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## Lecture 5

- 1. Terms of Trade Theory**
- 2. Product Life Cycle Theory**
- 3. Schumpeter's Creative Destruction Theory**
- 4. Role of Innovation in International Trade**

# 1. Terms of Trade Theory

**The ToT is the ratio of the average price of exports to the average price of imports:**

$$ToT = \frac{\text{average price of exports}}{\text{average price of imports}}$$

relative price of exports in **terms** of imports

**Example: (two countries and two commodities)**

**Assume that Finland and Russia trade only mobile phones (Finland) and oil (Russia):**

**One mob phone = USD 300**

**One barrel oil = USD 100**

**ToT Finland =  $300/100 = 3$  → One phone buys 3 barrels oil**

**ToT Russia =  $100/300 = 0.33$  → One barrel oil will buy 0.33 mob phones.**

Suppose price of barrel oil ↓ to USD 50:

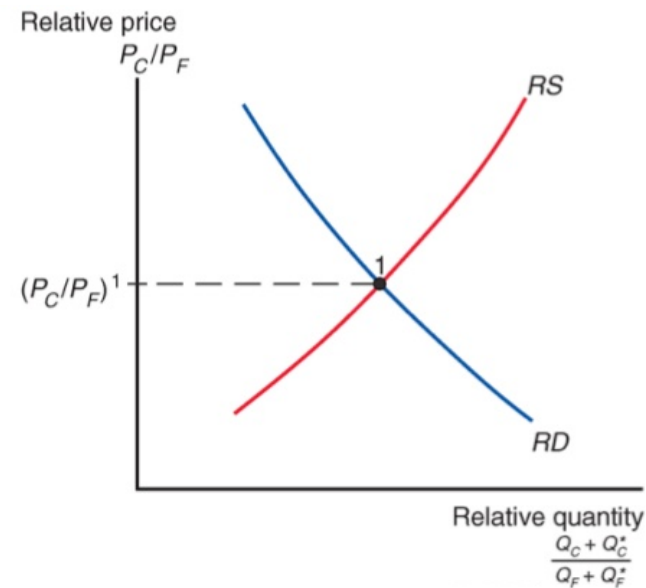
ToT Fin =  $300/50 = 6.00$  (↑) **Improvement** of ToT

ToT Rus =  $50/300 = 0.17$  (↓) **Deterioration** of ToT

**A country will gain from a change in its ToT if it can ↑ its X revenues or if it can ↓ its M expenditures. In both cases current account improves.**

**Terms of trade can change do to: change in relative supply (for example new technology of oil extracting) or in relative demand (for example change in consumer tastes)**

Relative supply and demand



5-16

# Multi-commodity multi-country model

$$\frac{p_x^c q_x^0}{p_x^0 q_x^0} / \frac{p_m^c q_m^0}{p_m^0 q_m^0}$$

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$$P_P = \frac{\sum(p_{c,t_n} \cdot q_{c,t_n})}{\sum(p_{c,t_0} \cdot q_{c,t_n})}$$

