40	91	62	46

How can organizations reduce power distance and promote individualism?

- Go for a flat organizational structure.
- Do not shy away from placing a young person in charge of potentially 'star' projects, i.e., those with a large content of innovation
- Replace seniority-based promotions with performance-based ones,
- Do not punish failure. Celebrate it.
- Respect the individualism of people in your organization. Do not emphasize standardization of procedures.
- Do not be perturbed when people leave. Staff turnover has its own advantages.

Further tips for educational institutions

- Do not focus on the quantity of knowledge supposedly transferred. Focus on developing the ability to learn to learn.
- Learning can be fun. Encourage 'fun' within the classrooms.
- Do not strive to make everyone an A-student.
- Let students organize their own group activities autonomously. Do not over-advise.
- Let students experiment with their own ideas. Do not invoke lack of precedent when a new idea is presented.
- Establish an entrepreneurship-development unit. Put at the helm a young person who can communicate with students. Do not encumber unit-members with undue evaluation procedures. But put a time limit on the time they can spend within the unit incubating their ventures. Support them by providing them with the institution's external (industrial) contacts.