$p_x^c$  = price of exports in the current period

$q_x^0$  = quantity of exports in the base period

$p_x^0$  = price of exports in the base period

$p_m^c$  = price of imports in the current period

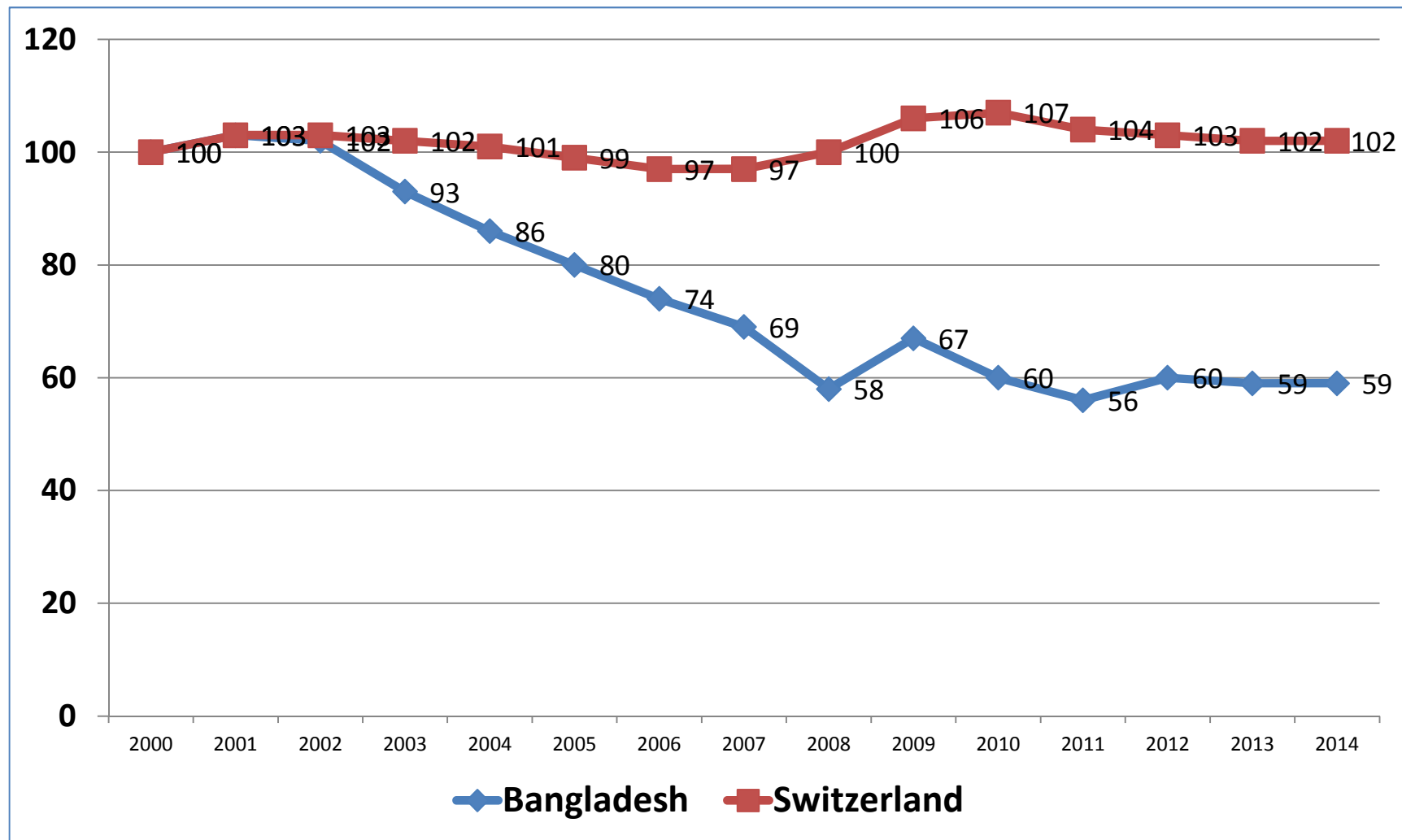
$q_m^0$  = quantity of imports in the base period

$p_m^0$  = price of imports in the base period

$$\text{ToT}_{\text{ind}} = \text{PX}_{\text{ind}} / \text{MX}_{\text{ind}}$$

Basically: Export price over Import price times 100 - if the percentage is over 100% then your economy is doing well (Capital Accumulation). If the percentage is under 100% then your economy is not going well (More money going out than coming in).

## ToT Index of Bangladesh and Switzerland (2000 – 2014)



## Criticism:

1. Terms of trade calculations do not tell us about the volume of the countries' exports and imports. But to understand how a country's trade gains changes, it is necessary to consider changes in the volume of trade, changes in productivity and resource allocation, and changes in capital flows.
2. Terms of trade should be considered together with the exchange rate index. A country with good terms of trade results could lose GDP due to the declining value of the national currency and the opposite.
3. In the real world of over 200 nations trading hundreds of thousands of products, terms of trade calculations can get very complex. Thus, the possibility of errors is significant.

## 2. Product Life Cycle Theory

- The product life-cycle theory is an economic theory that was developed by Raymond Vernon
- The intent of his International Product Life Cycle model (IPLC) was to advance trade theory beyond David Ricardo's static framework of comparative advantages
- The product life cycle explains how trade patterns change overtime

**Raymond Vernon** (1913-1999)  
American economist, a professor  
at Harvard University



Vernon



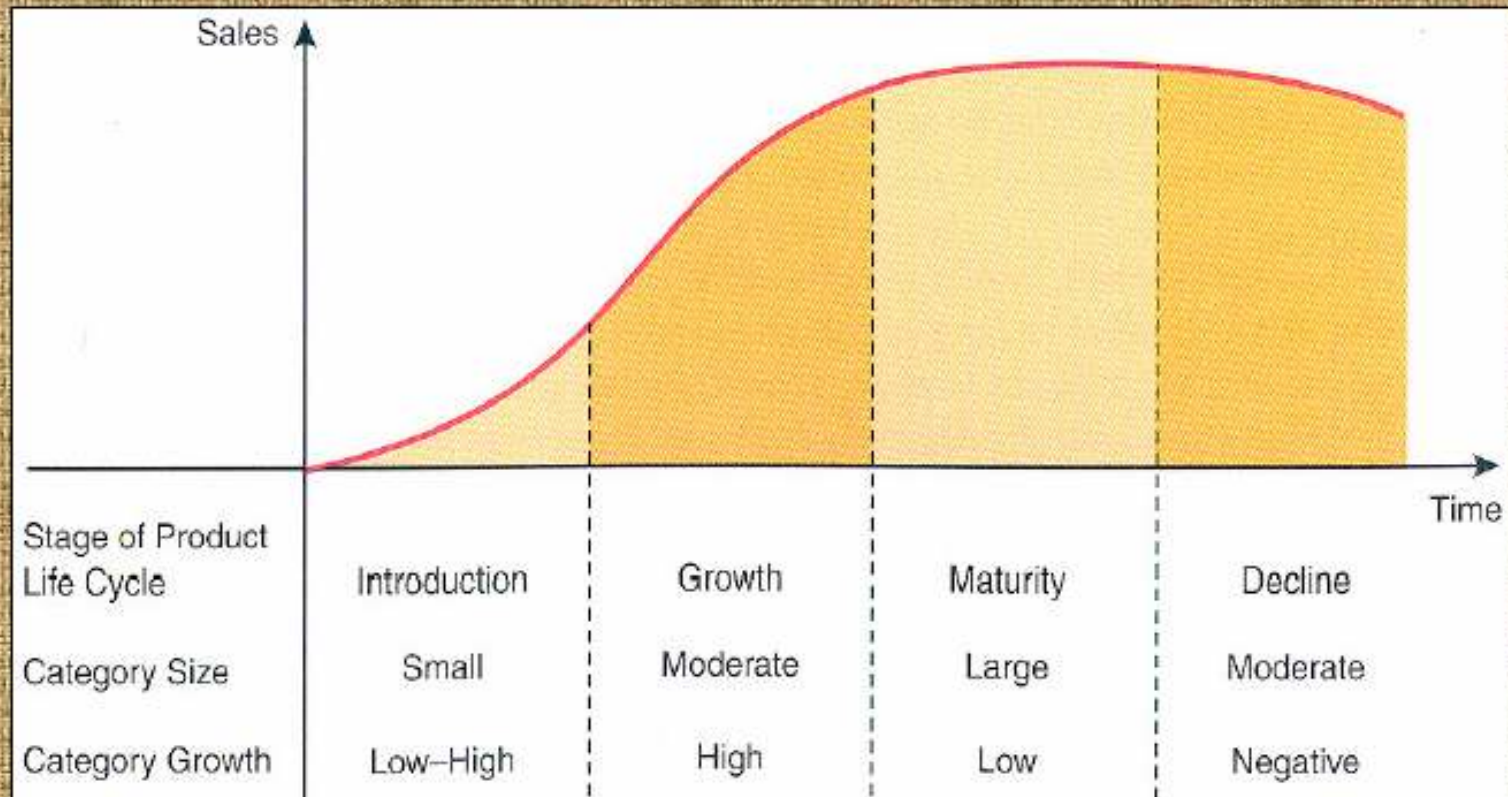
## The microeconomic approach to the explanation of contemporary International trade

- Raymond Vernon initially proposed the product life-cycle theory in the mid-1960s
- Vernon's theory was based on the observation that for most of the 20th century a very large proportion of the world's new products had been developed by U.S. firms and sold first in the U.S. market  
*(e.g., mass-produced automobiles, televisions, instant cameras, photocopiers, personal computers, and semiconductor chips)*
- To explain this, Vernon argued that the wealth and size of the U.S. market gives U.S. firms a strong incentive to develop new consumer products. In addition, the high cost of U.S. labor gives U.S. firms an incentive to develop cost-saving process innovations



## Product Life Cycle

# Product Life Cycle



**Introduction  
and Growth  
Stages:**

**Product  
manufactured  
in Developed  
countries;**

**Exports to  
Developing  
countries**

**Sales**

**Early  
Maturity:**

**Production  
moves to  
Developing  
countries;**

**Begins to  
import into  
Home  
country**

**Late  
Maturity**

**Developing  
Country  
Exports  
Product  
To Home  
Country;**

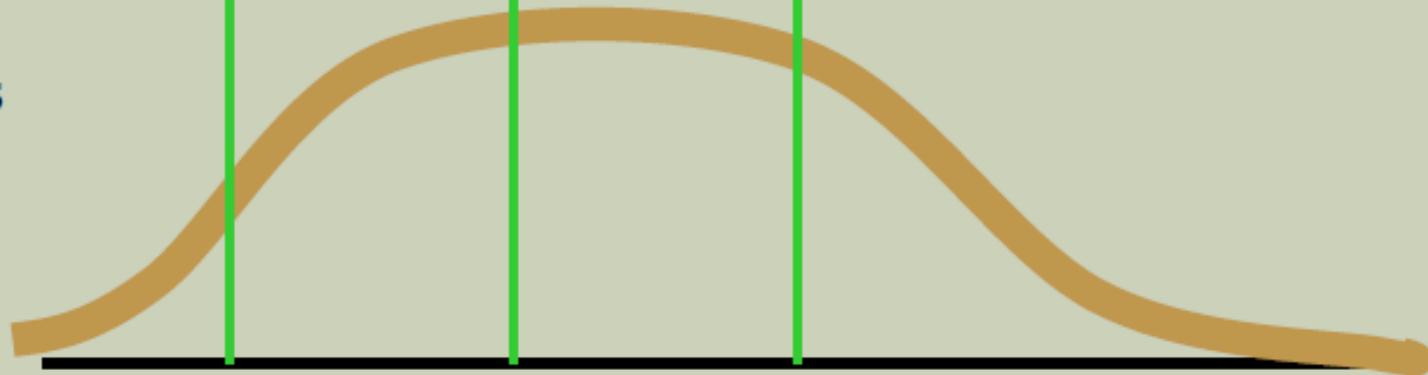
**Competes  
With Imports**

**Decline**

**Developing Country  
Markets Remain Viable  
Target Markets;**

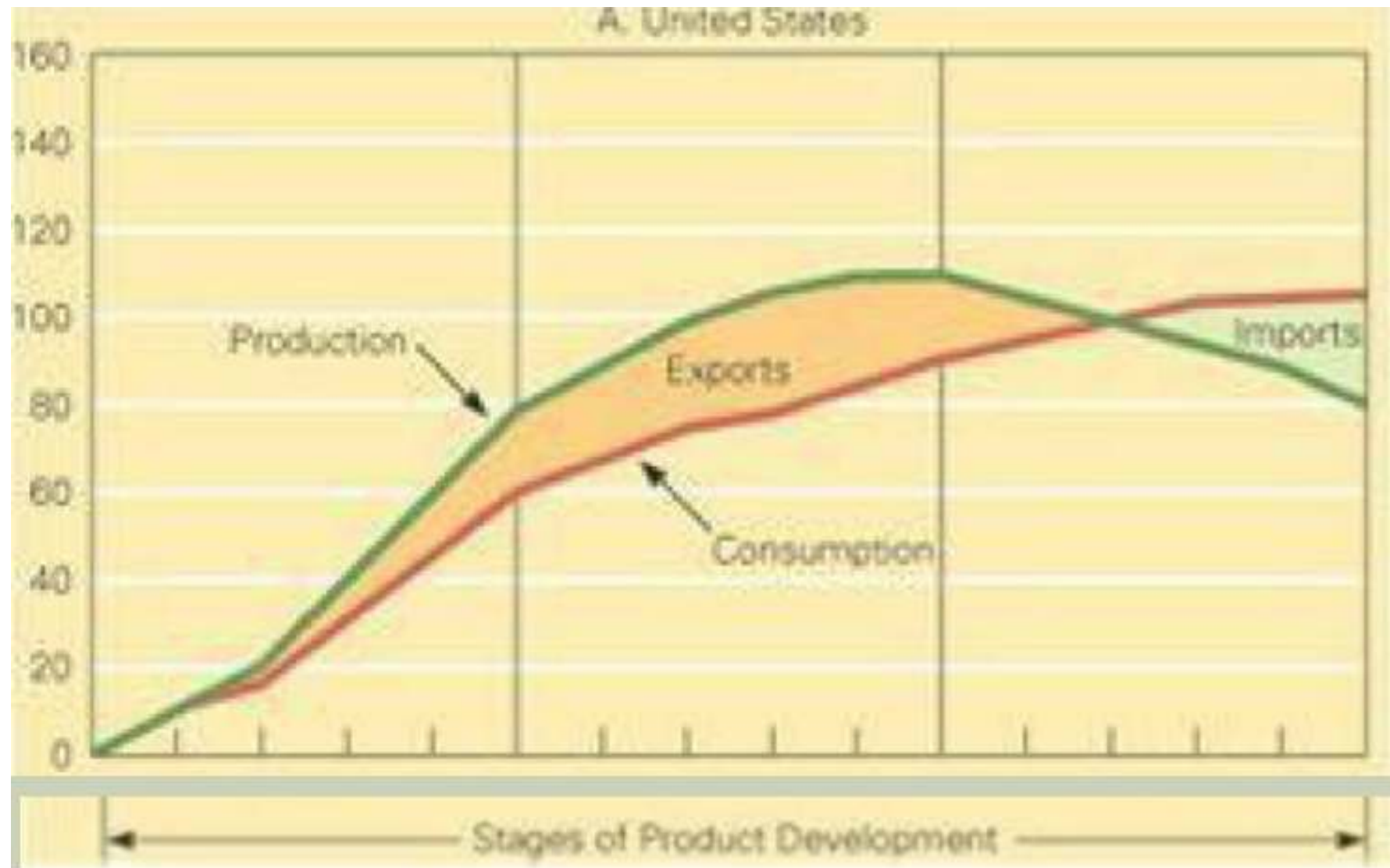
**Home Country Market Is  
Diminishing**

**Time**





- As the market in the US and other advanced nations matures, the product becomes **standardized**, and price becomes the main competitive weapon
- Cost considerations start to play a greater role in the competitive process. Producers based in advanced countries **where labor costs are lower** than in the US (e.g., Italy, Spain) might now be able to export to the United States
- If cost pressures become intense, the cycle by which the US lost its advantage to other advanced countries might be repeated once more, as **developing countries** (e.g., Thailand) begin to acquire a production advantage over advanced countries
- Thus, the locus of global production initially switches from the US to other advanced nations and then from those nations to developing countries
- The United States switches from being an exporter to an **importer**
  - New product development in a country does not occur by chance. A country must have a ready market, an able industrial capability and enough capital or labour to make a new product flourish. Countries with high per capita incomes foster newly invented products. Countries with lower per capita incomes will focus on adapting existing products to create lower priced versions.



## LIFE CYCLE STAGE

	1: INTRODUCTION	2: GROWTH	3: MATURITY	4: DECLINE
Production location	<ul style="list-style-type: none"> <li>• In innovating (usually industrial) country</li> </ul>	<ul style="list-style-type: none"> <li>• In innovating and other industrial countries</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple countries</li> </ul>	<ul style="list-style-type: none"> <li>• Mainly in developing countries</li> </ul>
Market location	<ul style="list-style-type: none"> <li>• Mainly in innovating country, with some exports</li> </ul>	<ul style="list-style-type: none"> <li>• Mainly in industrial countries</li> <li>• Shift in export markets as foreign production replaces exports in some markets</li> </ul>	<ul style="list-style-type: none"> <li>• Growth in developing countries</li> <li>• Some decrease in industrial countries</li> </ul>	<ul style="list-style-type: none"> <li>• Mainly in developing countries</li> <li>• Some developing country exports</li> </ul>
Competitive factors	<ul style="list-style-type: none"> <li>• Near-monopoly position</li> <li>• Sales based on uniqueness rather than price</li> <li>• Evolving product characteristics</li> </ul>	<ul style="list-style-type: none"> <li>• Fast-growing demand</li> <li>• Number of competitors increases</li> <li>• Some competitors begin price cutting</li> <li>• Product becoming more standardized</li> </ul>	<ul style="list-style-type: none"> <li>• Overall stabilized demand</li> <li>• Number of competitors decreases</li> <li>• Price is very important, especially in developing countries</li> </ul>	<ul style="list-style-type: none"> <li>• Overall declining demand</li> <li>• Price is key weapon</li> <li>• Number of producers continues to decline</li> </ul>
Production technology	<ul style="list-style-type: none"> <li>• Short production runs</li> <li>• Evolving methods to coincide with product evolution</li> <li>• High labor input and labor skills relative to capital input</li> </ul>	<ul style="list-style-type: none"> <li>• Capital input increases</li> <li>• Methods more standardized</li> </ul>	<ul style="list-style-type: none"> <li>• Long production runs using high capital inputs</li> <li>• Highly standardized</li> <li>• Less labor skill needed</li> </ul>	<ul style="list-style-type: none"> <li>• Unskilled labor on mechanized long production runs</li> </ul>



## Criticism:

1. Too US-centric. Perhaps this was normal in the 1950' and early 1960' but not now in the time of polycentric innovation activities.
2. Ignores the enormous importance of the exports of capital and the connected with it transfer of knowledge.

3.

■ The relation between the organization and the country level was not well structured. Vernon emphasized the country level. Furthermore, he used the product side of the product life cycle, not the consumer side, thereby stressing the supply side. Selling 'older' products to a lesser developed market does not work if transportation costs for imports is low and information is accessible globally through the Internet and satellite TV.

Q: Can you find some other limitations?

### 3. Shumpeter's Creative Destruction Theory

Creative destruction refers to the incessant product and process innovation mechanism by which new production units replace outdated ones. It was coined by Joseph Schumpeter (1942), who considered it 'the essential fact about capitalism'.

**Creative destruction is a process through which something new brings about the demise of whatever existed before it.**

**The term is used in a variety of areas including economics, corporate governance, product development, technology and marketing.**

**One frequently cited example is the smartphone, which all but killed the market for not only regular cell phones but also PDAs, MP3 players, point-and-shoot cameras, wrist watches, calculators and voice recorders -- among other things.**



1883 – 1950

Born in Triesch, Moravia,  
Austria-Hungary  
(now Třešť, Czech Republic)



## 4. Role of innovation in the international trade

Schumpeter identified innovation as the critical dimension of economic change.

He argued that economic change revolves around innovation, entrepreneurial activities, and market power. He sought to prove that innovation-originated market power can provide better results than the invisible hand and price competition.

He argues that technological innovation often creates temporary monopolies, allowing abnormal profits that would soon be competed away by rivals and imitators.

These temporary monopolies were necessary to provide the incentive for firms to develop new products and processes.

These temporary monopolies are the most important contemporary form of competitive advantages!

**Q: Why are those monopolies only possible for a limited time?**

# The 4 Types of Innovation

**Product innovation** is the introduction of new or significantly improved products or services. It is related to a significant change in its technical specification, components, materials, software, user interface or other functional characteristics.

**Process innovation** means the implementation of a new or significantly improved production or delivery method.



**Marketing innovation** refers to the implementation of new marketing methods, involving significant improvements on product or package design, price, placement and promotion.



**Organisational innovation** means the implementation of a new organisational method in the undertaking's business practices, workplace organisation or external relations.



# International Innovation Index

